Chapter IV. Bull Trout Biological Opinion

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A. CONTEXT OF THE PROPOSED ACTION FOR BULL TROUT

The Kootenai National Forest (KNF) 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 2013a).

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), 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). 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). 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 Kootenai 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	2 of 23 management units in the Columbia River Interim Recovery Unit
Core Areas Lower Clark Fork River; Kootenai River, Bull Lake, Lake Koocanusa	1 of 35 core areas in the Clark Fork River Basin; 3 of 4 core areas in the Kootenai 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.

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 either the Clark Fork River Basin or the Kootenai River

Basin 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 Kootenai National Forest Revised Forest Plan.

Name	Hierarchical Relationship
Critical Habitat Units Clark Fork River Basin Kootenai River Basin	2 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 Kootenai National Forest (KNF). The KNF contains bull trout habitat in 4 core areas in two management units. The KNF supports bull trout habitat in the Clark Fork management unit in the Lower Clark Fork River core area and in the Kootenai River management unit in the Bull Lake, Kootenai River, Lake Koocanusa core areas. 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 KNF 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 definition of RHCAs and the list of the standards and guidelines included in INFISH please refer to USFS 2013a, Glossary and Appendix A, respectively.

The INFISH strategy was designed to provide protection for native fish and has been the primary aquatic conservation strategy for the KNF 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 2013a). 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. KNF Management Areas and Acreages.

MA	Management Area Name	Acres	Percent
1a	Wilderness	93,700	4.2
1b	Recommended Wilderness	110,200	5.0
1c	Wilderness Study Areas	34,100	1.5
2	Eligible Wild and Scenic Rivers	43,700	2.1
3	Botanical, Geological, Historical, Recreational, Scenic or Zoological Areas	31,600	1.4
4	Established and Recommended Research Natural Areas	8,400	0.4
5a	Backcountry – Non-motorized summer and winter	227,600	10.3
5b	Backcountry – Motorized summer and winter	163,800	7.4
5c	Backcountry – Non-motorized summer, motorized winter	86,100	3.9
6	General Forest	1,403,900	63.3
7	Primary Recreation Areas	12,400	0.6
	Total NFS lands	**2,219,100**	

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 22 conservation and 15 (12 active and 3 passive) restoration subwatersheds on the Forest, related to bull trout (see Section 3). Long-term persistence of aquatic species is dependent upon restoring watershed processes that create and maintain habitats across stream networks (Rieman et al. 2000) and the use of ecologically compatible land use polices that ensure the long-term productivity of aquatic and riparian ecosystems (Thurow et al. 1997). 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 re-establish 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, 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 2013a). 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-3 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). 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).

Until the Service completes recovery planning for bull trout, the Forest recognizes the need for a strategy to conserve and recover bull trout. For that reason, the USFS with the participation of the Service, has developed the Western Montana Bull Trout Conservation Strategy (BTCS) (USFS 2013b), which will be used to inform baseline data needs and management direction as it relates to bull trout and designated critical habitat on the KNF. The BTCS fits with the Revised Plan’s stated goal (Goal-05 - Aquatic Species) to contribute to the recovery of threatened and endangered aquatic species.

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

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	**FW-GDL-AQS-02**.	When conducting management activities and fire suppression, all

Bull Trout Management Need	Element Code	Element Description
quality.		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 and located away from spawning areas to prevent entrainment of fish and aquatic organisms. During the spawning season for native fish, pumping sites should be located away from spawning gravels. Drafting equipment should be cleaned and inspected for aquatic invasive species prior to use in a water body.
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. Short-term effects from activities in the RHCAs may be acceptable when those activities support long-term benefits to the RHCAs and aquatic resources.
Complex stream channels.	**FW-STD-RIP-02.**	When RHCAs are not intact and not functioning at desired condition, management activities shall include restoration components that compensate for project effects to promote a trend toward desired conditions. Large-scale restoration plans or projects that address other cumulative effects within the same watershed may be considered as compensatory components and shall be described during site-specific project analyses.
Cold and clean water quality and complex stream channels and well-connect habitat.	**FW-STD-RIP-03.**	The INFISH direction in the Decision Notice (USFS 1995) and terms and conditions in the Biological Opinion (USFWS 1998) shall be applied, with the following clarifications: INFISH Priority Watersheds have been added to and adapted into Conservation and Restoration Watersheds; The description of Standard Widths Defining Interim RHCAs is consistent for all Category 4 streams or water bodies: The area from the edges of the stream channel, wetland, landslide, or landslide-prone area to a distance equal to the height of one site-potential tree, or 100 feet slope distance, whichever is greatest; Site-specific widths can be changed (increased where necessary to achieve management goals and objectives, or decreased where interim widths are not needed to attain RMOs or avoid adverse effects) and requires documentation of rationale supporting the change, but does not require watershed analysis or an amendment; and

Bull Trout Management Need	Element Code	Element Description
		These INFISH "standards and guidelines" are defined as standards: TM-1, MM-3, MM-4, MM-5, and RA-4. All others are defined as guidelines.
Cold and clean water quality.	**FW-GDL-WTR-01.**	Management activities in impaired watersheds (listed by the state under section 5 of the Integrated 303(d)/305(b) Report) with approved TMDLs are designed to comply with the TMDL. Management activities in watersheds with streams on the 303(d) list are designed to maintain or improve conditions relative to the cause for impairment and will 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.
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.**	Management activities shall maintain or improve water quality in public source water areas, and be consistent with applicable state source water protection requirements. Short-term effects from activities in source water areas may be acceptable when those activities support long-term benefits to aquatic resources.
Cold and clean water quality and complex stream channels.	**FW-GDL-SOIL-01.**	Ground-based equipment should only operate on slopes less than 40 percent, in order to avoid detrimental soil disturbance. Where slopes within an activity area contain short pitches greater than 40 percent, but less than 150 feet in length, ground-based equipment may be allowed, as designated by the timber sale administrator.
Cold and clean water quality and complex stream channels.	**FW-GDL-VEG-03.**	Vegetation management activities should retain the amounts of coarse woody debris (including logs) that are displayed in table 3. A variety of species, sizes, and decay stages should be retained. Exceptions may occur in areas where a site-specific analysis indicates that leaving the quantities listed in the table would create an unacceptable fire hazard to private property, people, or sensitive natural or historical resources. In addition, exceptions may occur where the minimum quantities listed in the table are not available for retention.
Cold and clean water quality, complex stream channels, and well-connected habitat.	**FW-GDL-SOIL-04.**	Ground-disturbing management activities on landslide prone areas should be avoided. 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.

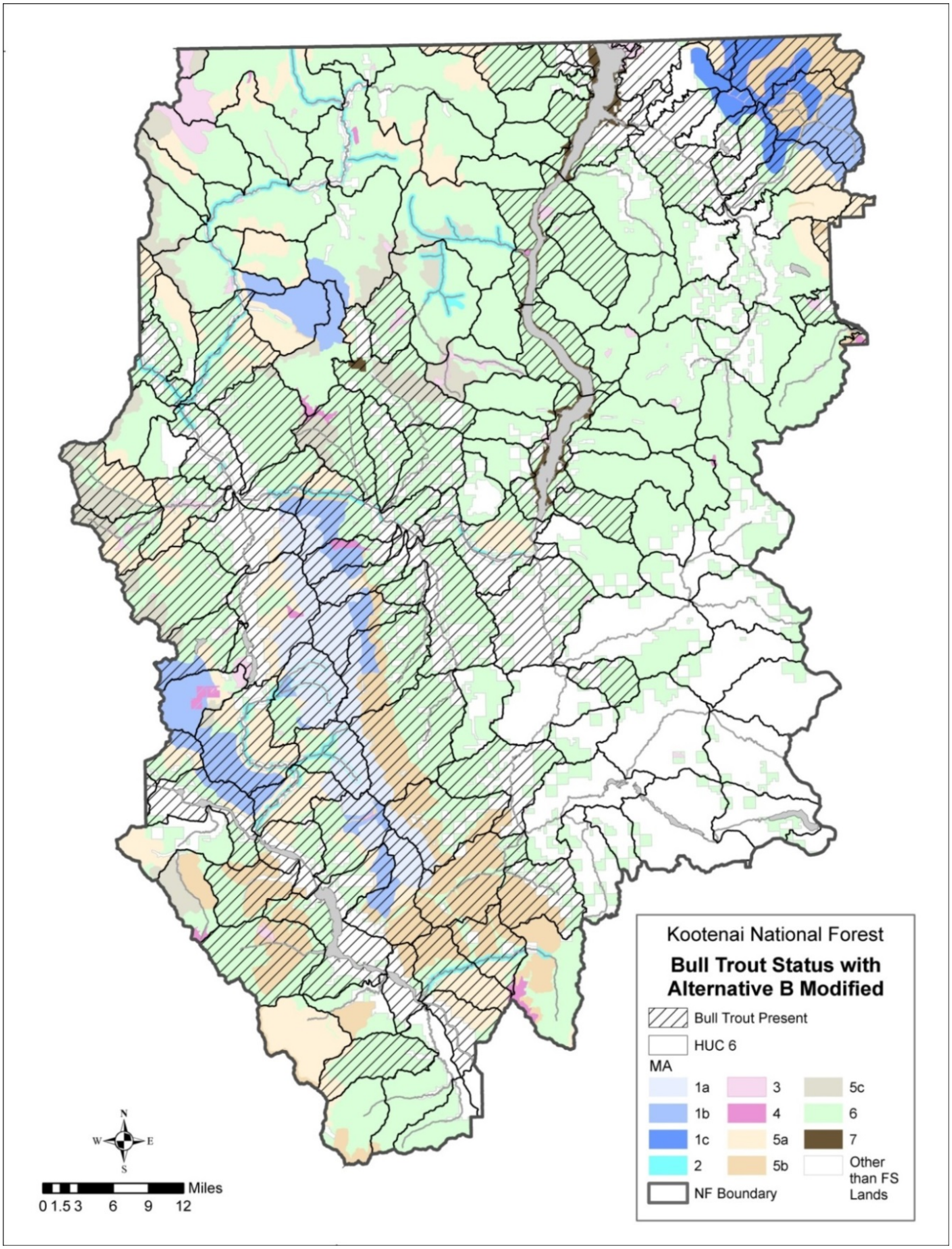

Figure IV-1. Occupied bull trout watersheds and Management Area designation under the proposed action.

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, Bond 1992, Brewin and Brewin 1997, Leary and Allendorf 1997).

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) 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). 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) 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). 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; Goetz 1989). 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; Goetz 1989), 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; Fraley and Shepard 1989; Pratt 1992; Rieman and McIntyre 1996).

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; Goetz 1989). The largest verified bull trout is a 32-pound specimen caught in Lake Pend Oreille, Idaho, in 1949 (Simpson and Wallace 1982).

Habitat Characteristics

Bull trout have more specific habitat requirements than most other salmonids (Rieman and McIntyre 1993). 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; Goetz 1989; Hoelscher and Bjornn 1989; Sedell and Everest 1991; Howell and Buchanan 1992; Pratt 1992; Rieman and McIntyre 1993, 1995; Rich 1996; Watson and Hillman 1997). Watson and Hillman (1997) 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), fish should not be expected to simultaneously occupy all available habitats (Rieman et. al 1997).

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; Gilpin 1997; Rieman et al. 1997). 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; Pratt 1992; Rieman and McIntyre 1993).

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; Rieman and McIntyre 1993; Baxter and McPhail 1997; Rieman et al. 1997). 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; Goetz 1989; Buchanan and Gregory 1997). 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) 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; Rieman and McIntyre 1993, 1995; Buchanan and Gregory 1997; Rieman et al. 1997). 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; Goetz 1989; Hoelscher and Bjornn 1989; Sedell and Everest 1991; Pratt 1992; Thomas 1992; Rich 1996; Sexauer and James 1997; Watson and Hillman 1997). Maintaining bull trout habitat requires stability of stream channels and maintenance of natural flow patterns (Rieman and McIntyre 1993). Juvenile and adult bull trout frequently inhabit side channels, stream margins, and pools with suitable cover (Sexauer and James 1997). 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; Pratt 1992; Pratt and Huston 1993). Pratt (1992) 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). Redds are often constructed in stream reaches fed by springs or near other sources of cold groundwater (Goetz 1989; Pratt 1992; Rieman and McIntyre 1996). Depending on water temperature, incubation is normally 100 to 145 days (Pratt 1992), 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; Ratliff and Howell 1992).

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). 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; 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).

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; Goetz 1989; Donald and Alger 1993). Adult migratory bull trout feed on various fish species (Leathe and Graham 1982; Fraley and Shepard 1989; Brown 1994; Donald and Alger 1993).

Population Dynamics

The draft bull trout Recovery Plan (USFWS 2002) 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). In theory, bull trout metapopulations (core areas) can be composed of two or more local populations, but Rieman and Allendorf (2001) 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 oflocal 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).

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). 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) 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). Increased habitat fragmentation reduces the amount of available habitat and increases isolation from other populations of the same species (Saunders et al. 1991). 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) and Rieman and Allendorf (2001), 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 (B.C.) and Alberta in western Canada (Rieman and McIntyre 1993). 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; 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; 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 B.C., with populations extending along the east slopes of the Rockies in Alberta and including a small area in northern Montana (Rieman et al. 1997).

Bull trout distribution has probably contracted and expanded periodically with natural climate change (Williams et al. 1997). 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; Haas and McPhail 2001; Whitesel et al. 2004).

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). Bull trout are now extirpated in California and only remnant populations are found in portions of Oregon (Ratliff and Howell 1992). 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).

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; Pratt and Huston 1993; Rieman and McIntyre 1993, 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; 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). 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); 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). Maintaining and improving habitat condition on federal lands in western Montana 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). 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.

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). 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.

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)[1]. 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.

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); 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); 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); 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; Rieman and McIntyre 1993).

[1]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.

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; Rieman and McIntyre 1993);
- 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; 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);
- 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 northwest Montana. 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, Casola et al. 2005, Dunham et al. 2007, Isaak et al. 2010). 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). 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) 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). 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). 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). The model also predicted that of the three major bull trout basins in Montana, the Clark Fork River basin is at greatest risk from climate change, followed by the Flathead and Kootenai River basins.

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, Rahel and Olden 2008, Fausch et al. 2009, 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, Isaak et al. 2010). However, the risk of climate-induced extirpation in subbasins of northwestern Montana may be less than other, relatively drier and warmer, subbasins in the Columbia River basin (Rieman et al. 2007).

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 Lower Clark Fork River core area of the Clark Fork River Management Unit and in the Kootenai River, Lake Koocanusa, and Bull Lake core areas of the Kootenai River 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 Kootenai 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 KNF. Therefore, the action area is the entire Forest (2,219,100 acres). Within the Forest, bull trout occur on portions of 779,873 acres encompassed in 4 bull trout core areas and 154 stream miles and 28,710 acres of critical habitat. 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 2013a), the Conservation Strategy for Bull Trout on USFS Lands in Western Montana (USFS 2013b), and the bull trout core area assessments and 5-year review (USFWS 2005a, 2005b).

Lower Clark Fork River Core Area

There are 36 local populations recognized by the Service in the Lower Clark Fork core area. The populations that occupy watersheds managed by the KNF include four Bull River watersheds, Rock Creek, Swamp Creek and two Vermilion River watersheds. Additional watersheds not identified by the

Service as local populations on the KNF include the West Fork Trout Creek and Marten Creek, both tributaries to Noxon Reservoir.

Bull trout densities in the Lower Clark Fork River (LCFR) core area were historically much higher than they are today. Impacts to bull trout populations in the LCFR core area began in the early part of the 20th century, and have continued through the present time. Distributions of bull trout populations are significantly restricted from historical patterns. Many large streams that once likely supported strong fluvial populations now contain few, if any bull trout. Numerous small streams that once contained healthy resident populations with a minor fluvial component now contain no bull trout. Remaining fluvial populations, however, are geographically distributed throughout the core area, which increases the potential for recovery. The proportion of fluvial to resident forms is likely much different than historical, due to the extremely low numbers of fluvial fish in the population.

Bull trout populations in the LCFR core area were first exposed to significant human-caused impacts approximately 100 years ago with the construction of Thompson Falls Dam (1916). This dam blocked upstream migration of bull trout from Lake Pend Oreille, and effectively cut off all upstream spawning habitat, affecting hundreds of miles of bull trout populations. This was the single-most significant impact to bull trout in the core area during the current era.

Numerous smaller scale impacts to bull trout gradually occurred throughout the Lower Clark Fork River valley in the early part of the 20th century as well. These included grazing and agricultural development along many of the important low gradient spawning streams, road and energy corridor development in riparian areas, and logging and road development in tributary streams. These all had impacts to bull trout and their habitats; however they were not of the same magnitude as Thompson Falls Dam.

In 1952 and 1958, respectively, Avista, formerly Washington Water Power, constructed Cabinet Gorge and Noxon Dams. These dams also blocked upstream access to 90 percent of the Clark Fork system, resulting in only a few smaller tributaries remaining to support the entire Lake Pend Oreille population. With the completion of these three dams, combined with Thompson Falls Dam, the fate of bull trout in the LCFR was cast. The once robust population was now effectively isolated into three distinct units with only downstream connectivity. As a result, the upper-most populations, isolated above Thompson Falls Dam, were affected the most in the short-term.

Over the next several decades, changes in fish species composition within the LCFR, brought about by Montana Fish, Wildlife and Parks (MFWP) stocking programs and some illegal introductions, brought an additional impact to the system. Brown trout, northern pike, smallmouth and largemouth bass, walleye, and a host of other non-native species became established in the reservoirs, creating predation and competition pressures that impacted bull trout populations.

From the 1930’s through the 1960’s, bull trout populations in the LCFR continued to decline due to a host of developments and increasing land utilization that impacted stream habitats. The Thompson River was heavily impacted by two logging roads that paralleled the stream. Many of the wide riparian valleys in key spawning tributaries like Prospect Creek, Vermilion River, and Thompson River, were impacted by grazing, logging, mining, or often a combination of these.

The 1970’s and 1980’s saw a rapid expansion of road construction and logging in areas that were, up to this time, refugia for bull trout populations. Steep slopes in the middle and upper portions of many drainages were logged, resulting in high sediment loads that exceeded the transport capacity of streams. The sediment eventually settled out in lower gradient spawning reaches and larger streams and rivers, causing systemic changes in the stream systems and aquatic communities they supported. Chronic erosion and sediment addition from the extensive road network constructed during this period still occurs

today. This period of heavy road construction also resulted in extensive fragmentation of bull trout populations at undersized culvert crossings.

By the 1990's, bull trout populations throughout much of the LCFR core area were eliminated or severely reduced. Small fluvial populations still existed in many of the larger, less developed watersheds. However, chronic impacts from existing developments, combined with climate change and a drought that caused low flows and warm water, further impacted populations. As a result, many of the streams that supported a few bull trout in the early 1990's now contain none (or too few to detect). The current distribution of local populations reflects only a small portion of the historic range of occupied habitat for bull trout in the LCFR core area.

Some of the past impacts have been reduced or eliminated, and therefore some stressors on the population no longer play as large of a role as they did historically. Logging and road construction have decreased considerably, but the effects of the existing road networks throughout many watersheds are still prevalent. The drought seems to have subsided. Fishing regulation changes do not allow people to keep, or intentionally fish for, bull trout, and no fishing zones have been established at the mouths of many important spawning streams to discourage poaching.

Overall, current bull trout numbers in the LCFR core area are very low. One major change in the last decade is a direct result of the AVISTA Federal Energy Regulatory Commission relicensing which was successfully completed in 2001. This relicensing resulted in mitigation programs to actively trap and transport bull trout around the three dams in an effort to restore connectivity for spawning movements and future recovery priorities. A second major improvement was the construction of a fish ladder on Thompson Falls Dam in 2011 to restore passive connectivity to the Thompson River and tributaries upstream of Noxon Reservoir. Future work to provide passage at Noxon Rapids and Cabinet Gorge Dams to allow for unmitigated fish passage is occurring. The success of these efforts will likely significantly affect bull trout populations in the core area over the coming decades. Active trap and transport has already resulted in higher numbers of bull trout in Bull River, Rock Creek, and Vermilion Creek as well as the Thompson River over the past 10 years.

Lower Clark Fork River Core Area Summary

The populations that occupy the LCFR core area watersheds managed by the KNF include four Bull River watersheds, Rock Creek, Swamp Creek and two Vermilion River watersheds. Additional watersheds not identified by the Service as local populations on the KNF include the West Fork Trout Creek and Marten Creek, both tributaries to Noxon Reservoir. Table IV-5 summarizes relevant information for each of the 6th level HUCs that support the local populations that occupy the KNF. This includes: the restoration strategies proposed under the Revised Plan and the BTCS, as well as additional management designations that would result in added conservation or restoration in the watershed (i.e., watersheds contained in bear management units (BMU) or areas supporting grizzly bears outside the Selkirk-Cabinet Yaak recovery zones (BORZ) as addressed under the Grizzly Bear Access Amendment (USFS 2011)).

The restoration strategy for the watershed under the BTCS differs from that under the Revised Plan because the two strategies differ in purpose while having similar goals. The BTCS is intended to be incorporated into the Bull Trout Recovery Plan when it becomes finalized. During the interim, the BTCS has identified those watersheds supporting depressed local populations determined to have the high likelihood of maintaining bull trout and providing a source population to recolonize suitable habitat within the core areas with an active restoration strategy. Watersheds currently supporting smaller numbers of bull trout with a low likelihood of serving as source populations were identified with a passive restoration designation. Those watersheds currently supporting secure or even robust populations

are designated conservation watersheds as they are presently source populations to their associated core areas.

The Revised Plan has a much broader purpose and provides an administrative framework for implementing multiple resource management goals and activities across the landscape. Designating watersheds as conservation watersheds under the Revised Plan identifies them as being properly functioning stream systems that support multiple aquatic species including but not limited to bull trout. The designation does not preclude active instream restoration but rather highlights the importance of those watersheds to aquatic systems at the larger planning scale. Watersheds identified as active restoration watersheds are those having the greatest likelihood of improved function through active management. Watersheds designated as passive restoration watersheds are those determined to be limited by factors beyond the scope of forest management activities such as those streams predominantly on private lands with some NFS lands. The following sections summarize the condition of the watersheds in the action area.

The Bull River watersheds have a high significance to the LCFR core area between Noxon Rapids and Cabinet Gorge dams supporting the bulk of the bull trout in this reach. The primary threat to these local populations are interspecific competition for spawning and rearing habitat with brown trout introduced into the system in the 1970's by MFWP. Additional threats include hybridization with brook trout. Habitat in these watersheds is not limiting production as much of the best occupied habitat, the East Fork Bull River, is within the Cabinet Mountain Wilderness. Currently, access management is the only Forest activity that is ongoing in these watersheds.

Rock Creek is another watershed in this reach that is of high significance to the LCFR core area. Rock Creek is predominantly a resident population with a smaller migratory component. Primary risks to this population are naturally intermittent flows. Currently, access management is the only Forest activity that is ongoing in this watershed.

The Noxon Reservoir reach supports two local populations, Swamp Creek and the Vermilion River. The portion of Swamp Creek that lies on NFS lands is predominantly in the Cabinet Mountain Wilderness. The downstream section lies on private lands where development and interspecific competition with non-native species are the greatest risks to the population. The Vermilion River local population is the strongest local population in this reach. Primary threats to this population include legacy forest practices, access management, and ongoing placer mining. Interspecific competition with brown trout for spawning and rearing habitat is also a major limiting factor to this local population.

There are no active grazing allotments in the LCFR core area and active resource management has been limited due to large areas set aside in wilderness, grizzly bear core, and anticipation of the Rock Creek Mine. The greatest threat to bull trout persistence in this core area is a lack of reliable connectivity between quality rearing habitat in Lake Pend Oreille and natal spawning streams.

Table IV-5. Revised Plan strategy and administrative designations for the 6th code HUCs supporting local populations on the KNF in the Lower Clark Fork River core area.

Local Population	Revised Plan Strategy	Administrative Designations		
		BTCS	BMU	BORZ
Middle Vermilion River	Conservation	Active	Vermilion	NA[1]
Lower Vermilion River	Conservation	Active	Silver Butte	NA
Noxon Reservoir-Bear	Conservation	NA	Vermilion	NA

Creek				
Noxon Reservoir-Belgian Gulch	Conservation	NA	Silver Butte	NA
Swamp Creek	Conservation	Passive	Silver Butte	NA
Noxon Reservoir-Stevens Creek	Conservation	NA	NA	Clark Fork
Bull River Headwaters	Conservation	Active	Bull, Snowshoe	NA
Upper Bull River	Conservation	Active	St. Paul	NA
Middle Bull River	Conservation	Active	Bull, Spar, St. Paul, Snowshoe	NA
Lower Bull River	Active Restoration	Active	Bull, St. Paul	NA
Rock Creek	Active Restoration	Active	Bull, St. Paul, Wanless	NA
Upper Cabinet Gorge Reservoir	Active Restoration	NA	St. Paul	NA
Lower Cabinet Gorge Reservoir	Conservation	NA	Bull	NA

BTCS – Bull Trout Conservation Strategy (USFS 2013b); BMU- bear management unit; BORZ – bears outside recovery zone area.

1. NA - Not Applicable. The local population is not designated under the BTCS or does not overlap with BORZ areas.

The two additional watersheds that support local populations in this reach are the West Fork Trout Creek, which lies within a large designated roadless area. The only management that occurs in this watershed is prescribed fire for the purpose of big game habitat enhancement.

Marten Creek is the remaining watershed that supports bull trout. Threats in this watershed include access and vegetation management. There are no active grazing allotments nor is there any active mineral development. Biological risks include interspecific competition with brown trout and a high likelihood of hybridization with brook trout.

Kootenai River and Bull Lake Core Areas

Bull trout densities in the Kootenai River core area (KRCA) were historically somewhat higher than they are today in large part due to the construction of Libby Dam. The USFWS has recognized 8 local populations in the Kootenai River core area.

Impacts to bull trout populations in the KRCA began in the late 19th century with extensive habitat destruction due to gold mining in Libby Creek, agricultural land conversion, and the development of riparian railroads; however, more significant changes in bull trout populations likely occurred in the middle part of the century when development pressures in the form of timber harvest and road construction began to occur over relatively large areas of spawning and rearing habitat, including the mainstem Fisher River.

A major event affecting populations in the core area occurred with the construction of Libby Dam in 1974. This dam effectively isolated the upper watershed, including productive habitat in Grave Creek, the Wigwam River and other river systems in Canada. Movement patterns of fluvial bull trout in the KRCA are therefore significantly restricted from historical patterns. Kootenai Falls also bisects this core area, which (because of the falls) was originally considered to be two separate core areas, but radio telemetry has demonstrated that at least partial upstream passage occurs over the falls. Fluvial populations in the truncated system are, however, geographically distributed throughout the core area, which increases the potential for recovery.

The proportion of fluvial to resident forms as it compares to historic proportions is uncertain. The only known resident bull trout population is found in Libby Creek above an impassable waterfall. There has been some loss of smaller populations in Parmenter and Flower creeks. The primary cause of loss in Parmenter was due to irrigation withdrawals and irregular flows over the last 75 years. The Flower Creek population became isolated with the development of the Libby municipal water supply and associated dams which isolated the once migratory population. The Kootenai River provides abundant deep water FMO habitat and there does appear to be a relatively strong fluvial component remaining in index spawning reaches.

The main factors affecting bull trout in the KRCA are gas bubble disease associated with spring spill in high water years and flow alterations from Libby Dam. Also significant is the reduced nutrient flow past the dam due to the reservoir acting as a sink and reduced phosphate spill in the Canadian portion of the Kootenai River. These three issues appear to be key contributors to mainstem rearing capacity limitations. Conversely the dam provides a tremendous food source for bull trout directly downstream. Kokanee salmon entrained by the dam are discharged at the base of the dam. Opportunistic species such as bull trout have benefitted from this condition and bull trout in excess of 20 lbs are common in this core area as a result of the enhanced food supply. More recently there has been extensive *Didymosphenia geminata* growth below Libby Dam and extending beyond the Idaho-Montana Border. The effect of this nuisance algae growth on bull trout rearing in the mainstem Kootenai River is undetermined.

While Libby Dam significantly affects bull trout populations in the KRCA, the creation of a large reservoir with abundant forage increased bull trout populations upstream of the dam in Lake Koocanusa. This is discussed further in the Lake Koocanusa core area chapter.

It is conservatively estimated that approximately 300 to 400 fluvial redds may have been present in the KRCA prior to the 1850's. This would equate to a population size of somewhere between 700 and 1000 adult fluvial bull trout. As with most bull trout populations, overall numbers were likely highly variable from year to year, based on natural climatic and disturbance patterns.

Bull trout populations in the KRCA were first exposed to significant human-caused impacts in the late 1800's. As the population in the area grew and agricultural production increased there was a need for a steady water supply to local farms. For example, the Glen Lake Irrigation District (GLID) was formed around the turn of the century. The GLID built a log dam and diversion on Grave Creek in 1917. Grave Creek was the primary bull trout stream in this core area south of the Canadian border prior to Libby Dam. The GLID dam limited connectivity with the bulk of the available bull trout spawning habitat for fish rearing in the upper reaches of the Kootenai River or what is now Lake Koocanusa. Timber harvest and road construction impacted most spawning tributaries and cumulatively impacted rearing habitats in the mainstem Kootenai River. The construction of Libby Dam in 1974 was the single-most significant impact to bull trout in this core area during the current era.

Numerous smaller scale impacts to bull trout gradually occurred throughout the Kootenai River valley in the middle part of the 20th century. These included grazing, subdivision, and agricultural development

along many of the important low gradient streams, road and energy corridor development in riparian areas, and logging and road development in tributary streams. These all had impacts to bull trout and their habitats; however, they were not of the same magnitude as Libby Dam.

Changes in fish species composition within the Kootenai River system, brought about by MFWP stocking programs and some illegal introductions, have created an additional impact to the system. Brook trout are the main non-native species threat; they exist in numerous tributary streams that contain bull trout and are of particular concern in Callahan and O'Brien Creek drainages. Several lake trout have been captured in the Kootenai River downstream of Libby Dam and potential establishment and proliferation of a lake trout population downstream in Kootenay Lake could be a major concern. Brown trout also occur in low numbers, but may be increasing in some locations.

The 1950's-80's saw a rapid expansion of road construction and logging to recover first those trees affected by spruce budworm and later remnant populations of pine affected by pine beetle outbreaks, especially on the upper watersheds of this core area. Further downstream, the climate is more maritime and dominated by rain on snow events. Steep slopes in the middle and upper portions of many Cabinet Mountain drainages produce high bedload levels as a result of their flashy nature. In some cases these loads have exceeded the transport capacity of streams resulting in cobble and boulder dominated systems.

In some cases this period of management and heavy road construction also resulted in fragmentation of bull trout populations at undersized culvert crossings. Most of these barriers have been addressed in recent years and connectivity, aside from Libby Dam, is not a significant issue.

Some past impacts, such as culvert barriers, have been reduced or eliminated, and therefore some stressors on the population no longer play as large of a role as they did historically. Logging and road construction have decreased considerably and hundreds of road miles have been removed from the landscape in key bull trout watersheds such as Quartz, Pipe, Callahan, and O'Brien Creeks. Fishing regulation changes do not allow people to keep, or intentionally fish for bull trout in most areas (with the exception of Lake Koocanusa, which primarily affects the Lake Koocanusa core area). Bull trout poaching was historically a big factor in this core area and likely remains a problem.

Overall, current bull trout numbers in the KRCA are lower over the last ten years but may have stabilized. Bull trout distribution is relatively good and fluvial components exist in all Local Populations. The mainstem Fisher River has potential to support more bull trout but would require major habitat restoration efforts to restore function and thermal conditions suitable to bull trout.

Biologically, if nonnative brook trout and the potentially emerging lake trout and brown trout threats can be controlled, and headwater spawning and rearing habitat can be improved and connectivity maintained, there is potential for this core area to rebound. However, the apparent population strength is misleading as a significant proportion of the large bull trout routinely encountered downstream of Libby Dam appear (genetic testing has verified) to have originated from upstream of Libby Dam. Also of concern is the prevalence of *Didymosphenia geminate* in the reaches below Libby Dam.

The Bull Lake core area is a historically disjunct population with downstream connectivity to the KRCA. Most of the habitat used by bull trout in the Bull Lake core area is on private lands with the headwaters portions on NFS lands.

<u>Kootenai River /Bull Lake Core Area Summary:</u>

Tables IV-6 and IV-7 summarize relevant information from each of the 6th level HUCs that support the local populations that occupy the Kootenai River and Bull Lake core areas on the KNF, respectively. This summary provides an overall assessment of the relative importance of the population to the core area, the restoration strategies proposed under the Revised Plan and the BTCS, and additional protection

and restoration direction as provided by the Grizzly Bear Access Amendment for those watersheds contained in BMUs and BORZ (USFS 2011). The following paragraphs summarize the condition of these watersheds within the action area.

The mainstem Kootenai River provides rearing and some unquantified spawning habitat for bull trout in this core area. Given the size of the Kootenai River forest management has little effect on the quality of habitat in the mainstem.

Libby Creek is divided into two sixth code watersheds. The lower end is a migratory corridor through predominantly private ownership. Upper Libby Creek supports two populations, a migratory population in Bear Creek and a second resident population in the headwaters of Libby Creek. Primary threats are low and intermittent flows during low flow periods. An instream flow reserve of 40 cubic feet per second has been acquired for the confluence of Libby and Bear Creeks to provide for connectivity during the fall spawning period. Additional threats include access and timber management. There is also extensive placer mining conducted through the lower canyon reach of upper Libby Creek. These activities are all operate under separate project specific consultations. Rock Creek and Montanore are proposed large mines which, if implemented, will likely affect many of the streams in this area. Biological risks in Libby Creek consist of low numbers and a high likelihood of hybridization with brook trout.

Granite Creek and Big Cherry Creek are two watersheds that support unknown numbers of bull trout. Both have large areas in their headwaters that lay within the Cabinet Wilderness and designated roadless areas. There is currently low threat to these populations due to current management.

The remaining bull trout watersheds on the south side of the Kootenai River are West Fisher and Silver Butte creeks. These are predominantly known to support migratory spawning populations. Numbers vary annually. The greatest threats to these populations are associated with access and vegetation management.

Tributaries on the north side of the Kootenai include O'Brien, Quartz, and the Pipe Creek watersheds. These streams support migratory populations with O'Brien currently supporting the larger number of spawners. Management in Quartz and O'Brien has been minimal since 1998. Quartz Creek has been set aside since 1994 as a bull trout stronghold. The primary threat from forest management activities in these creeks is road use and management. There are no active allotments or minerals activities in either watershed.

Pipe Creek has been actively managed for both access and timber. Angling continues to be a major factor affecting bull trout numbers in this watershed. Recreation and dams associated with recreational use are consistently a connectivity issue in the fall. Three major instream restoration projects have been implemented in the last ten years on Pipe Creek.

The Callahan Creek local population is moderately significant to the KRCA. It supports low but steady numbers of migratory bull trout. Primary threats to this local population include access and vegetation management.

Table IV-6. Revised Plan strategy and administrative designations for the 6th code HUCs supporting local populations on the KNF in the Kootenai River Core Area.

Local Population	Revised Plan Strategy	Administrative Designations		
		BTCS	BMU	BORZ
Upper Kootenai River	NA	NA	NA	NA

Upper Libby Creek	Conservation	Active	Wanless	NA
Lower Libby Creek	Passive Restoration	Active	Snowshoe	NA
Granite Creek	Conservation	Passive	Snowshoe	NA
Big Cherry Creek	Conservation	Passive	Snowshoe	NA
East Fork Pipe Creek	Active Restoration	Active	Big Creek	NA
Upper Pipe Creek	Active Restoration	Active	Big Creek, Roderick	NA
Lower Pipe Creek	Passive Restoration	Active	NA	West Kootenai
Quartz Creek	Conservation	Conserve	Pulpit	NA
Middle Kootenai River	Active Restoration	Conserve	Newton, Callahan, Pulpit, Cedar	NA
O'Brien Creek	Active Restoration	Passive	Pulpit	NA
South Callahan Creek	Active Restoration	Passive	Callahan	NA
North Callahan Creek	Conservation	Passive	Callahan	NA
Callahan Creek	Conservation	Passive	Callahan	NA
Silver Butte Fisher River	Conservation	Passive	Silver Butte	NA
West Fisher Creek	Conservation	Active	Wanless	NA
Lower Kootenai River	Active Restoration	Conserve	Callahan, Newton, Pulpit	NA

BTCS – Bull Trout Conservation Strategy (USFS 2013b); BMU- bear management unit; BORZ – bears outside recovery zone area.

1. NA - Not Applicable. The local population is not designated under the BTCS or does not overlap with a BMU or BORZ.

Fish in the Bull Lake core area rear in Bull Lake and use Lake Creek to migrate to spawning areas in Keeler Creek with most spawning activity occurring in the North Fork Keeler Creek on private lands. On Forest lands, access and vegetation management are the primary risks to bull trout and designated critical habitat in this core area.

Table IV-7. Revised Plan strategy and administrative designations for the 6th code HUCs supporting local populations on the KNF in the Bull Lake Core area.

Local Population	Revised Plan	Administrative Designations

	Strategy	BTCS	BMU	BORZ
Lower Lake Creek	Passive Restoration	Passive	Spar, Cedar	NA
Upper Lake Creek	Active Restoration	Passive	Spar	NA
Keeler Creek	Active Restoration	Active	Spar	NA

BTCS – Bull Trout Conservation Strategy (USFS 2013b); BMU- bear management unit; BORZ – bears outside recovery zone area.

1. NA - Not Applicable. The local population is not designated under the BTCS or does not overlap with BORZ areas.

Lake Koocanusa Core Area

Bull trout densities in the Lake Koocanusa Core Area (LKCA) were historically less than they are today. A significant amount of fluvial bull trout FMO habitat was flooded with the construction of Libby Dam, but was mitigated and perhaps even enhanced by the subsequent formation of Lake Koocanusa (name adopted for the reservoir). The reservoir created a large, deep, cold and relatively secure water body with abundant forage where bull trout numbers increased significantly. The Canadian portion of the watershed upstream includes most of the highly productive spawning portions of the Wigwam River, White River, Skookumchuck Creek and other systems. Redd numbers would be much higher if data from Canada were included; the graph would show current populations being much stronger – likely several multiples greater than pre-dam numbers.

Like the KRCA, minor impacts to bull trout populations began in the later part of the 19th century. Significant changes in bull trout populations did not likely occur until the 1920's when development pressures in the form of timber harvest, road construction, and irrigation began to occur. The GLID irrigation ditch and dam were constructed in 1917 and entrained large numbers of both adult and juvenile bull trout which negatively affected the population in Grave Creek, the only significant U.S. local population. The main event affecting populations in the core area was the construction of Libby Dam in 1974. This dam fragmented bull trout populations in the upper Kootenai River from those in the rest of the system, creating a new adfluvial population. That adfluvial population increased, likely many fold, following the construction of Libby Dam.

Spawning in the Montana portion of the LKCA occurs primarily in the Grave Creek drainage (roughly 100-200 redds per year) and, to a lesser extent, the upper Wigwam River (4-30 redds per year).

It is conservatively estimated that 100 or more fluvial redds may have been present in the Montana portion of the Upper Kootenai River core area prior to the 1850's. This would equate to a population size of 200 or more adult fluvial bull trout. There is some uncertainty about the upside, since the natural rearing habitat in the Kootenai River likely had a lower, but largely unquantified potential relative to the existing condition within the reservoir. As with most bull trout populations, overall numbers were likely highly variable from year to year, based on natural climatic and disturbance patterns. The total number of fluvial bull trout in the core area (including portions in Canada) was likely much greater (perhaps 2000 to 3000 adults) and in recent times has ranged as high as 10,000 or more adults due to the highly productive

FMO habitat provided by the reservoir. At those levels, Lake Koocanusa was one of the strongest core areas anywhere in the range of the species and likely remains so.

Minor impacts to the population occurred throughout the early and middle part of the 20th century as human populations increased. In the 1950's -70's, significant timber harvest of spruce (to combat spruce budworm) and road construction likely caused some populations to decline. These effects were likely very significant in the late 1960's and early 1970's as the entire area of the future reservoir behind Libby Dam was clearcut. The construction of the dam and filling of the reservoir also had significant but largely unquantified impacts on bull trout populations. Following completion of the dam and subsequent filling of the reservoir in 1974, bull trout upstream of the dam definitely benefitted from the newly created reservoir habitat. Construction of Libby Dam was the single-most significant impact (both negative and positive) to bull trout in the core area during the current era.

Numerous smaller scale impacts to bull trout gradually occurred throughout the Kootenai River valley in the middle part of the 20th century as well. These included grazing and agricultural development along many of the important low gradient spawning and rearing streams, road development in riparian areas, and logging and road development in tributary streams. These all had impacts to bull trout and their habitat; however they were not of the same magnitude as Libby Dam.

Changes in fish species composition within the Kootenai River system, brought about by Montana and B.C. stocking programs and some illegal introductions, have created an additional impact to the system, however this impact to date is not as great as in many core areas, and in some cases is positive. Brook trout are the main existing non-native species threat, and they exist in numerous tributary streams that contain bull trout, but typically not at levels considered problematic. The potential for lake trout introduction into Lake Koocanusa is a major concern, but thus far has not been reported. Within the reservoir, kokanee are the primary nonnative species. They have provided a significant forage base for bull trout. Also present are large Girard strain rainbows which have been stocked by MFWP to support a trophy trout fishery. They could compete directly with bull trout and cause potential conflicts in the future, but at present there is no direct evidence of a conflict.

Overall, current bull trout numbers in the LKCA are strong compared to nearly all other core areas. If fishing pressure is regulated adequately and non-native species such as lake trout are kept out of the core area, prospects for a long-term, stable population at high abundance are relatively high.

<u>Lake Koocanusa Core Area Summary</u>

Table IV-8 summarizes relevant information from each of the 6th level HUCs that support the local populations that occupy the LKCA on the KNF. The following paragraphs summarize the current condition of local populations in the action area.

Grave Creek is the most significant local population in the LKCA. Major risks and threats have been addressed in Grave Creek with the removal of the GLID dam in 2000. This population is currently a source population for other tributaries in the Koocanusa core area. Management activities affecting this local population would include access, limited grazing and limited vegetation management. Previously, there was a recreational harvest permitted for bull trout; however, that has been discontinued. Current snagging fisheries for spawning kokanee continues to be a threat to spawning bull trout in Grave Creek through inadvertent hooking and illegal harvest.

The Wigwam local population is moderately important to this core area. The Canadian portion of the Wigwam watershed is where the majority of bull trout in this core area originate. Redd counts for the Canadian portion of the Wigwam range between 1,000-2,000 redds annually.

Young Creek has low significance as it supports some sub-adult rearing. To date there has been no spawning activity identified in Young Creek.

Table IV-8. Revised Plan strategy and administrative designations for the 6th code HUCs supporting local populations in the Lake Koocanusa core area.

Local Population	Revised Plan Strategy	Administrative Designations		
		BTCS	BMU	BORZ
Wigwam River	Conservation	Conserve	NA	NA
Upper Grave Creek	NA	Conserve	NA	NA
Lower Grave Creek	Conservation	Conserve	NA	NA
Young Creek	Active Restoration	Active	NA	West Kootenai
Lake Koocanusa-Gold Creek	NA	NA	NA	West Kootenai, Tobacco
Lake Koocanusa-Geibler Creek	Conservation	NA	NA	West Kootenai, Tobacco
Lake Koocanusa-Little Jackson Creek	Conservation	NA	NA	West Kootenai, Tobacco

BTCS – Bull Trout Conservation Strategy (USFS 2013b); BMU- bear management unit; BORZ – bears outside recovery zone area.

1. NA - Not Applicable. The local population is not designated under the BTCS or does not overlap with BORZ areas.

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 Lower Clark Fork River Core Area

A total of 283 miles of stream/river and 9,719 acres of reservoir are included in the revised designation of critical habitat for the LCFR core area. Of this amount, 34 stream miles occur on the KNF. The fragmented nature of the migratory corridor by the mainstem dams (Cabinet Gorge, Noxon Rapids, and Thompson Falls) affects PCE 2, limiting the physical connections between spawning, rearing, foraging, and overwintering habitats (MBTSG 1996). Mitigations are being undertaken at the dams at Cabinet Gorge (Lockard et al. 2004) and Noxon Rapids, but apart from such ongoing management, these are permanent barriers. A fish ladder has been installed at Thompson Falls and has been functioning since 2011; its effectiveness is yet to be determined.

The mainstem dams and the reservoirs behind them affect PCEs 4, 5, 7, and 8. Complexity of river, stream, and reservoir aquatic environments is reduced over the natural condition by both the backup and slowing of water behind the dams and the changed hydrograph affecting the natural rates and locations of

erosion, deposition, and sediment transport (PCE 4). The large surface area of the reservoirs allows for greater solar insolation and raises water temperatures (PCE 5). The dams and their regulation based on energy production needs disrupt the natural hydrograph governing the timing and quantity of runoff (PCE 7). Finally, the high aeration of the water going through the dams can result in super-saturation by nitrogen, which may be lethal to fish in extreme cases (PCE 8). Forest management has relatively little influence in the reservoirs.

PCE 9 is degraded because the reservoirs change the habitat to favor non-native species, such as brown trout and lake trout. Brook trout and rainbow trout are also common in many of the spawning and rearing streams (USFWS 2005a).

Critical Habitat in the Lake Koocanusa /Bull Lake Core Area

Approximately 40 miles of streams and 28,710 acres of reservoir surface area are included in the revised critical habitat for the Lake Koocanusa core area. Forest management has relatively little influence in the reservoir. This core area exhibits perhaps the strongest record of an increasing trend across the entire U.S. range of the species. The adult bull trout population in this core area is likely over 10,000 fish. Consequently, the PCEs in this core area appear to be functioning appropriately for the most part, albeit somewhat artificially in relation to the reservoir (as described above for the core area). Risk to the function of the PCEs appears minimal. It appears that this core area has achieved or exceeded full recovery status.

Bull Lake, Lake Creek and Keeler Creek constitute critical habitat in the Bull Lake core area, totaling 17 miles of stream and 1,162 acres of lake. Much of Bull Lake and Lake Creek run through private land. The greatest impacts to critical habitat in this core area come from dewatering, the presence of non-native species, forest management practices, and residential development (USFWS 2005a), resulting in reduced function of PCEs 2, 3, 4, 6, 8 and 9.

Keeler Creek is the sole spawning reach for the adfluvial population that migrates from Bull Lake and occurs primarily on NFS lands. The KNF has been conducting road decommissioning and the implementation of road BMPs with the intent of improving habitat in the spawning area.

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. 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.

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).

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

<u>General Effects</u>

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.

Effects of Proposed Action

Revised Forest Plan direction would provide for harvesting and selling a volume of 47.5 MMBF (FW-OBJ-TBR-01). The long-term sustainable yield capacity for the forest is approximately 90 MMBF (FW-DC-TBR-04) so that the proposed harvest rate would capture slightly more than half the sustainable yield. This volume is commensurate with current harvest levels which range from 35-50 MMBF (USFS 2013a).

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-03). 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, 05). TM1(b) from INFISH 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, emphasizing the protection of water quality and thus bull trout and designated critical habitat.

Implementing the Revised Plan direction for timber harvest reduces the overall acreage affected by scheduled harvest. It also reduces the volume required to meet forest plan objectives. This would provide for a reduced intensity of effects across the forest as a result of timber management and increased natural recovery and development of forest vegetation, which is expected to have a general positive effect on bull trout 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 2013a). 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.

<u>Effects of Proposed Action</u>

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 macroinvertebrates. 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

1,000 miles of roads (USFS 2013a). 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

The construction of new roads is anticipated to occur at a rate similar to what currently occurs, 6-10 miles annually. New road is typically built to access timber for harvest or replace alignments determined to be unsafe. 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 objective for 150 to 350 miles of road decommissioning or placing roads into intermittent storage over the life of the plan (FW-OBJ-AR-03). The same objective requires annual maintenance of 20-30% of existing Level 3-5 roads (those suitable for passenger vehicles) and 10-20% 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, potentially resulting in some 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

General Effects

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

Most grazing on the Kootenai NF is done 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. Current grazing on the Kootenai NF is limited with the majority of allotments vacant. The only occupied streams directly affected by grazing in active allotments are Grave Creek and Young Creek.

The Revised Forest Plan reduces the number of acres determined suitable for grazing and provides direction to close allotments that are not needed or not viable. The Revised Plan allows for 4,000 to 5,000 head months across the forest. The 12 currently vacant allotments in bull trout watersheds (Wigwam River, Grave Creek, Quartz Creek, Pipe Creek, Granite Creek, Big Cherry Creek, Libby Creek, West Fisher Creek, Silver Butte, Swamp Creek, and the Vermilion River) would be reviewed and considered for closure under a future decision, which would require site-specific consultation. The allotments in Grave Creek and Young Creek would continue until the current permits expire or are transferred, requiring a new project-level NEPA decision and site-specific consultation. No additional allotments would be opened in bull trout watersheds. By reducing the number of acres suitable for grazing and considering closing existing unoccupied allotments, the Revised Forest Plan is expected to generally reduce the effects of grazing on bull trout.

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 in the Vermilion River drainage (FW-OBJ-AR-01), by implementing human waste management techniques, and physically improving 50-75 dispersed sites at heavily used areas (FW-OBJ-AR-01) over the life of the plan. 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 to the standard as described in FW-DC- AR-01, 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 Kootenai NF. New mining projects would be addressed by site specific analysis. Legacy mining across the Kootenai 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 have been the most common associated with historic mining. Liquid mercury, which was used to recover gold, continues to persist in Libby Creek.

Mining can reduce surface water flow, increase sedimentation, decrease pH, and leach heavy metals into surface waters supporting bull trout. Mineral deposits on the Kootenai are primarily silver and copper. The ore typically is low in sulfides which greatly reduces the risk of acid rock generation. The ore is also typically low in heavy metals such as cadmium, lead, and arsenic. Most metals toxicity is associated with copper and zinc which is exacerbated by the soft water conditions in most tributaries.

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), 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). This would potentially benefit bull trout and designated habitat in the following watersheds: Grave, Callahan, Keeler, Granite, Big Cherry, Libby, West Fisher, and Silver Buttes, along with Bull and Vermilion rivers. Proposed mine projects such as Rock Creek and Montanore would be analyzed with project-specific information and covered under separate consultations, as would abandoned mine reclamation projects.

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 Kootenai NF has documented that the increase in turbidity and sedimentation is of very short duration (USFS 2013a). 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 by proposed FW-OBJ-WTR-01 & 02, FW-OBJ-AQH-01 & 03, and FW-OBJ-AQS-01 which specifically directs restoration of 5% of watersheds supporting sensitive or threatened and endangered species. Watersheds with degraded habitat conditions and/or depressed populations of native fish have been designated as restoration watersheds. 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 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.

Lower Clark Fork River Core Area

Management area designations for bull trout watersheds on the KNF in the Lower Clark Fork Core Area are displayed in Table IV-9. Over 70 percent of the bull trout watersheds in this core area are allocated to MA1 (wilderness), MA2 (wild and scenic river), and MA5 (backcountry). These more protective designations include substantial areas for all the bull trout local populations in the core area: Bull River, Vermilion River, Rock Creek, and Swamp Creek. Spawning areas in the headwaters of these drainages are predominantly wilderness. Timber harvest, grazing, and motorized access are limited or entirely 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. All of the bull trout watersheds in this core area overlap with bear management units (BMU) that limit, and in many cases reduce, motorized access under the 2011 Access Amendment (Table IV-5).

General Forest (MA6) designation occurs in lower Rock Creek and along Cabinet Gorge and Noxon Reservoirs, which serve as foraging, migrating, and overwintering habitat for bull trout. Future timber management, travel access and mining projects would be likely to impact these areas; however, impacts to bull trout are expected to be minimal due to the large volume of the Clark Fork River, the nature of the habitat, and the lower number of juveniles present.

Most of the watersheds in this core area are designated for conservation, with Lower Bull River, Rock Creek, and Upper Cabinet Gorge designated for active restoration. 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.

Table IV-9. Lower Clark Fork River Core Area bull trout watershed acres (%) by proposed Management Area (MA).

Lower Clark Fork River	Management Area-acres (percent)							
Core Area	Total	MA 1	MA2	MA 3	MA 4	MA 5	MA 6	MA 7
Middle Vermilion River	15289	0	1556 (10)		332 (2)	10065 (66)	3335 (22)	

Lower Vermilion River	19883	0	1592 (8)		151 (1)	15156 (76)	2984 (15)	
Noxon Reservoir-Bear Creek	6,705					5,496 (82)	1209 (18)	
Noxon Reservoir-Belgian Gulch	3338	0				2267 (68)	1071 (32)	
Swamp Creek	20068	9815 (49)				8912 (44)	1341 (7)	
Noxon Reservoir-Stevens Creek	22488	3135 (14)				4649 (21)	14705 (65)	
Bull River Headwaters	24054	17335 (72)	323 (1)	86 (0)		1468 (6)	4844 (20)	
Upper Bull River	29256	12033 (42)	2075 (7)			12382 (43)	2766 (9)	
Middle Bull River	16829	9580 (57)	1683 (10)			1316 (8)	4250 (25)	
Lower Bull River	14696	4078 (28)	1620 (11)			7533 (53)	1466 (10)	
Rock Creek	19524	8578 (44)		92 (0)		2521 (13)	8334 (43)	
Upper Cabinet Gorge Reservoir	8467	0				4062 (48)	4405 (52)	
Lower Cabinet Gorge Reservoir	12986	4382 (34)				1604 (13)	6999 (54)	
TOTAL	213583	68936 (32)	8949 (4)	92/0	483/0	78431 (37)	57709 (27)	0

Kootenai River and Bull Lake Core Areas

Management area designations for bull trout watersheds on the KNF in the Kootenai River and Bull Lake Core Areas are displayed in Table IV-10 and IV-11, respectively. Over 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 12 percent to MA1 (wilderness). Local populations most likely to be affected by future management decisions under the Revised Forest Plan include Quartz, Pipe, and O'Brien Creeks, where the vast majority of land would be allocated to MA6, which allows the full suite of forest management activities. 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.

Impacts will be somewhat less to spawning areas for the Libby Creek local population (includes Granite and Big Cherry Creeks) where just under half the land is allocated to MA1 and MA5, limiting forest management activities. For Fisher and West Fisher local populations most of the watersheds are limited by MA1 and MA5 allocations. Specific activities expected under the Revised Plan are mining, access management, and historic mine reclamation (USFS 2013). The remainder is allocated to MA6. Negative impacts to the core area population are not expected.

Management activities in watersheds adjacent to the Kootenai River would likely have less potential to impact bull trout because the large volume of the river serves to buffer the effects of sediment generated by management activities.

Table IV-10. Upper Kootenai River Core Area bull trout watershed acres (%) by proposed Management Area (MA).

Kootenai River Core Area	Management Area-acres (percent)							
	Total	MA 1	MA2	MA 3	MA 4	MA 5	MA 6	MA 7
Upper Kootenai River	16900	0	764 (5)			6571 (39)	9566 (57)	
Upper Libby Creek	39568	5471 (14)				13260 (34)	20836 (53)	
Lower Libby Creek	20725	0				0	20725 (100)	
Granite Creek	16791	13384 (80)				1687 (10)	1720 (10)	
Big Cherry Creek	31982	8987 (28)				7048 (22)	15948 (50)	
East Fork Pipe Creek	12857	0		1118 (9)		1111 (9)	10628 (83)	
Upper Pipe Creek	26939	22 (0)		55 (0)		8263 (31)	17773 (66)	826 (3)
Lower Pipe Creek	14498	0				0	14498 (100)	
Quartz Creek	22506	0	15 (0)		792 (4)	6064 (27)	15633 (69)	
Middle Kootenai River	25056	9339 (37)	1698 (7)	110 (0)		3780 (15)	10127 (40)	
O'Brien Creek	26639	0			186 (1)	1351 (5)	25101 (94)	
South Callahan Creek	13812	0		1641 (12)		7472 (54)	4699 (34)	
North Callahan Creek	21776	0		4 (0)		18263 (84)	3509 (16)	
Callahan Creek	14506	0		1596 (11)		6793 (47)	6117 (42)	
Silver Butte/ Fisher River	28373	893 (3)				21905 (77)	5574 (20)	
West Fisher Creek	24502	4704 (19)				10968 (45)	8828 (36)	
Lower Kootenai River	17799	1248 (7)	1802 (10)			1712 (9)	13034 (73)	
TOTAL	375229	44048 (12)	4279 (1)	4524 (1)	978 (0)	116248 (31)	204316 (54)	826 (0)

Bull Lake Core Area is an isolated, simple core area with only one population that spawns in Keeler Creek. Just less than half the National Forest lands in the core area are allocated to MA6 and just over half to MA1 and MA5. The full suite of forest management activities may affect spawning sites for the core area population, as 70 percent of the Keeler Creek watershed is allocated to MA6. The most common effect would be increased sediment delivery associated with timber harvest and access. The design and timing of future activities will be important determinants of effects on bull trout and their habitat.

Active watershed restoration may affect local populations in Pipe Creek, O'Brien Creek, Callahan Creek, and Bull Lake. Short-term adverse effects would be expected from projects that may be implemented, followed by long-term benefits to bull trout habitat. All bull trout watersheds in the Kootenai River and Bull Lake watersheds overlap with BMUs that limit, and in many cases reduce, motorized access under the 2011 Access Amendment (Tables IV-6, IV-7).

Table IV-11. Bull Lake Core Area bull trout watershed acres (%) by proposed Management Area (MA).

Bull Lake Core Area	Management Area-acres (percent)							
	Total	MA 1	MA2	MA 3	MA 4	MA 5	MA 6	MA 7
Lower Lake Creek	11691	4076 (35)		21 (0)		2323 (20)	5271 (45)	
Upper Lake Creek	27177	11194 (41)		962 (4)	504 (2)	8922 (33)	5595 (21)	
Keeler Creek	31809	0		47		9502 (30)	22261 (70)	
TOTAL	70677	15270 (22)	0/0	1030 (1)	504 (1)	20747 (29)	33127 (47)	0/0

Lake Koocanusa Core Area

Management area designations for bull trout watersheds on the KNF in the Lake Koocanusa Core Area are displayed in Table IV-12. Approximately half the forest acres are designated as MA6 general forestry. All but about 4800 acres of this designation occurs in watersheds adjacent to Lake Koocanusa and the lower end of Young Creek where local populations of bull trout do not occur. Effects to bull trout from forest management in these areas are expected to be minimal, given the large size of the reservoir, 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). Recreation in this core area consists primarily of non-motorized trails and developed campsites along the lake. The effects on bull trout from the use and maintenance of such facilities is expected to be low (USFS 2013a).

The most important watersheds supporting bull trout local populations are Wigwam River and Grave Creek. Of the 70,466 acres in these watersheds, 93 percent is allocated to wilderness (MA1) or back country (MA5) where timber harvest, grazing, and motorized access are limited or prohibited. Lower Grave Creek, where MA6 allocations would occur, is primarily a migratory corridor for spawning in Upper Grave Creek (USFS 2013b). Thus, for the Lake Koocanusa Core Area, management area allocations would focus future impacts in areas where bull trout are little affected and protect important bull trout spawning areas by management area allocations that are dominated by natural processes. We

do not expect discernible negative impacts to the core area population as a whole from implementation of the Revised Forest Plan.

Active watershed restoration would occur in Young Creek, while all other bull trout watersheds in the core area are designated for conservation (maintaining high quality habitat). None of the watersheds overlap with BMUs under the Access Amendment to the Forest Plan (Table IV-9).

Table IV-12. Lake Koocanusa Core Area bull trout watershed acres (%) by proposed Management Area (MA).

Lake Koocanusa Core Area	Management Area-acres (percent)							
	Total	MA 1	MA2	MA 3	MA 4	MA 5	MA 6	MA 7
Wigwam River	26108	11368 (44)		6 (0)		14735 (56)		
Upper Grave Creek	28210	19508 (69)				8693 (31)	10 (0)	
Lower Grave Creek	16148	5178 (32)				6192 (38)	4778 (30)	
Young Creek	13,655					1611(12)	11968 (88)	77 (1)
Lake Koocanusa-Gold Creek	24,773		86 (0)	841 (3)	178 (1)		22277 (90)	1391 (6)
Lake Koocanusa-Geibler Creek	18,209						16839 (92)	1369 (8)
Lake Koocanusa-Little Jackson Creek	13,281			191 (1)			9596 (72)	3495 (26)
TOTAL	140384	36054 (26)	86 (0)	1038 (1)	178 (0)	31231 (22)	65468 (47)	6332 (5)

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 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 KNF grazing occurs primarily along roads and in transitory range where previous timber harvest has created an open understory with herbaceous vegetation (USFS 2013a), 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. Grave Creek is the only designated critical habitat with an active grazing allotment.

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. Two large proposed underground mines in the Libby area may potentially effect groundwater recharge and streamflows in the area to the extent that PCE's 1 through 8 could be affected and show reduced functionality. Analysis of effects and mitigation for these proposed mines is ongoing.

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-13 as miles of critical habitat within each core area allocated to different management areas and restoration strategies on KNF 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 KNF lands is also displayed.

Twenty-five percent of total designated critical habitat in the four core areas occurs on the KNF. Of the 154 miles of designated critical habitat which occurs on the forest, half is allocated to MA6 (general forest), occurring mostly in the Bull Lake and Kootenai River core areas. The other half is allocated to wilderness, backcountry and special management areas. Restoration strategies for bull trout watersheds place the majority of designated critical habitat on the forest into conservation status, where high quality habitat is protected, and most of the remaining into active restoration, where projects resulting in long-term benefit to critical habitat would occur.

Table IV-13. Miles of bull trout critical habitat on KNF in each core area by management area and restoration strategy designations. Percent is for all land ownerships within the core area.

Core Area	1a	1b	1c	2	3	5a	5b	5c	6	7	KNF Total	% Total
Bull Lake									**7**		**7**	**41**
Active Restoration									7		7	
Kootenai River	**0**			**1**	**15**		**6**	**11**	**57**		**91**	**34**
Active Restoration				1	9			3	18		31	
Conservation	0			0	6		6	8	33		53	
Passive Restoration				0					7		7	
Lake Koocanusa		**2**	**1**				**12**		**6**	**1**	**22**	**56**
Conservation		0					4		6		10	
NA		2	1				7				11	
Passive Restoration							1			1	1	
Lower Clark Fork River	**6**	**2**		**16**		**2**	**1**		**6**		**34**	**12**
Active Restoration		0		3		0	1		4		8	
Conservation	6	2		13		1	0		3		26	
Grand Total	**6**	**4**	**1**	**17**	**15**	**1**	**19**	**11**	**77**	**1**	**154**	**25**

Lower Clark Fork River Core Area

In the Lower Clark Fork River Core Area designated critical habitat occurs in the Bull River, Rock Creek, Swamp Creek and Vermilion River, as well as portions of the west side of Cabinet Gorge Reservoir. Of the 34 miles on the forest approximately half is allocated to MA2 (wild and scenic river) along the Vermilion River and another one-third to MA1 (wilderness) and MA5 (backcountry). Six miles would be allocated to MA6 (general forest). Conservation is the predominant restoration strategy to be employed on over 75 percent of critical habitat, favoring the development of natural processes, with the remaining designated as active restoration, focusing primarily on stabilization and riparian restoration in Vermilion River (USFS 2013a). Improvement in the functioning of PCEs 1-4 and 6-8 would be expected over the long term, primarily from the development of natural processes with the addition of some active restoration.

Kootenai River and Bull Lake Core Areas

In the Kootenai River Core Area designated critical habitat on the KNF is found in Callahan, O'Brien, Libby, Bear, West Fisher, and Pipe creeks, as well as the mainstem of the Kootenai River. Of the 92 miles of critical habitat on NFS lands over half is allocated to MA6 (general forest), where project-level impacts to PCEs 1 and 4 would be likely to occur. Over half is allocated to a conservation strategy, favoring the development of natural processes. One-third is designated to active restoration, with the expectation for instream and riparian restoration projects. Given the combination of conservation and restoration strategies for all but a small portion of critical habitat on forest lands in the core area, long-term improvement in PCEs 1-8 would be expected.

In the Bull Lake Core Area designated critical habitat on the KNF occurs in Keeler Creek, as well as some ownership adjacent to Bull Lake. The majority of critical habitat for both lake and stream is in private ownership. Designated critical habitat on the forest is beyond the extreme extent of spawning habitat in Keeler and North Fork Keeler creeks. No rearing occurs in those reaches due to the lack of spawning habitat and low flows through the summer months (USFS 2013a, b). Keeler Creek is allocated to MA6 with an active restoration strategy. 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 8 from road decommissioning, instream and riparian restoration projects (USFS 2013a, b).

Lake Koocanusa Core Area

Critical stream habitat in the Lake Koocanusa Core Area on the KNF occurs in Grave Creek and the Wigwam River. The Wigwam River and upper Grave Creek are in MA1 (wilderness) and MA5 (backcountry). These are the important spawning areas in the core area and include two-thirds of the critical habitat on the forest. Impacts to the functioning of all PCEs are generally expected to be low in these areas; specific impacts are not readily predictable and will be addressed at the project-level consultation. General forest (MA6) allocations occur in middle Grave Creek, and primary recreation (MA7) occurs along one mile of the Kootenai River as it enters Lake Koocanusa. Impacts to the functioning of PCEs 1 and 4 are likely to occur in these areas; impacts to other PCEs are less predictable. Critical habitat in Grave Creek will continue to be affected by grazing in Grave Creek. All watersheds in the core area are allocated to conservation or passive restoration strategies.

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 Kootenai NF, or to the actions of state and local governments when no other federal nexus (e.g., permit, funding) is present. The largest non-federal land owners are the State of Montana, Plum Creek Timber Co., and Stimpson Lumber Co. All three operate and manage their lands under existing habitat conservation plans (HCP) completed and approved under section 10 of the Endangered Species Act and consulted on through section 7, and hence are not considered in the cumulative effects analysis.

Numerous smaller private landowners within the boundaries of the Kootenai NF 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 western Montana 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).

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 four 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 and Kootenai River 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 Basin and the Kootenai 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. In the Clark Fork River Basin a total of 34 miles of 3,328 miles total designated critical habitat (75 FR 63898) occurs on the forest and only 6 miles are allocated to MA6 (general forest), where the full suite of impacts may occur, depending on the projects authorized in the future. For the Kootenai River Basin 121 of 325 miles total designated critical habitat occurs on the forest, of which 70 miles are allocated to MA6.

Projects must be consistent with forest-wide standards and guides in the Revised Plan, which are 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. 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 Kootenai National Forest 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 Opinion.
3. The agency action is subsequently modified in a manner that causes an effect to the listed species or critical habitat that was not considered in this Opinion.
4. A new species is listed or critical habitat designated that may be affected by the action.

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