United States Department of the Interior

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JUL 01 2016

Subject: Biological Opinion on the Salmon-Challis National Forest Non-Wilderness Invasive Plant Management Program in Lemhi, Custer, and Butte Counties, Idaho (EIFW00-2016-F-0617)

Dear Mr. Mark:

This letter transmits the U.S. Fish and Wildlife Service's (Service) biological opinion (Opinion) on effects of the Salmon-Challis National Forests' (Forest) proposed Non-Wilderness Invasive Plant Management Program to the threatened bull trout (*Salvelinus confluentus*) and its designated critical habitat. In a letter dated October 30, 2015, and received by the Service on November 5, 2015, the Forest requested formal consultation under section 7 of the Endangered Species Act of 1973, as amended (16 U.S.C. 1531 et seq.). Your letter included a biological assessment describing effects of the subject action on bull trout and its habitat.

Through the biological assessment, the Forest determined that the proposed management program was likely to adversely affect bull trout and its designated critical habitat. In the enclosed Opinion, the Service finds that effects of the proposed management program are not likely to jeopardize the coterminous United States population of bull trout, or destroy or adversely modify designated critical habitat.

Please note that if conditions change such that the analysis in the enclosed Opinion is no longer accurate, reinitiation of formal consultation may be necessary provided the Forest retains discretionary Federal involvement or control over the action. If you have any questions regarding this Opinion, please contact Laura Berglund of our office at (208) 237-6975 extension 103.

Sincerely,

Sandra J. Fisher

for Dennis Mackey
Acting State Supervisor

Enclosure

cc: SCNF, Salmon (Kreiger)
NMFS, Salmon (Murphy)

BIOLOGICAL OPINION
FOR THE
SALMON-CHALLIS NATIONAL FOREST
INVASIVE PLANT MANAGEMENT PROGRAM
LEMHI, CUSTER, AND BUTTE COUNTIES, IDAHO

01EIFW00-2016-F-0617

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

Supervisor______________________

Date 1 July 2016

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INTRODUCTION

This document represents the U.S. Fish and Wildlife Service's (Service) Biological Opinion (Opinion) on the effects to the threatened bull trout (*Salvelinus confluentus*) and its designated critical habitat from the Salmon-Challis National Forest's (Forest) proposed invasive plant management program (Program) within non-wilderness Forest lands in Idaho. This Opinion was prepared in accordance with section 7 of the Endangered Species Act of 1973, as amended (16 USC 1531 et seq.; [Act]). Your October 30, 2015, request for consultation was received on November 5, 2015.

This Opinion is primarily based on the Forest's *Invasive Plant Treatment Program Biological Assessment* (USFS 2015, entire), dated October 20, 2015, and other sources of information cited herein. The biological assessment (Assessment) is incorporated by reference in this Opinion.

Consultation History

In April 2004, the Forest completed a biological assessment for a noxious weed management program, and in August of that year the Service issued a biological opinion regarding the proposed five year weed management program that concluded the proposed action was not likely to jeopardize the bull trout. The included conference opinion concluded the proposed action was not likely to destroy or adversely modify proposed bull trout critical habitat. In 2012, the Forest requested to continue implementation of the weed management program through 2013, with all program design elements unchanged from past implementation. The Service responded, supporting an extension of the consultation, and confirming the conference opinion as a biological opinion for the now designated bull trout critical habitat. In 2014, the Forest again requested to continue implementation of the weed management program and provided updated environmental baseline information for the action area. The Service responded, supporting an extension of the consultation through 2018. The current Assessment was developed to address proposed changes to the existing weed management program, including use of aerial application methods and use of three additional herbicides. This Opinion supersedes the August 2004 Opinion.

In the October 20, 2015, Assessment, the Forest determined that the proposed action may affect and is likely to adversely affect bull trout and its designated critical habitat.

A chronology of this consultation is presented below. A complete decision record for this consultation is on file at the Service's Eastern Idaho Field Office in Chubbuck, Idaho.

April 22, 2015	The Forest presents and discusses its proposed non-wilderness weeds treatment program at a Level 1 meeting.
June 10, 2015	The Service receives a draft biological assessment for the subject action.
June 24, 2015	The Forest discusses components of the subject action at a Level 1/Level 2 meeting.

July 16, 2015	The Service provides comments to the Forest on the draft biological assessment.
July 22, 2015	The Forest discusses comments received from the Service and the National Marine Fisheries Service (NMFS) at a Level 1 team meeting.
August 12, 2015	The Service receives a revised draft biological opinion for the subject action.
September 15, 2015	The Service provides additional comments to the Forest on the draft biological assessment.
September 16, 2015	The Service participates in a conference call to discuss revisions to the biological assessment based on Service and NMFS comments.

PURPOSE and ORGANIZATION of this BIOLOGICAL OPINION

In accordance with the requirements of section 7(a)(2) of the Act and its implementing regulations, the formal consultation process culminates in the Service's issuance of an Opinion that sets forth the basis for a determination as to whether the proposed Federal action is likely to jeopardize the continued existence of listed species or to destroy or adversely modify critical habitat, as appropriate. The regulatory definition of jeopardy and a description of the formal consultation process are provided at 50 CFR[1] 402.02 and 402.14, respectively. If the Service finds that the action is not likely to jeopardize a listed species, but anticipates that it is likely to cause incidental take of the species, then the Service must identify that take and exempt it from the prohibitions against such take under section 9 of the Act through an Incidental Take Statement.

Analytical Framework for the Jeopardy and Adverse Modification Analyses

<u>Jeopardy Determination</u>
In accordance with policy and regulation, the jeopardy analysis for bull trout in this Opinion relies on four components:

1. *Status of the Species*, which evaluates the rangewide condition of the bull trout, the factors responsible for that condition, and its survival and recovery needs;

2. *Environmental Baseline*, which supplements the findings of the *Status of the Species* analysis by specifically evaluating the condition of bull trout in the action area, the factors responsible for that condition, and the role of the action area in the survival and recovery of the bull trout;

[1] CFR represents the Code of Federal Regulations which is a codification of the general and permanent rules published in the Federal Register by Executive departments and agencies of the Federal Government. It is published by the Office of the Federal Register National Archives and Records Administration. More information can be found at http://www.gpoaccess.gov/cfr/index.html

3. *Effects of the Action*, which determines the direct and indirect impacts of the proposed Federal action and the effects of any interrelated or interdependent activities on bull trout; and

4. *Cumulative Effects*, which evaluates the effects of future, non-Federal activities reasonably certain to occur in the action area on bull trout. Future Federal actions that are unrelated to the proposed action are not considered in this section because they require separate consultation pursuant to section 7 of the Act.

In accordance with policy and regulation, the jeopardy determination is made by evaluating the effects of the proposed Federal action in the context of bull trout current status, taking into account any cumulative effects, to determine if implementation of the proposed action is likely to cause an appreciable reduction in the likelihood of both the survival and recovery of bull trout in the wild, at the rangewide scale.

Interim recovery units were defined in the final listing rule for bull trout for use in completing jeopardy analyses (USFWS 1999, p. 58910). Subsequently, the Recovery Plan for the Coterminous United States Population of Bull Trout (*Salvelinus* confluentus), released by the Service in September 2015, formally established six bull trout recovery units, each of which is individually necessary to conserve the entire listed entity (USFWS 2015, p. 33). Pursuant to Service policy, when an action impairs or precludes the capacity of a recovery unit from providing both the survival and recovery function assigned to it, that action may represent jeopardy to the species. When using this type of analysis, the biological opinion describes how the action affects not only the recovery unit's capability, but the relationship of the recovery unit to both the survival and recovery of the listed species as a whole. The following analysis uses this approach and considers the role of the action area and core area (discussed below under the *Status of the Species* section) in the function of the recovery unit as context for evaluating the effects of the proposed Federal action, together with any cumulative effects, on the survival and recovery of the bull trout to make the jeopardy determination. Please note that consideration of the recovery units for purposes of the jeopardy analysis is done within the context of making the jeopardy determination at the scale of the entire listed species in accordance with Service policy (USFWS 2006).

<u>Destruction or Adverse Modification Determination</u>

In accordance with policy and regulation, the adverse modification analysis for bull trout critical habitat in this Opinion relies on four components:

1. The *Status of Critical Habitat* analysis, which evaluates the rangewide condition of designated critical habitat for the bull trout in terms of physical or biological features (PBFs), the factors responsible for that condition, and the intended recovery function of the critical habitat overall, as well as the intended recovery function in general of critical habitat units;

2. The *Environmental Baseline* analysis, which supplements the *Status of the Critical Habitat* analysis by specifically evaluating the condition of bull trout critical habitat in the action area, the factors responsible for that condition, and the recovery role of the critical habitat in the action area;

3. The *Effects of the Action* analysis, which determines the direct and indirect impacts of the proposed Federal action and the effects of any interrelated or interdependent activities on the PBFs of bull trout critical habitat and how those effects are likely to influence the recovery role of affected critical habitat units; and

4. The *Cumulative Effects* analysis, which evaluates the effects of future, non-Federal activities reasonably certain to occur in the action area on bull trout critical habitat. Future Federal actions that are unrelated to the proposed action are not considered in this section because they require separate consultation pursuant to section 7 of the Act.

Past designations of critical habitat have used the terms "primary constituent elements" (PCEs), "physical or biological features" (PBFs) or "essential features" to characterize the key components of critical habitat that provide for the conservation of the listed species. The new critical habitat regulations (81 FR 7214) discontinue use of the terms PCEs or essential features, and rely exclusively on use of the term PBFs for that purpose because that term is contained in the statute. However, the shift in terminology does not change the approach used in conducting a ''destruction or adverse modification'' analysis, which is the same regardless of whether the original designation identified PCEs, PBFs or essential features. For those reasons, in this Opinion, we use the term PBF to characterize the key components of critical habitat that provide for the conservation of the bull trout.

For purposes of making the destruction or adverse modification determination, the effects of the proposed Federal action, together with any cumulative effects, are evaluated to determine if the critical habitat rangewide would remain functional (or retain the current ability for the PBFs to be functionally re-established in areas of currently unsuitable but capable habitat) to serve its intended conservation/recovery role for the bull trout.

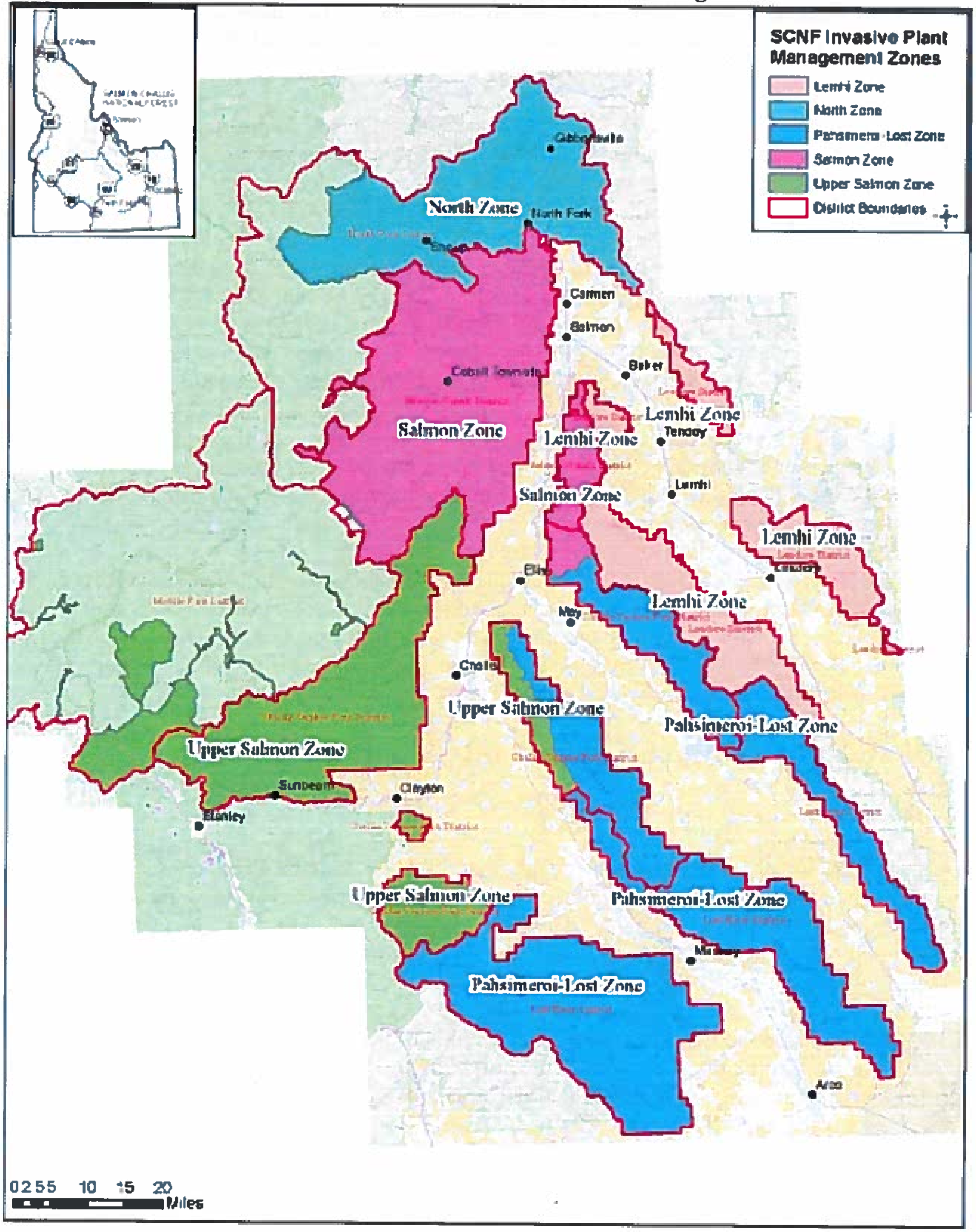
I. DESCRIPTION OF THE PROPOSED ACTION

A. Action Area

The term "action area" is defined in the regulations as "all areas to be affected directly or indirectly by the Federal action and not merely the immediate area involved in the action." An action includes activities or programs "directly or indirectly causing modifications to the land, water, or air" (50 CFR 402.02). In this case, the area where land, water, or air is likely to be affected includes all lands administered by the Forest's six ranger districts, excluding the Frank Church River of No Return wilderness area. The action area encompasses approximately 3,100,000 acres, and includes the following 4^{th} field hydrologic unit code (HUC)[2] watersheds: Middle Salmon-Chamberlain, Lower Middle Fork Salmon, Upper Middle Fork Salmon, Lemhi River, Middle Salmon-Panther, Pahsimeroi River, Upper Salmon River, Big Lost River, and Little Lost River (Figure 1).

[2] The hydrologic unit codes (HUCs) describe the relation of the hydrologic units to each other to represent the way smaller watersheds drain areas that together form larger watersheds. For example, the Pahsimeroi River Watershed is a considered a 4^{th} field HUC. Streams draining into the River would represent 5^{th} and 6^{th} field HUCs.

Figure 1. Boundaries of the Salmon-Challis National Forest Non-wilderness Invasive Plant Management Program Area and locations of Invasive Plant Management Zones



B. Proposed Action

The term "action" is defined in the implementing regulations for section 7 as "all activities or programs of any kind authorized, funded, or carried out, in whole or in part, by Federal agencies in the United States or upon the high seas" (50 CFR 402.02).

The Forest proposes to implement an adaptive integrated invasive plant management program (Program) to eradicate or control existing and newly discovered infested areas on non-wilderness Forest lands. The Program includes both treatment and non-treatment elements, and an aquatic invasive plant control framework strategy. Although no aquatic invasive plant infestations have been identified within the action area to date, the framework strategy is included in the Program to facilitate and expedite a treatment response if/when an aquatic infestation is identified. If an infestation were discovered, the Forest would initiate a separate, site-specific consultation addressing potential treatments (Assessment, pp. 47, 71-73). Non-treatment elements of the Program include prevention, early detection/rapid response, and implementation and effectiveness monitoring. These elements involve education and outreach efforts, planning, inventory, and assessment (Assessment, pp. 48, 49-50, 75-78). Treatment elements of the Program are described in detail below, and include rehabilitation and restoration, and control and management (Assessment, pp. 48-49).

1. Rehabilitation and Restoration

Rehabilitation is defined as short-term mitigation to ensure minimum site stability and functionality, while restoration is a long-term objective and involves returning sites to natural functions and native species (Assessment, p. 49). Many invasive plant-infested plant communities are able to successfully re-establish without intervention after control efforts, and natural revegetation is preferred whenever possible. However, sites that have been severely impacted by invasive plant species may require management activities to recover. Rehabilitation and restoration activities would be designed and implemented based on site conditions, and may include site preparation and seeding of desirable vegetation. Equipment that may be used includes hand tools, such as rakes, or larger equipment, such as off highway vehicle (OHV)-drawn harrows. Aerial delivery of seed may also be used (Assessment, pp. 73-75).

2. Control and Management

A variety of treatment options and combinations intended to minimize the effect of invasive plants and limit their spread could be used throughout the project area. A maximum of 20,000 acres could be proposed for treatment annually. Proposed treatments would be based on integrated pest management principles and methods known to be effective for each target species. Treatment methods would be based on the extent, location, type, and character of an infestation, and would be implemented using mandatory design criteria (Assessment, pp. 48-49). Treatment methods include: manual and mechanical control, biological control, and chemical control.

a. Manual and Mechanical Control

These methods would typically be used to remove seed heads, individual plants, or small infestations. Manual treatments include hand pulling or use of hand tools to remove plants or seed heads. Manual treatments may require digging below the soil surface to remove the main root of plants. Mechanical treatments would use equipment and power tools to complete actions such as mowing, torching, and weed whipping. No mechanical control methods proposed by the Forest include digging or tilling the ground. A maximum of 2,000 acres may be treated each year with this method (Assessment, pp. 59-60).

b. Biological Control

Biological control would use plant predators or pathogens to attack and weaken target invasive plant species and reduce their ability to compete or reproduce. The Forest would use only biological control agents approved by the Animal and Plant Health Inspection Service and the State of Idaho. This method would be used when the target species occupies extensive portions of the landscape, other methods of control are prohibitive based on cost or location, and an effective biological control regime exists. Biological control may be used to supplement herbicide control in larger infestations where treatments cannot be accomplished regularly (Assessment, p. 61). A maximum of 2,000 acres may be treated each year with this method (Assessment, p. 59).

c. Chemical Control

This method would involve ground-based or aerial application of herbicides and associated adjuvants. Herbicide application rates and methods used would depend on several factors: the target species and its phenological stage, abundance, and distribution; type of herbicide used; site condition; type of non-target vegetation; soil type and depth to water table; and distance to open water, riparian areas, and sensitive plant species (Assessment, pp. 62-64). A maximum of 16,000 acres (consisting of up to 8,000 acres ground-based application and up to 8,000 acres aerial application) may be treated each year with this method (Assessment, p. 59).

The method of herbicide application would result in a variance in the amount of herbicide used on the landscape. Three types of herbicide application would be used:

- Spot spraying – This method targets individual plants and the immediate area around them. Most spot spraying is usually done with a backpack sprayer. However, spot spraying may also be accomplished using a hose from a truck-mounted or OHV-mounted tank, or tanks mounted on pack animals. This is the most common herbicide application method.

- Broadcast – Herbicide is applied to cover an area of ground rather than individual plants. This method may employ a spray system mounted on a truck or OHV. Broadcast applications are used in areas where invasive plants occupy a large percentage of plant cover on the site, making spot spraying impractical.

- Aerial application – This method would be used in areas where physical features, such as topography, restricted access, size and/or rate of spread of infestation, personnel safety, or other factors such as prohibitive unit cost of ground application occur. Invasive plants would be treated with herbicide through the use of helicopters.

Herbicides

Thirteen herbicides are proposed for use by the Forest. Herbicide formulations and mixtures could contain one or more of the herbicides discussed below. Additional herbicides may be added in the future at either the Forest Plan or project level through appropriate risk analysis, National Environmental Policy Act procedures, and Endangered Species Act consultation (Assessment, p. 63).

2,4-D amine is the most commonly used and most widely studied herbicide in the United States. It is labeled for a wide range of uses. 2,4-D has very little persistence in the environment (half-life of approximately 1 week), although its salts can move through sandy soils. Soil microorganisms degrade 2,4-D in a matter of weeks. 2,4-D has low toxicity to aquatic organisms, with several formulations approved for use in water and near water. 2,4-D has been implicated in a class of synthetic chemicals called endocrine disrupting compounds (EDCs). The Environmental Protection Agency (EPA) has identified 2,4-D for continuing study, but notes that the connection between 2,4-D and endocrine disruption in wildlife and humans is uncertain. The herbicide continues to be recommended for use. 2,4-D amine is proposed for ground-based upland and riparian applications (Assessment, pp. 80-81).

Aminopyralid is a new, low toxicity, low application rate herbicide belonging to the same class of herbicides as picloram and clopyralid. Because of its low toxicity to both fish and aquatic invertebrates, aminopyralid can be used in riparian areas and close to water. The EPA classifies aminopyralid as "practically non-toxic to freshwater fish" and "practically non-toxic to freshwater invertebrates". Aminopyralid is identified as a "low risk" herbicide, and is proposed for ground-based upland and riparian applications, and aerial applications (Assessment, p. 81).

Chlorsulfuron is used to control many broadleaf weeds and some annual grasses. It has a half-life of 1 to 3 months, and is broken down to smaller compounds by soil microorganisms. Contact of this herbicide with non-target plants may injure or kill plants. However, it is practically non-toxic to most fish and aquatic invertebrates because of the very low use rates and dispersion of residues to deeper soil layers with leaching. Chlorsulfuron is proposed for ground-based upland and riparian applications (Assessment, p. 81).

Clopyralid is a relatively new and very selective herbicide. It is toxic to some members of only three plant families: the composites, the legumes, and the buckwheats. Clopyralid exhibits low toxicity to aquatic animals. Its selectivity makes it an attractive alternative herbicide on sites with non-target species that are sensitive to other herbicides. Clopyralid is degraded almost entirely by microbes and it is not susceptible to photo or chemical degradation. Clopyralid does not bind strongly with soil particles. This lack of adsorption means that it can possibly leach into surface and groundwater. Although no extensive off-site movement has been reported, the possibility of groundwater effects must be considered. Clopyralid is proposed for ground-based upland and riparian applications, and aerial applications (Assessment, pp. 81-82).

Dicamba is a broadleaf herbicide, effective against a similar range of weed species applied at similar rates as 2,4-D. However, dicamba is somewhat more persistent in the environment than 2,4-D, and therefore, provides somewhat longer control of susceptible weed species. Dicamba is slightly toxic to fish and amphibians and is practically non-toxic to aquatic invertebrates. Dicamba does not accumulate in aquatic animals. Dicamba is moderately persistent in soils and slightly soluble in water. Despite its low toxicity, dicamba is not recommended for direct application to water. Dicamba is proposed only for ground-based upland applications (Assessment, p. 82).

Glyphosate is a non-selective, broad-spectrum herbicide labeled for a variety of uses. This herbicide affects a wide variety of plants, including grasses and many broadleafs, and has the potential to eliminate desirable as well as undesirable vegetation. Glyphosate exhibits slight soil movement, and its absorption by roots is minimal to non-existent. Glyphosate readily binds to organic matter in soil and is easily broken down by microorganisms. This herbicide is especially appropriate for use where low soil mobility and short-term persistence are required to alleviate environmental concerns. Applied at the label direction rates, glyphosate would not adversely affect fish, aquatic invertebrates, or aquatic macrophytes. Glyphosate is proposed for ground-based upland and riparian applications (Assessment, p. 82).

Imazamox displays a low toxicity to both fish and aquatic invertebrates, and is characterized as "essentially non-toxic to fish". Imazamox is identified as a "low risk" herbicide. This herbicide is proposed for ground-based riparian applications (Assessment, p. 83).

Imazapic is a selective herbicide that would potentially be used in a limited number of situations. It has a half-life of 7 to 150 days, depending on soil type and climate conditions. Imazapic is proposed for ground-based upland and riparian applications, and aerial applications (Assessment, p. 83).

Imazapyr is a broad spectrum herbicide similar to glyphosate in terms of its non-selectivity. Imazapyr displays a low toxicity to both fish and aquatic invertebrates. The EPA classifies this herbicide as "practically non-toxic to fish" and "practically non-toxic to *Daphnia*". Imazapyr is identified as a "low risk" herbicide. Imazapyr is proposed for ground-based upland and riparian applications (Assessment, p. 83).

Metsulfuron methyl is used to control annual and perennial broadleaf weeds, and can be mixed with other chemicals to provide more effective weed control. This herbicide is broken down in the soil by the action of microorganisms and by the chemical action of water. Metsulfuron methyl is proposed for ground-based upland and riparian applications (Assessment, p. 83).

Picloram is a restricted use pesticide (can only be used by certified applicators) used to control a variety of broadleaf weed species. Picloram is water soluble, mobile in sandy soils low in organic matter, and may affect desirable plants that have roots growing in treated areas. Degradation by soil organisms is slow, and primary breakdown is by ultraviolet light. Picloram is relatively persistent (effectively controlling many weed species up to 3 years after application), although its persistence varies with soil type and weather. Picloram's mobility and persistence have generated concerns over possible groundwater contamination or runoff to surface water. Because of this concern, no more than one application of picloram will occur in a year. In addition, picloram is unsuitable for use on areas with shallow water tables and is restricted from use near surface water or groundwater. Although picloram is currently being scrutinized as an EDC, no adverse effects to endocrine activity have resulted from numerous studies conducted on mammals and birds to determine picloram toxicity values. The evidence indicates that the endocrine system in birds and mammals is not affected by exposure to picloram at expected environmental concentrations. Picloram is proposed for ground-based and aerial upland terrestrial plant applications (Assessment, pp. 83-84).

Sulfometuron methyl is used to control annual and perennial grasses and broadleaf weeds. This herbicide has a half-life of 1 to 3 days in bright light, and approximately 1 month in soil. It is practically unsoluble in water and should not be applied to any body of water or wetlands. Sulfometuron methyl is proposed for ground-based upland and riparian applications (Assessment, p. 84).

Triclopyr is a selective herbicide. Triclopyr TEA is the active ingredient in Garlon 3A, and is effective in controlling brush when used in combination with foliar, basal bark, and cut-stump treatments. Triclopyr is often mixed with other chemicals at varying rates to improve effectiveness and reduce the amount of herbicide applied. This herbicide degrades rapidly in soil and water. Tryclopyr is proposed for ground-based upland and riparian applications. Only the Garlon 3 formulation of triclopyr TEA would be used (Assessment, p. 84).

Maximum and proposed typical application rates and general application categories of herbicides proposed for use in the Forest's Program are presented in Table 1 below.

Table 1. Herbicides Proposed for Use in the Invasive Plant Management Program

Herbicide (Active Ingredient)	Product Name 1/	Maximum Label Application Rate (lbs. AI/AC)	Proposed Typical Application Rate (lbs. AI/AC)	General Application
2,4-D amine	Weedar 64, Weedestroy, Clean Amine, DMA4	4.0 lb/ac	0.5-1.5 lb/ac	Upland, Riparian
Aminopyralid	Milestone	0.11 lb/ac	0.06 – 0.11 lb/ac	Upland, Riparian, Aerial
Chlorsulfuron	Telar	2.6 oz./ac (.12 lb./ac)	0.5 - 2.0 oz./ac (0.0.02 - 0.09 lb./ac)	Upland, Riparian
Clopyralid	Transline	0.5 lb/ac	0.28 - 0.5 lb/ac	Upland, Riparian, Aerial
Dicamba	Banvel, Vanquish	2.0 lb/ac	0.75 - 2.0 lb/ac	Upland
Glyphosate	Rodeo, Aquamaster, Aquaneet	10.8 lb/ac	0.35 -5.0 lb/ac	Upland, Riparian
Imazamox	Clearcast	0.5lb/ac	0.25-0.5 lb/ac	Riparian
Imazapic	Plateau	0.19 lb/ac	0.1 - 0.19 lb/ac	Upland, Riparian, Aerial
Imazapyr	Habitat	1.5 lbs/ac	0.5-1.0 lb/ac	Upland, Riparian
Metsulfuron-methyl	Escort	4.0 oz./ac (.15 lb./ac)	1.0 - 3.0 oz./ac (0.04lb/ac - 0.11 lb./ac)	Upland, Riparian
Picloram	Tordon 22K	1.0 lb/ac	0.5 - 0.75 lb/ac	Upland, Aerial
Sulfometuron methyl	Oust	8.0 oz./ac (.37 lb./ac)	2.0 - 5.0 oz./ac (0.09lb/ac - 0.23 lb./ac)	Upland, Riparian
Triclopyr: triethylamine salt	Garlon 3A	9.0 lb/ac	4.5 - 6.0 lb/ac	Upland, Riparian

AI – Active Ingredient
AC - Acre
1/ Other product brands of identical or "substantially similar" formulation may be added or substituted in the future. (reference to EPA Pesticide Registration Manual and 40 CFR 152.113)

Adjuvants and Inert Ingredients

Chemical control activities frequently utilize adjuvants in addition to herbicides for more effective control of target species. Adjuvants are compounds added to herbicide solution to improve its performance. Adjuvants can either enhance the activity of an herbicide's active ingredient (activator adjuvant) or offset any problems associated with its application (special purpose or utility modifiers). Adjuvants can be added during the manufacturing process or by the applicator as needed based on site conditions.

Currently, the State of Idaho does not have a registration system for adjuvants. In order to address toxicity concerns related to the use of adjuvants in riparian areas, the Forest proposes to use only Washington State aquatic-certified adjuvants in riparian areas. To be certified in Washington, adjuvant manufacturers have to provide a complete ingredient list, display all ingredients on the label, and submit efficacy data to the State Departments of Water Quality to prove that the product does what they claim it does. Once all requirements are met, the State assigns a unique state registration number that will be listed on the product label (Assessment, p. 66).

Inert ingredients are substances other than the active ingredient that are added to an herbicide formulation. The EPA reviews the inert ingredients prior to registration of herbicides. Lack of disclosure on the label of other ingredients indicates that none of the inert ingredients present at a concentration of 0.1 percent or greater are classified as hazardous or toxic. Many manufacturers consider inert ingredients in their herbicide formulations to be proprietary information and do not list them on the product label. During preparation of risk assessments for herbicides proposed for use in the Program, data on inert ingredients was obtained under a Freedom of Information Act request. The information release indicated the inert ingredients are on the EPA Inert List 4A: minimal risk ingredients (non-toxic or low toxicity), List 4B: sufficient information to reasonably conclude that the current use will not adversely affect public health, or List 3: unknown toxicity. No toxic substances were found to be included in any herbicide formulation proposed for use in the Program (Assessment, p. 86).

The Forest proposes to use dyes in conjunction with herbicide application to ensure uniform coverage, minimize overlapped and skipped areas, and to ensure non-target areas have not been treated. All dyes used would be non-toxic, water-soluble liquid formulations (Assessment, p. 67).

Carriers are gases, solids, or liquids used to dilute or suspend herbicides during application and allow for proper placement of the herbicide, whether on soil or on foliage. Water is the only carrier proposed for use by the Forest.

C. Term of Action

The Forest expects to implement the adaptive integrated invasive plant management program over the next 10 to 15 years, as funding allows. On that basis, the Service considers the term of the action to extend to December 31, 2026, provided there are no changes to trigger reinitiation (see Section IX) of this consultation.

D. Proposed Program Design Criteria

The Forest has identified specific design criteria to reduce or eliminate adverse impacts of the invasive plant treatments. Implementation of the design criteria is mandatory (Assessment, p. 59). The Service considers the design criteria essential to limit impacts to bull trout and its habitat. If any of the criteria are not implemented, there may be effects of the action that were not considered in this Opinion, and reinitation of consultation may be required. Project design criteria pertinent to bull trout and its habitat are summarized below. A complete list of design criteria and best management practices (BMPs) can be found in the Assessment (pp. 60, 61-62, 66-70, Appendices D - H).

1. Design Criteria for Manual and Mechanical Treatment

- Minimize soil disturbance as much as possible to minimize bare soils and germination of invasive plant seeds.
- Avoid non-target species damage to the extent practicable. Select mechanical methods to effectively control the target species.
- Thoroughly inspect and clean all equipment and clothing to remove invasive plant seeds or vegetative propagules to prevent the movement of the invasive plant to another site.
- Specific to aquatic invasive plants, hand-pulling and/or smothering may be used when an infestation is very limited in extent and occurs close to the shoreline of a waterbody, but has not yet infested deeper waters.
- Mechanical treatments should not occur on any slopes where excessive erosion to waterbodies (e.g., slope fall lines to lakes, streams, etc.) and resource damage will occur. Proper erosion control techniques will be utilized on steep slopes to prevent excessive erosion and resource damage from occurring.

2. Design Criteria for General Herbicide Treatment

- Always read and follow label directions, including instructions for herbicide use.
- Make sure Safety Data Sheets, safety plan, spill prevention plan and clean up kits are available to applicators, per the requirements of FSH 2109.
- Ensure the contracts and agreements include all of these Design Criteria as a minimum.
- Monitor wind speed and direction, and equipment and spray parameters, throughout an herbicide application. No herbicide shall be applied in sustained wind conditions exceeding five miles per hour (mph) in riparian areas or in any wind conditions exceeding product label directions.
- Herbicide applicators would obtain a weather forecast for the area prior to initiating a spraying project to ensure no extreme precipitation or wind events were predicted to occur during or immediately after spraying that could allow runoff or drift into waterbodies.
- Transport only the quantity of herbicide and adjuvants needed for a project. Secure containers being transported in such a way to prevent the likelihood of spills. Make periodic checks en route to help avoid spillage. Carry herbicides and adjuvants in water-tight, floatable containers when supplies need to be carried over water by boat, raft, or other watercraft.
- When out in the field, use practical measures to restrict access to herbicides and adjuvants, and spray equipment, by unauthorized personnel.
- OHVs used to transport or spray herbicides are administratively allowed to travel off designated motorized routes. These vehicles would not be taken off designated routes if

damage to soils could occur due to wet conditions. Take care to ensure that disturbance to desirable vegetation is minimized and that no visible "trail" creation occurs.
- Follow the procedures in the Forest Spill Plan in the event of a spill. Keep the Forest Spill Plan compliant with National Pollutant Discharge Elimination System.
- Use indicator dye in the herbicide mix to visually assure uniform coverage and minimize overlapped or skipped areas and treatment of non-target areas. All colorants used by the Forest will be non-toxic, water-soluble liquid formulations.
- To minimize herbicide drift during broadcast operations, use low pressure and larger droplet size to the extent possible with the equipment being used. Use nozzles designed for herbicide application.
- Equip drafting equipment with back siphoning prevention devices.
- Whenever possible, mix and load at a distance greater than 100 feet from water and where spilled material will not flow into groundwater, wetlands, or streams.
- No broadcast application methods are used in riparian areas (the transition area between the aquatic ecosystem and the adjacent terrestrial ecosystem; identified by soil characteristics or distinctive vegetation communities that require free or unbound water).
- Use a spray pattern that avoids application of herbicide to non-target species.
- In order to prevent herbicide and adjuvants from entering water, check local weather conditions daily, monitor site-specific conditions during herbicide application, select the most suitable herbicide and adjuvants (as appropriate) combination for the setting and apply the lowest effective use rates, employ spot spraying techniques in riparian areas, apply herbicide at low pressure, use the largest appropriate nozzle size and other appropriate equipment, add drift control agents where necessary, and utilize directional application techniques to direct herbicide away from water.
- The Forest will use only Washington State aquatic-certified adjuvants in riparian areas.

3. Additional Design Criteria for Aerial Herbicide Application

- All live water (perennial streams, flowing intermittent streams, lakes, ponds, springs, and wetlands) would have a 300 foot no application aerial herbicide buffer.
- Aerial herbicide application would not occur when sustained wind speeds exceed five mph or label recommendations, whichever is less.
- Aerial herbicide applications would not occur during inversions, or below minimum relative humidity, or above maximum temperature, as stated on product label.
- Herbicide applicators would obtain a weather forecast for the area prior to initiating a spraying project to ensure no extreme precipitation or wind events were predicted to occur during or immediately after spraying that could allow runoff or drift into waterbodies.
- Aerial spray units (and all lakes, perennial streams, flowing intermittent streams, seeps, ponds, springs, and wetlands in proposed aerial units) would be identified prior to spraying to ensure only appropriate portions of the unit are aerially treated. A GPS system would be used in spray helicopters and each treatment unit mapped before the flight to ensure only areas marked for treatment are treated. Drift monitoring cards would be placed out to 300 feet from, and perpendicular to, perennial streams to monitor herbicide presence.

The Forest has stated that herbicide label directions will be followed. Table 2 identifies label-specified directions for ground application of herbicides near live waters, and buffer widths from water for aerial applications.

Table 2. Ground and Aerial Herbicide Application Buffers

Herbicide	Product 1/2/	Use	Ground Application Buffer 3/	Aerial Application Buffer
2,4-D amine	Weedar 64, Weedestroy, Clean Amine, DMA 4	Riparian, Upland	Water Edge 3/	n/a
Aminopyralid	Milestone	Riparian, Upland, Aerial	Water Edge 4/	300 ft
Chlorsulfuron	Telar XP	Riparian, Upland, Aerial	Water Edge 4/	300 ft
Clopyralid	Transline	Riparian, Upland, Aerial	Water Edge 4/	300 ft
Dicamba	Vanquish, Banvel	Upland	Outside riparian vegetation OR 50 feet from water's edge, whichever is greater.4/ 5/	n/a
Glyphosate	Rodeo, Aquamaster, Aquaneet	Riparian, Upland	Water Edge 4/	n/a
Imazamox	Clearcast	Riparian	Water Edge 4/	n/a
Imazapic	Plateau	Upland, Riparian, Aerial	A level, well-maintained vegetative buffer strip between areas to which this product is applied and surface water 4/	300 ft
Imazapyr	Habitat	Riparian, Upland	Water Edge 4/	n/a
Metsulfuron-methyl	Escort XP	Riparian, Upland, Aerial	Water Edge 4/	300 ft
Picloram	Tordon 22K	Upland, Aerial	Outside riparian vegetation OR 50 feet from water's edge, whichever is greater.	300 ft
Sulfometuron-methyl	Oust XP	Riparian, Upland, Aerial	15 ft 6/	300 ft
Triclopyr TEA	Garlon 3A	Riparian, Upland	Water Edge 3/	n/a

1/ Aquatic formulations of 2,4-D amine, glyphosate, imazamox, imazapyr and triclopyr TEA shall be used.
2/ Other product brands of identical or "substantially similar" formulation may be added or substituted in the future. (reference to EPA Pesticide Registration Manual and 40 CFR 152.113)
3/ No broadcast application of herbicides would be conducted within riparian areas.
4/ Per label direction; Do not apply directly to water or areas where surface water is present, or intertidal areas below the mean high water mark
5/ No applications will be made within riparian areas.
6/ Per label direction; All handheld spot treatment applications – 15 feet

II. STATUS OF THE BULL TROUT

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

A. Regulatory Status

1. Listing Status

The coterminous United States population of bull trout was listed as threatened under the Act on November 1, 1999 (USFWS 1999, p. 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 (USFWS 1999, pp. 58910-58916).

The bull trout was initially listed as three separate Distinct Population Segments (DPSs) (USFWS 1999, p. 58910). The preamble to the final listing rule discusses the consolidation of these DPSs, plus two other population segments, into one listed taxon and the application of the jeopardy standard under section 7 of the Act relative to this species (USFWS 1999, p. 58910):

> "*Although this rule consolidates the five bull trout DPSs into one listed taxon, based on conformance with the DPS policy for purposes of consultation under section 7 of the Act, we intend to retain recognition of each DPS in light of available scientific information relating to their uniqueness and significance. Under this approach, these DPSs will be treated as interim recovery units with respect to application of the jeopardy standard until an approved recovery plan is developed. Formal establishment of bull trout recovery units will occur during the recovery planning process.*"

Please note that consideration of the interim recovery units for purposes of the jeopardy analysis is done within the context of making the jeopardy determination at the scale of the entire listed species in accordance with Service policy (USFWS 2006). See the analytical framework for the jeopardy determination discussed above that explains the use of recovery units in the jeopardy analysis.

2. Threats

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 nonnative species (USFWS 1999, p. 58912).

3. Climate Change

Climate change represents a relatively new threat to bull trout. The current change in world climate is trending toward warmer temperatures (Intergovernmental Panel on Climate Change 2007). Because bull trout are dependent on cold water temperatures, changes toward higher average temperatures could effectively reduce its available habitat (Rieman et al. 2007, p. 4). Rieman et al. (2007, p. 14) found that a change of 0.6 to 5 °Celsius (C) could reduce the percent of large habitat patches by 27 to 97 percent across the bull trout's range.

In Central Idaho, habitat may be affected less by climate change than other areas of the bull trout's range because of the wide range in elevation of current habitat distribution. Given the broad range of the estimate above for reduction of large habitat patches, it is difficult to reasonably interpret what impact the actual changes to bull trout habitat are likely to have on the survival and recovery of the bull trout throughout its range. Rieman et al. (2007, p. 17) caution that their results cannot be extrapolated directly for management of bull trout without consideration of many other factors. Until better models are developed on which to base an understanding of climate change-related effects on the bull trout, Rieman et. al. (2007, p. 17) suggest continuation of bull trout conservation efforts to maximize its resiliency.

B. Survival and Recovery Needs

1. Recovery Planning

Between 2002 and 2004, three separate draft recovery plans were completed. The 2002 draft recovery plan addressed bull trout populations within the Columbia, Saint Mary-Belly, and Klamath River basins (USFWS 2002a, 2002b, 2002c), and included individual chapters for 24 separate recovery units (later referred to as management units). In 2004, draft recovery plans were developed for the Coastal-Puget Sound drainages in western Washington (USFWS 2004a) and for the Jarbidge River in Nevada (USFWS 2004b). Those draft plans were not finalized, but have served to identify recovery actions across the range of the species and to provide a framework for implementing numerous recovery actions by our partner agencies, local working groups, and others with an interest in bull trout conservation (USFWS 2015, p. 2).

The Service released the final bull trout recovery plan in September 2015 (USFWS 2015, entire). The final plan incorporated and built upon new information collected on status of bull trout, factors affecting the species, and ongoing conservation efforts across the range of the species since the draft 2002 and 2004 recovery planning efforts. The 2002 and 2004 draft recovery plans provide life history information, habitat characteristics, reasons for decline, and distribution and abundance of bull trout subpopulations covered by those draft plans. The 2015 final recovery plan, utilizing new information and reanalysis, identified six biologically-based recovery units (USFWS 2015, p. 33). Recovery actions for each of the six recovery units include:

- Protect, restore, and maintain suitable habitat conditions for bull trout

- Minimize demographic threats to bull trout by restoring connectivity or populations where appropriate to promote diverse life history strategies and conserve genetic diversity

- Prevent and reduce negative effects of nonnative fishes and other nonnative taxa on bull trout

- Work with partners to conduct research and monitoring to implement and evaluate bull trout recovery activities, consistent with an adaptive management approach using feedback from implemented, site-specific recovery tasks, and considering the effects of climate change (USFWS 2015, pp. 50-53)

A Recovery Unit Implementation Plan (RUIP) was developed for each unit, and the Service's Bull Trout Recovery Implementation Team is currently developing guidance on implementation of the RUIPs. While the 2015 final recovery plan supercedes and replaces the previous draft recovery plans, the 2002 and 2004 draft recovery plans still provide important information on bull trout status and life history.

Each of the six recovery units consists of one or more core areas. Approximately 109 occupied core areas are recognized across the coterminous United States range of the bull trout. In addition, six historically occupied core areas, and two "research needs areas" are identified (USFWS 2105, p. 34). The occupied core areas can be described as simple or complex, and are composed of one or more local populations. See definitions below.

<u>Core Area</u>: a geographic area within a recovery unit occupied by one or more local bull trout populations. Core areas are functionally similar to a metapopulation, in that bull trout within a core area are much more likely to overlap in their use of rearing, foraging, migratory, and overwintering habitat, and in some cases in their use of spawning habitat, than are bull trout from separate core areas.

- Simple Core Area: a geographic area occupied by one bull trout local population. Simple core areas are small in scope, isolated from other core areas by natural barriers, and may contain unique genes or life history adaptations.

- Complex Core Area: a geographic area containing multiple bull trout local populations. Complex core areas are found in large watersheds, have multiple life history forms, and have migratory connectivity between spawning and rearing habitat and foraging, migrating, and overwintering habitat.

<u>Local Population</u>: a group of bull trout within a core area that spawn within a particular stream or portion of a stream system. A local population is considered to be the smallest group of fish that is known to represent an interacting reproductive unit.

C. Rangewide Status and Distribution

The six biologically-based recovery units of the coterminous United States population of bull trout, each of which is individually necessary to conserve the entire listed entity (USFWS 2015, p. 33), are: (1) Coastal Recovery Unit, (2) Klamath Recovery Unit, (3) Mid-Columbia Recovery Unit, (4) Upper Snake Recovery Unit, (5) Columbia Headwaters Recovery Unit, and (6) Saint Mary Recovery Unit. A summary of the current status of the bull trout within these units is provided below.

1. Coastal Recovery Unit

The Coastal Recovery Unit is divided into three geographic regions in western Oregon and Washington: the Puget Sound, Olympic Peninsula, and the Lower Columbia River. Bull trout in the Coastal Recovery Unit exhibit anadromous, adfluvial, fluvial, and resident life history patterns. The anadromous life history form is unique to Puget Sound and Olympic Peninsula regions. This recovery unit contains 21 occupied core areas and 85 local populations, including the Clackamas River core area where bull trout had been extirpated and were reintroduced in 2011. Four historically occupied core areas that could be re-established have been identified. This recovery unit also contains ten shared foraging, migrating, and overwintering (FMO) habitats which are outside core areas and allow for the continued natural population dynamics in which the core areas have evolved. Four core areas within the Coastal Recovery Unit have been identified as current population strongholds: Lower Skagit, Upper Skagit, Quinault River, and Lower Deschutes River. These are the most stable and largest bull trout populations in the recovery unit.

The current condition of the bull trout in this recovery unit is attributed to the adverse effects of climate change, loss of functioning estuarine and nearshore marine habitats, development and related impacts (e.g., flood control, floodplain disconnection, bank armoring, channel straightening, loss of instream habitat complexity), agriculture (e.g., diking, water control structures, draining of wetlands, channelization and the removal of riparian vegetation, livestock grazing), fish passage (e.g., dams, culverts, instream flows) residential development, urbanization, forest management practices (e.g., timber harvest and associated road building activities), connectivity impairment, mining, and the introduction of nonnative species. Conservation measures or recovery actions implemented include relicensing of major hydropower facilities that have provided upstream and downstream fish passage or completely removed dams, land acquisition to conserve bull trout habitat, floodplain restoration, culvert removal, riparian revegetation, levee setbacks, road removal, and projects to protect and restore important nearshore marine habitats.

2. Klamath Recovery Unit

The Klamath Recovery Unit, located in southern Oregon, is the most significantly imperiled recovery unit, having experienced considerable extirpation and geographic contraction of local populations and declining demographic condition, and natural re-colonization is constrained by dispersal barriers and presence of nonnative brook trout (USFWS 2015, p.39). This recovery unit currently contains three core areas and eight local populations. Nine historic local populations of bull trout have been extirpated, and restoring additional local populations will be necessary to achieve recovery (USFWS 2015b, p. B7). All three core areas have been isolated from other bull trout populations for the past 10,000 years.

The current condition of the bull trout in this recovery unit is attributed to the adverse effects of climate change, habitat degradation and fragmentation, past and present land use practices, agricultural water diversions, nonnative species, and past fisheries management practices. Conservation measures or recovery actions implemented include removal of nonnative fish (e.g., brook trout, brown trout, and hybrids), acquiring water rights for instream flows, replacing diversion structures, installing fish screens, constructing bypass channels, installing riparian fencing, culvert replacement, and habitat restoration.

3. Mid-Columbia Recovery Unit

The Mid-Columbia Recovery Unit is located in eastern Washington, eastern Oregon, and portions of central Idaho. The Mid-Columbia Recovery Unit is divided into four geographic regions: Lower Mid-Columbia, Upper Mid-Columbia, Lower Snake, and Mid-Snake. This recovery unit contains 24 occupied core areas, two historically occupied core areas, one research needs area, and seven FMO habitats. The current condition of the bull trout in this recovery unit is attributed to the adverse effects of climate change, agricultural practices (e.g., irrigation, water withdrawals, livestock grazing), fish passage (e.g., dams, culverts), nonnative species, forest management practices, and mining. Conservation measures or recovery actions implemented include road removal, channel restoration, mine reclamation, improved grazing management, removal of fish barriers, and instream flow requirements.

4. Upper Snake Recovery Unit (includes the action area)

The Upper Snake Recovery Unit is located in central Idaho, northern Nevada, and eastern Oregon. The Upper Snake Recovery Unit is divided into seven geographic regions: Salmon River, Boise River, Payette River, Little Lost River, Malheur River, Jarbidge River, and Weiser River. This recovery unit contains 22 core areas and 206 local populations, with almost 60 percent of local populations being present in the Salmon River Geographic Region. The current condition of the bull trout in this recovery unit is attributed to the adverse effects of climate change, dams, mining, forest management practices, nonnative species, and agriculture (e.g., water diversions, grazing). Conservation measures or recovery actions implemented include instream habitat restoration, instream flow requirements, screening of irrigation diversions, and riparian restoration.

5. Columbia Headwaters Recovery Unit

The Columbia Headwaters Recovery Unit is located in western Montana, northern Idaho, and the northeastern corner of Washington. The Columbia Headwaters Recovery Unit is divided into five geographic regions: Upper Clark Fork, Lower Clark Fork, Flathead, Kootenai, and Coeur d'Alene. This recovery unit contains 35 bull trout core areas, of which 15 are complex core areas and 20 are simple core areas. The 20 simple core areas are each represented by a single local population, many of which may have persisted for thousands of years despite small populations and their isolation (USFWS 2015c, p. D1). Fish passage improvements within the recovery unit have reconnected previously fragmented habitats. The current condition of the bull trout in this recovery unit is attributed to the adverse effects of climate change, mining and contamination by heavy metals, nonnative species, modified instream flows, migratory barriers (e.g., dams), habitat fragmentation, forest practices (e.g., logging, roads), agriculture practices (e.g., irrigation, livestock grazing), and residential development. Conservation measures or recovery actions implemented include habitat improvement, fish passage, and removal of nonnative species. Unlike the other recovery units, the Columbia Headwaters Recovery Unit does not overlap with salmon distribution. Therefore, bull trout within the Columbia Headwaters Recovery Unit do not benefit from the recovery actions for salmon (USFWS 2015c, p. D41).

6. St. Mary Recovery Unit

The Saint Mary Recovery Unit is located in Montana, but is heavily dependent on resources in southern Alberta, Canada. Most of the watershed in this recovery unit is located in Canada. The United States portion includes headwater spawning and rearing habitat and the upper reaches of FMO habitat. This recovery unit contains four core areas and eight local populations. The current condition of the bull trout in this recovery unit is attributed to the adverse effects of climate change, the Saint Mary Diversion operated by the Bureau of Reclamation (e.g., entrainment, fish passage, instream flows), and nonnative species. The primary issue precluding bull trout recovery in this recovery unit relates to impacts of water diversions, specifically at the Bureau of Reclamation's Milk River Project.

D. 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. 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. Migratory bull trout spawn in tributary streams where juvenile fish rear one to four years before migrating to either a lake (adfluvial form), a river (fluvial form), or saltwater (anadromous) to rear as subadults or to live as adults. Bull trout normally reach sexual maturity in four to seven years and may live longer than 12 years. 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. They are iteroparous (they spawn more than once in a lifetime), and both repeat- and alternate-year spawning have been reported, although repeat-spawning frequency and post-spawning mortality are not well documented.

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 salmonids (fishes that spawn once and then die, and therefore require only one-way passage upstream). 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.

Additional information about the bull trout's life history can be found in the final listing rule (USFWS 1999).

E. Habitat Characteristics

Bull trout have more specific habitat requirements than most other salmonids. 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. Watson and Hillman (1997, p. 247-250) 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, fish should not be expected to simultaneously occupy all available habitats.

Migratory corridors link seasonal habitats for all bull trout life histories. The ability to migrate is important to the persistence of bull trout. 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 °Fahrenheit (F)), and spawning habitats are generally characterized by temperatures that drop below 48 °F in the fall. 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. Optimum incubation temperatures for bull trout eggs range from 35 to 39 °F, whereas optimum water temperatures for rearing range from about 46 to 50 °F (Buchanan and Gregory 1997, p. 122). In Granite Creek, Idaho, Bonneau and Scarnecchia (1996, p. 629-630) observed that juvenile bull trout selected the coldest water available in a plunge pool, 46 to 48 °F, within a temperature gradient of 46 to 60 °F. In a landscape study relating bull trout distribution to maximum water temperatures, Dunham et al. (2003, pp. 899-900) found that the probability of juvenile bull trout occurrence does not become high (i.e., greater than 75 percent) until maximum temperatures decline to 52 to 54 °F.

Although bull trout are found primarily in cold streams, occasionally these fish are found in larger, warmer river systems throughout the Columbia River Basin. Factors that can influence bull trout ability to survive in warmer rivers include availability and proximity of cold water patches and food productivity. In the Little Lost River, Idaho, bull trout have been collected in water having temperatures up to 68 °F; however, the trend in the relationship between temperature and species composition shows that bull trout made up less than 50 percent of all salmonids when maximum summer water temperature exceeded 59 °F and less than 10 percent of all salmonids when temperature exceeded 63 °F (Gamett 1999, pp. 28-29).

All life history stages of bull trout are associated with complex forms of cover, including large woody debris, undercut banks, boulders, and pools. Maintaining bull trout habitat requires stability of stream channels and maintenance of natural flow patterns. Juvenile and adult bull trout frequently inhabit side channels, stream margins, and pools with suitable cover. 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 alevins in the gravel from winter through spring. Increases in fine sediment can 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. Redds are often constructed in stream reaches fed by springs or near other sources of cold groundwater. Depending on water temperature, incubation is normally 100 to 145 days (Pratt 1992, p. 5), and after hatching, alevins 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.

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, pp. 347-351). 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. In the absence of the migratory bull trout life form, isolated populations cannot be replenished when disturbance makes local habitats temporarily unsuitable, the range of the species is diminished, and the potential for enhanced reproductive capabilities are lost (Rieman and McIntyre 1993, p. 11).

Additional information about the bull trout's habitat requirements can be found in the final listing rule (USFWS 1999).

F. Diet

Bull trout are opportunistic feeders, with food habits primarily a function of size and life history strategy. Resident and juvenile migratory bull trout prey on terrestrial and aquatic insects, macro zooplankton, mysids, and small fish. Adult migratory bull trout feed on various fish species. Fish growth depends on the quantity and quality of food that is eaten, and as fish grow, their foraging strategy changes in quantity, size, or other characteristics. Bull trout that are 110 millimeters (4.3 inches) long or longer commonly have fish in their diet (Shepard et al. 1984, p. 38), and bull trout of all sizes have been found to eat fish half their length (Beauchamp and Van Tassell 2001, p. 210).

Migration allows bull trout to move to or with a food source, access optimal foraging areas, and exploit a wider variety of prey resources. Migratory bull trout begin growing rapidly once they move to waters with abundant forage that includes fish (Shepard et al. 1984, p. 49). As these fish mature they become larger-bodied predators and are able to travel greater distances in search of prey species of larger size and in greater abundance. In Lake Billy Chinook, as bull trout became increasingly piscivorous with increasing size, the prey species changed from mainly smaller bull trout and rainbow trout for bull trout less than 17.7 inches in length to mainly kokanee for bull trout greater in size (Beauchamp and Van Tassell 2001, p. 213).

Additional information on the bull trout's diet can be found in the final listing rule (USFWS 1999).

G. Previously Consulted-on Effects

1. Rangewide

Consulted-on effects are effects that have been analyzed in section 7 consultations and reported in a biological opinion. In 2003, the Service reviewed all of the biological opinions issued by the Region 1 and Region 6 Service offices, from the time of bull trout listing until August 2003; this summed to 137 biological opinions. The Service completed section 7 consultations on many programs and actions that benefit bull trout. While some of the beneficial programs were small-scale actions such as removing passage barriers and installing 'fish friendly' crossing structures, some were large, such as restoring habitat conditions in degraded streams and riparian areas. Three consultations that had broad and long-term benefits to bull trout were consultations on documents that amended Forest Plans and provided standards and guidelines related to federally listed anadromous and native inland fish on National Forest Service lands in Idaho.

The majority of consultations on projects that resulted in adverse effects were for effects that were short-term and very local. Overall, our review showed that we consulted on a wide array of actions which had varying levels of effect and that none were found to appreciably reduce the likelihood of survival and recovery of the bull trout. Furthermore, no actions that have undergone consultation were anticipated to result in the loss of local populations of bull trout. This is still true as of the date of this Opinion.

Between August 2003 and July 2006, the Service issued 198 opinions that included analyses of effects to the bull trout. These opinions also reached "not likely to jeopardize" determinations and the Service concluded that the continued long-term survival and existence of the species had not been appreciably reduced rangewide due to these actions. All opinions issued after July 2006 also reached "not likely to jeopardize" determinations. Since July 2006, a review of the data in our national Tracking and Integrated Logging System reveals this trend is still true to date; no jeopardy opinions have been issued for the bull trout.

2. Eastern Idaho

For this Opinion, the Eastern Idaho Office examined the record for biological opinions issued since 2003 for those action areas that overlap any or all of the following eight bull trout core areas: Upper Salmon River, Pahsimeroi River, Lemhi River, Middle Salmon River-Panther, Little Lost River, Middle Fork Salmon River, Lake Creek, and Opal Creek (USFWS 2016, entire).

Approximately 66 biological opinions have been issued across the eight bull trout core areas. Five of them are broad-scale, program-level Opinions. In three of those five, no take was anticipated or none has occurred. In the remaining Opinions, varying amounts of lethal and nonlethal take of adult bull trout, juvenile bull trout, and bull trout redds were anticipated. In each of those actions, less take than was anticipated has been detected (USFWS 2016). All 66 Opinions concluded that the proposed actions would not be likely to jeopardize the coterminous U.S. population of bull trout.

III. STATUS OF BULL TROUT CRITICAL HABITAT

A. Legal Status

Ongoing litigation resulted in the U.S. District Court for the District of Oregon granting the Service a voluntary remand of the 2005 bull trout critical habitat designation. Subsequently, the Service published a final critical habitat designation for the coterminous United States population of the bull trout on October 18, 2010 (70 FR 63898); the rule became effective on November 17, 2010. A justification document was also developed to support the rule and is available on our website (http://www.fws.gov/pacific/bulltrout). The scope of the designation involved the species' coterminous range, which includes the Jarbidge River, Klamath River, Columbia River, Coastal-Puget Sound, and Saint Mary-Belly River population segments.

Rangewide, the Service designated reservoirs/lakes and stream/shoreline miles as bull trout critical habitat (Table 3). Designated bull trout critical habitat is of two primary use types: 1) spawning and rearing, and 2) foraging, migration, and overwintering (FMO).

Table 3. Stream/shoreline distance and reservoir/lake area designated as bull trout critical habitat by state.

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

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.

This rule also identifies and designates as critical habitat approximately 1,323.7 km (822.5 miles) of streams/shorelines and 6,758.8 ha (16,701.3 acres) of lakes/reservoirs of unoccupied habitat to address bull trout conservation needs in specific geographic areas in several areas not occupied at the time of listing. No unoccupied habitat was included in the 2005 designation. These unoccupied areas were determined by the Service to be essential for restoring functioning migratory bull trout populations based on currently available scientific information. These unoccupied areas often include lower 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.

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

B. 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. 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 final rule. Twenty-nine of the CHUs contain all of the physical or biological features identified in this final rule and support multiple life-history requirements. Three of the mainstem river units in the Columbia and Snake River basins contain most of the physical or biological features necessary to support the bull trout's particular use of that habitat, other than those physical or biological features associated with 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, p. 19); 2) provide for persistence of strong local populations, in part, by providing habitat conditions that encourage movement of migratory fish (Rieman and McIntyre 1993, pp. 22-23; MBTSG 1998, pp. 48-49); 3) are large enough to incorporate genetic and phenotypic diversity, but small enough to ensure connectivity between populations (Hard 1995, pp. 314-315; Healey and Prince 1995, p. 182; Rieman and McIntyre 1993, pp. 22-23; MBTSG 1998, pp. 48-49); and 4) are distributed throughout the historic range of the species to preserve both genetic and phenotypic adaptations (Hard 1995, pp. 321-322; Rieman and McIntyre 1993, p. 23; Rieman and Allendorf 2001, p. 763; MBTSG 1998, pp. 13-16).

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

Within the designated critical habitat areas, the PBFs 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 PBFs are essential for the conservation of bull trout.

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

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

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

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

(5) Water temperatures ranging from 2 to 15 °C (36 to 59 °F), with adequate thermal refugia available for temperatures that exceed the upper end of this range. Specific temperatures within this range will depend on bull trout life history stage and form; geography; elevation; diurnal and seasonal variation; shading, such as that provided by riparian habitat; stream flow; 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 substrate, 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 baseflows within the historical 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 nonnative predatory (e.g., lake trout, walleye, northern pike, smallmouth bass); interbreeding (e.g., brook trout); or competing (e.g., brown trout) species that, if present, are adequately temporally and spatially isolated from bull trout.

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

Note that only PBFs 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 PBFs 1 and 6. Additionally, all except PBF 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 one to two 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.

In marine nearshore areas, the inshore extent of critical habitat is the mean higher high-water (MHHW) line, including the uppermost reach of the saltwater wedge within tidally influenced freshwater heads of estuaries. The MHHW line refers to the average of all the higher high-water heights of the two daily tidal levels. Marine critical habitat extends offshore to the depth of 10 meters (m) (33 ft) relative to the mean lower low-water (MLLW) line (zero tidal level or average of all the lower low-water heights of the two daily tidal levels). This area between the MHHW line and minus 10 m MLLW line (the average extent of the photic zone) is considered the habitat most consistently used by bull trout in marine waters based on known use, forage fish availability, and ongoing migration studies and captures geological and ecological processes important to maintaining these habitats. This area contains essential foraging habitat and migration corridors such as estuaries, bays, inlets, shallow subtidal areas, and intertidal flats.

Adjacent shoreline riparian areas, bluffs, and uplands are not designated as critical habitat. However, it should be recognized that the quality of marine and freshwater habitat along streams, lakes, and shorelines is intrinsically related to the character of these adjacent features and that human activities that occur outside of the designated critical habitat can have major effects on physical and biological features of the aquatic environment.

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 PBFs that relate to the ability of the area to at least periodically support the species. Activities that may destroy or adversely modify critical habitat are those that alter the PBFs to such an extent that the conservation value of critical habitat is appreciably reduced (75 FR 63898:63943; USFWS 2004, Vol. 1. pp. 140-193, Vol. 2, pp. 69-114). 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, pp. 4-39). 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).

C. Current Critical Habitat Condition Rangewide

The condition of bull trout critical habitat varies across its range from poor to good. Although still relatively widely distributed across its historical range, the bull trout occurs in low numbers in many areas, and populations are considered depressed or declining across much of its range (67 FR 71240). This condition reflects the condition of bull trout habitat. The 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, June 10, 1998; 64 FR 17112, April 8, 1999).

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 PBFs, those which appear to be particularly significant and have resulted in a legacy of degraded habitat conditions are as follows: 1) fragmentation and isolation of local populations due to the proliferation of dams and water diversions that have eliminated habitat, altered water flow and temperature regimes, and impeded migratory movements (Dunham and Rieman 1999, p. 652; Rieman and McIntyre 1993, p. 7); 2) degradation of spawning and rearing habitat and upper watershed areas, particularly alterations in sedimentation rates and water temperature, resulting from forest and rangeland practices and intensive development of roads (Fraley and Shepard 1989, p. 141; MBTSG 1998, pp. ii - v, 20-45); 3) the introduction and spread of nonnative fish species, particularly brook trout and lake trout, as a result of fish stocking and degraded habitat conditions, which compete with bull trout for limited resources and, in the case of brook trout, hybridize with bull trout (Leary et al. 1993, p. 857; Rieman et al. 2006, pp. 73-76); 4) in the Coastal-Puget Sound region where amphidromous bull trout occur, degradation of mainstem river FMO habitat, and the degradation and loss of marine nearshore foraging and migration habitat due to urban and residential development; and 5) degradation of FMO habitat resulting from reduced prey base, roads, agriculture, development, and dams.

1. Effects of Climate Change on Bull Trout Critical Habitat

One objective of the final rule 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 PBFs 1, 2, 3, 5, 7, 8, and 9. Protecting bull trout strongholds and cold water refugia from disturbance and ensuring connectivity among populations were important considerations in addressing this potential impact. Additionally, climate change may exacerbate habitat degradation impacts both physically (e.g., decreased base flows, increased water temperatures) and biologically (e.g., increased competition with nonnative fishes).

D. Previously Consulted-on Effects for Critical Habitat

1. Rangewide

The Service has formally consulted on the effects to bull trout critical habitat throughout its range. Section 7 consultations include actions that continue to degrade the environmental baseline. However, long-term restoration efforts have also been implemented that provide some improvement in the existing functions within some of the critical habitat units. None of the consulted-on actions have resulted in an adverse modification finding.

2. Eastern Idaho

For this Opinion, the Eastern Idaho Office examined the record for biological opinions issued since 2010 for those action areas that overlap any or all of the following bull trout critical habitat units or subunits: Upper Salmon River, Pahsimeroi River, Lemhi River, Middle Salmon River-Panther, Little Lost River, Middle Fork Salmon River, Lake Creek, and Opal Creek. Thirteen biological opinions addressing bull trout critical habitat have been issued across these subunits. All 13 Opinions concluded that the proposed actions were not likely to result in destruction or adverse modification of critical habitat.

III. ENVIRONMENTAL BASELINE FOR THE BULL TROUT AND BULL TROUT DESIGNATED CRITICAL HABITAT

The preamble to the implementing regulations for section 7 (USFWS 1986) contemplates that the evaluation of ". . . the present environment in which the species or critical habitat exists, as well as the environment that will exist when the action is completed, in terms of the totality of factors affecting the species or critical habitat . . . will serve as the baseline for determining the effects of the action on the species or critical habitat". The regulations at 50 CFR 402.02 define the environmental baseline to include "the past and present impacts of all Federal, State, or private actions and other human activities in the action area that have already undergone formal or early section 7 consultation, and the impact of State or private actions which are contemporaneous with the consultation in process." The analysis presented in this section supplements the above *Status of the Species* evaluations by focusing on the current condition of the bull trout in the action area, the factors responsible for that condition, inclusive of the factors cited above in the regulatory definition of the environmental baseline, and the role the action area plays in the survival and recovery of the bull trout. Relevant factors on lands surrounding the action area that are influencing the condition of the bull trout were also considered in completing the status and baseline evaluations herein.

A. Status of Bull Trout in the Action Area

The action area includes portions of nine 4th field HUCs, one of which (Big Lost River) does not contain any aquatic species or habitats listed under the Act that would be affected by the action, thus the Big Lost River subbasin will not be addressed further in this Opinion. The eight remaining 4th field HUCs in the action area are within the Upper Snake Recovery Unit which encompasses portions of central Idaho, northern Nevada, and eastern Oregon, and includes the Salmon River, Malheur River, Jarbidge River, Little Lost River, Boise River, Payette River, and Weiser River drainages. There are 22 bull trout core areas within the Upper Snake Recovery Unit. The action area overlaps 9 of these core areas (USFWS 2015, p. E1).

Eight of the nine core areas are within the Salmon River basin. Most of the core areas within the Salmon River Basin contain large bull trout populations and many occupied stream segments (USFWS 2015, p. E2). Although bull trout habitat quantity and quality have been altered through time by influences including past timber harvest, livestock grazing, and mining, and more recently by residential development, the Salmon River basin provides large areas of intact habitat (USFWS 2002b, pp. 31, 44, 48; USFWS 2015, p. E1). Both wildfire and fire suppression have had effects on bull trout habitat components within the basin (USFWS 2002b, p. 33). Road densities in the Salmon River basin are relatively low, with 64 percent of the basin having no roads or low road density (USFWS 2002b, pp. 40-41). Bull trout and its habitat can be negatively affected by water diversions. Over 770 known diversions exist in the Salmon River basin (USFWS 2002b, pp. 36-37), but there are no major dams in the Salmon River basin, and connectivity within Salmon River core areas is mostly intact (USFWS 2015, p. E2).

One of the core areas is within the Little Lost River basin, a closed basin within the Upper Snake River basin (USFWS 2015, p. E107). The Little Lost River flows southeastward between the Lost River and Lemhi Mountain Ranges, terminating at a naturally occurring hydrologic sink

(USFWS 2002d, p. 1). Bull trout habitat conditions in the Little Lost River basin have been altered through time by influences including stream channelization, water diversion, and livestock grazing, which have occurred in the basin since the late 1800s (USFWS 2002d, p. 13-15). Timber harvest and road construction are more recent anthropogenic influences (USFWS 2002d, pp. 12, 15). Natural disturbances, such as wildfires, have also occurred (USFWS 2002d, p. 13).

Population and habitat information specific to each core area is provided below.

Middle Salmon River-Chamberlain Core Area

The Middle Salmon River-Chamberlain Core Area encompasses 866,600 acres, most of which is within the Frank Church River of No Return Wilderness. There are at least nine local populations in this core area (USFWS 2002b, p. 17; USFWS 2015, p. 90). Only a very small portion of this core area, from the Middle Fork Salmon River to Wheat Creek, outside the wilderness, is within the action area for the Program.

In 2005, Idaho Department of Fish and Game (IDFG) reported population numbers for the Middle Salmon River-Chamberlain Core Area (IDFG 2005, p. 32) that were based on an extensive modeling effort (IDFG 2005 and High et al. 2008). A corrected table (K. Meyer, IDFG, pers. comm., March 11, 2009) showed an approximate population of 2,930 (± 2,016) bull trout (adults and young) for the core area. Using an assumption that 10 percent of the total number is comprised of adult fish (K. Meyer, IDFG, pers. comm., March 11, 2009), that would suggest an adult population in the core area of approximately 293 adults (±202). Recent information provided by IDFG indicates an increasing trend in bull trout abundance within this core area (USFWS 2015, p. E90).

In the 2005 conservation status assessment (USFWS 2005) the Middle Salmon River-Chamberlain Core Area final rank was "at potential risk" because of limited and/or declining numbers, range, and/or habitat, even though bull trout may be locally abundant in some portions of the core area. The bull trout 5-year review (USFWS 2008) considered threats to the core area to be widespread, but of low severity, and determined the core area to be "at potential risk" overall.

Because a large part of the Middle Salmon River-Chamberlain Core Area is within the Frank Church River of No Return Wilderness, roads have not been a substantial impact to bull trout habitat (USFWS 2002b, p. 41). Road density in this core area is 0.3 mile per square mile (mi/mi^2) (USFWS 2005, p.50). Both current and historical mining affects water quality in some parts of this core area, and historical dredge mining has significantly influenced bull trout habitat in a few streams (USFWS 2002b, p. 47). Recreational and residential development, and associated water withdrawals, have impacted bull trout habitat in some parts of this core area (USFWS 2002b, p. 49).

Middle Fork Salmon River Core Area

The Middle Fork Salmon River Core Area encompasses 1,839,000 acres. Most of this core area is within the Frank Church River of No Return Wilderness, and is not within the action area. There are 28 local populations in this core area (USFWS 2015, p. E91).

The Middle Fork Salmon River Core Area is believed to contain some of the strongest bull trout populations in the Pacific Northwest (USFWS 2002b, p. 27; USFWS 2015, p. E91). In 2005, IDFG reported population numbers for the Middle Fork Salmon River Core Area (IDFG 2005, p. 32) that were based on an extensive modeling effort (IDFG 2005 and High et al. 2008). A corrected table (K. Meyer, IDFG, pers. comm., March 11, 2009) showed an approximate population of 35,999 (± 12,358) bull trout (adults and young) for the core area. Using an assumption that 10 percent of the total number is comprised of adult fish (K. Meyer, IDFG, pers. comm., March 11, 2009), that would suggest an adult population in the core area of approximately 3,600 adults (±1,200). Recent information provided by IDFG indicates a stable to decreasing trend in bull trout abundance within this core area (USFWS 2015, p. E91).

In the 2005 conservation status assessment (USFWS 2005) the Middle Fork Salmon River Core Area final rank was "low risk" because bull trout are common or uncommon (but not rare), and widespread through the core area. The core area is apparently not vulnerable to extirpation at this time, but may be cause for long-term concern. The bull trout 5-year review (USFWS 2008) also determined the core area to be "low risk" overall.

The Service has issued five biological opinions addressing ongoing Federal actions specific to this core area: two for water diversions (Middle Fork Salmon River and Camas Creek) and three for livestock grazing (Morgan Creek-Prairie Basin Allotment, Cape Horn Allotment, and Camas Creek Allotment). Each of these opinions found that the actions analyzed were not likely to jeopardize the coterminous U.S. population of bull trout. The aggregate amount or extent of take of bull trout and bull trout redds caused by these five Federal actions is estimated by the Service to be at the scale of 72 to 90 bull trout (mostly juveniles) and 53 to 74 bull trout redds. Take of redds was anticipated to result from livestock trampling, while take of adult and juvenile bull trout was anticipated to result from entrainment or stranding at water diversions. Surveys conducted from 2010 to date have not found any take of bull trout redds caused by the actions addressed in the opinions. Limited surveys have found take (nonlethal) of one adult bull trout due to entrainment, and subsequent salvage, at a diversion.

Because most of the Middle Fork Salmon River Core Area is within the Frank Church River of No Return Wilderness, roads have not been a substantial impact to bull trout habitat (USFWS 2002b, p. 41). Road density in this core area is 0.2 mi/mi^2 (USFWS 2005, p.50). Similarly, although some streams in this core area have been negatively affected by past livestock grazing, livestock grazing is not currently an issue with bull trout recovery (USFWS 2002b, pp. 35–36). Historic dredge mining has significantly influenced bull trout habitat in a few streams, and continues to contribute sediment to those streams (USFWS 2002b, p. 47).

<u>Opal Lake Core Area</u>
The Opal Lake Core Area encompasses 1,280 acres in the headwaters of the Panther Creek watershed, and includes Opal Lake and Opal Creek upstream of the lake. Opal Lake is a natural, oligotrophic lake, with no outlet. One local population has been identified in this core area (USFWS 2015, p. E97).

Currently available data are insufficient to establish a trend in bull trout abundance (USFWS 2015, p. E97). Although the single local population in the core area is believed to be migratory, the population is isolated from other core areas (USFWS 2002b, pp. 17, 66; USFWS 2015, p. E97).

In the 2005 conservation status assessment (USFWS 2005) the Opal Lake Core Area final rank was "at potential risk" because of limited and/or declining numbers, range, and/or habitat, even though bull trout may be locally abundant in some portions of the core area. The bull trout 5-year review (USFWS 2008) considered threats to the core area to be widespread, but of low severity, and determined the core area to be "at potential risk" overall.

The Service has issued one biological opinion addressing an ongoing Federal action specific to this core area for livestock grazing on the Morgan Creek-Prairie Basin Allotment. This opinion found that the action analyzed was not likely to jeopardize the coterminous U.S. population of bull trout. The amount or extent of take of bull trout caused by this Federal action is estimated by the Service to be at the scale of one to four bull trout redds, caused by livestock trampling. Surveys conducted from 2010 to date have not found any take of bull trout redds caused by the action addressed in the opinion.

Impacts to bull trout habitat from anthropogenic factors are minimal in the Opal Lake Core Area. Although livestock grazing occurs in this core area, dense woody vegetation limits livestock access to Opal Creek, and grazing has not substantially affected bull trout habitat (USFS 2010a, pp. 29, 30, C15). There are no roads within this core area (USFWS 2005, p. 49).

Middle Salmon River-Panther Core Area

The Middle Salmon River-Panther Core Area encompasses 1,377,500 acres and includes the Salmon River and Panther Creek drainages that extend from the confluence of the main Salmon River with the Lemhi River, to its confluence with the Middle Fork Salmon River. This core area has at least 19 local populations (USFWS 2002b, p. 13; USFWS 2015, p. E92). Migratory bull trout may persist in some of these local populations, but most populations appear to exhibit resident life history expression (USFWS 2002b, p. 66; USFWS 2015, p. E92).

In 2005, IDFG reported population numbers for the Middle Salmon River-Panther Core Area (IDFG 2005, p. 32) that were based on an extensive modeling effort (IDFG 2005 and High et al. 2008). A corrected table (K. Meyer, IDFG, pers. comm., March 11, 2009) showed an approximate population of 72,732 (± 24,772) bull trout (adults and young) for the core area. Using an assumption that 10 percent of the total number is comprised of adult fish (K. Meyer, IDFG, pers. comm., March 11, 2009), that would suggest an adult population in the core area of approximately 7,300 adults (±2,500). More recent information provided by IDFG indicates a stable to decreasing trend in bull trout abundance within this core area (USFWS 2015, p. E92).

In the 2005 conservation status assessment (USFWS 2005) the Middle Salmon River-Panther Core Area final rank was "at risk". While not the most imperiled (at high risk), the core area was considered at risk because of very limited and/or declining numbers, range, and/or habitat, making bull trout in this core area vulnerable to extirpation. The bull trout 5-year review (USFWS 2008) also determined the core area to be "at risk" overall.

The Service has issued 19 biological opinions addressing Federal actions specific to this core area: four for water diversions (Otter Creek, Lower Salmon River, Middle Salmon River, and Blackbird Mine diversions and settling basins), two for mining operations (Idaho Cobalt Mine and Beartrack Mine), two for ongoing activities at a watershed-level (including grazing) (Panther Creek Ongoing Activities, BLM Travel Plan), ten for grazing in specific allotments (Indian Ridge, Fourth of July Creek, South Fork Williams Creek, Deer-Iron, Carmen Creek, Morgan Creek-Prairie Basin, North Basin, Hat Creek, Cow Creek, and Forney Allotments) and one for emergency wildfire response (Mustang Fire). Each of these opinions found that the actions analyzed were not likely to jeopardize the coterminous U.S. population of bull trout. The aggregate amount or extent of take of bull trout and bull trout redds caused by these Federal actions is estimated by the Service to be at the scale of 164 to 214 bull trout (mostly juveniles), and includes both lethal and nonlethal take, and 92 to 257 bull trout redds. Take of redds was anticipated to result from livestock trampling, while take of adult and juvenile bull trout was anticipated to result from entrainment or stranding at water diversions. Surveys conducted from 2010 to date have not found any take of bull trout redds caused by the actions addressed in the opinions. Limited surveys have found no take of bull trout due to entrainment at a diversion.

Impacts to bull trout habitat from past livestock grazing and water diversions (primarily for agriculture) are prevalent in this core area (USFWS 2002b, pp. 34, 37). Although portions of the Middle Salmon River–Panther Core Area are within wilderness or other designated roadless areas, roads have been established in the floodplains of some streams, resulting in increased peak flows, reduced off-channel habitat, and elevated sediment loads (USFWS 2002b, pp. 41-42). Reported road density of this core area is 0.7 mi/mi^2 (USFWS 2005, p.49). Past mining activities have impacted stream channel conditions and water quality. Ongoing release of contaminants to some streams is a concern (USFWS 2002b, p. 46).

Lemhi River Core Area

The Lemhi River Core Area encompasses 808,670 acres, and is bordered by the Bitteroot Range of the Beaverhead Mountains to the north and east, and the Lemhi Mountain Range to the west. The Lemhi River begins at the confluence of Texas Creek and Eighteenmile Creek, and flows northwest through the Lemhi River valley. The core area contains at least six local populations. Migratory bull trout persist in some local populations in this core area (USFWS 2015, p. E93).

In 2005, IDFG reported population numbers for the Lemhi River Core Area (IDFG 2005, p. 32) that were based on an extensive modeling effort (IDFG 2005 and High et al. 2008). A corrected table (K. Meyer, IDFG, pers. comm., March 11, 2009) showed an approximate population of 58,019 (± 16,557) bull trout (adults and young) for the core area. Using an assumption that 10% of the total number is comprised of adult fish (K. Meyer, IDFG, pers. comm., March 11, 2009), that would suggest an adult population in the core area of approximately 5,800 adults (±1,600). Recent information provided by IDFG indicates an increasing trend in bull trout abundance within this core area (USFWS 2015, p. E93).

In the 2005 conservation status assessment (USFWS 2005) the Lemhi River Core Area final rank was "at risk". While not the most imperiled (at high risk), the core area was considered at risk because of very limited and/or declining numbers, range, and/or habitat, making bull trout in this core area vulnerable to extirpation. The bull trout 5-year review (USFWS 2008) also determined the core area to be "at risk" overall.

The Service has issued 14 biological opinions addressing Federal actions specific to this core area: three for water diversions (Lemhi River #47, Lemhi River #45, and Lemhi Water Diversions), one for ongoing activities at a watershed-level (BLM Travel Plan), nine for grazing in specific allotments (Grizzly Hill, Upper Hayden, Little Eightmile, Timber Creek, Hawley Creek, Swan Basin, Deer Park, Cove Creek, and Nez Perce Allotments), and one for bank stabilization (Rip Rap on Lemhi River). Each of these opinions found that the actions analyzed were not likely to jeopardize the coterminous U.S. population of bull trout. The aggregate amount or extent of take of bull trout and bull trout redds caused by these Federal actions is estimated by the Service to be at the scale of 135 to 231 bull trout, and 47 to 218 bull trout redds. Take of redds was anticipated to result from livestock trampling, while take of adult and juvenile bull trout was anticipated to result from construction and operation of water diversions. Surveys conducted from 2010 to date have not found any take of bull trout redds caused by the actions addressed in the opinions. Limited surveys have found no take of bull trout due to stranding or entrainment at a diversion. Two water diversions have not yet been constructed. Consequently, no take of bull trout has occurred at these project locations.

Impacts to bull trout habitat from water diversions (primarily for agriculture) are prevalent in this core area (USFWS 2002b, p. 37). Diversion of water has resulted in increased fragmentation, and decreased quantity of bull trout habitat (USFWS 2002b, pp. 39-40; USFWS 2015, p. E93). Agricultural practices (cultivation, irrigation, pesticide and herbicide application) and historic mining activities contribute to poor water quality in some streams within the core area (USFWS 2002b, p. 37; Assessment, pp. 45-46). Reported road density in the Lemhi River Core Area is moderate, at 0.8 mi/mi^2 (USFWS 2005, p.48).

<u>Lake Creek Core Area</u>

The Lake Creek Core Area encompasses 11,245 acres on the west side of the Salmon River between the mouths of the Pahsimeroi and Lemhi Rivers. The core area includes Williams Lake and Lake Creek. Williams Lake was formed by a massive landslide 8,000 to 10,000 years ago, and has no outlet. This core area has one local population, which occupies Williams Lake and Lake Creek, upstream of the lake (USFWS 2015, p. E96).

Although the population appears to be stable, currently available data are insufficient to establish a trend in bull trout abundance (USFWS 2015, p. E96). The single local population in the core area is believed to be migratory, but is isolated from other core areas (USFWS 2002b, pp. 8, 66; USFWS 2015, p. E96).

In the 2005 conservation status assessment (USFWS 2005) the Lake Creek Core Area final rank was "at risk". While not the most imperiled (at high risk), the core area was considered at risk because of very limited and/or declining numbers, range, and/or habitat, making bull trout in this core area vulnerable to extirpation. The bull trout 5-year review (USFWS 2008) considered threats to the core area to be widespread, but of low severity, and determined the core area to be "at risk" overall.

The Service has issued one biological opinion specific to this core area for livestock grazing on the Lake Creek Allotment. This opinion found that the action analyzed was not likely to jeopardize the coterminous U.S. population of bull trout. The amount or extent of take of bull trout caused by this Federal action is estimated by the Service to be two bull trout redds. Take of redds was anticipated to result from livestock trampling. Surveys conducted from 2010 to date have not found any take of bull trout redds caused by the action addressed in the opinion.

Although livestock grazing occurs in this core area, topography and dense woody vegetation limit livestock access to Lake Creek (USFS 2010, p. 23). Roads have been established in riparian areas and may be resulting in increased peak flows, reduced off-channel habitat, and elevated sediment loads. Reported road density is 1.0 mi/mi^2 (USFWS 2005, p.48). Residential and recreational development in this core area has negatively impacted water quality in Williams Lake (USFWS 2002b, p.49; USFWS 2015, p. E96).

<u>Pahsimeroi River Core Area</u>
The Pahsimeroi River Core Area encompasses 536,800 acres on the east side of the Salmon River, and includes the west slope of the Lemhi Mountain Range and the east slope of the Pahsimeroi Mountains in the Lost River Range. The core area contains at least nine local populations (USFWS 2002b, pp. 7-8; USFWS 2015, p. E94).

In 2005, IDFG reported population numbers for the Pahsimeroi River Core Area (IDFG 2005, p. 32) that were based on an extensive modeling effort (IDFG 2005 and High et al. 2008). A corrected table (K. Meyer, IDFG, pers. comm., March 11, 2009) showed an approximate population of 37,181 (± 16,913) bull trout (adults and young) for the core area. Using an assumption that 10% of the total number is comprised of adult fish (K. Meyer, IDFG, pers. comm., March 11, 2009), that would suggest an adult population in the core area of approximately 3,700 adults (±1,600). Currently available data are insufficient to establish a trend in bull trout abundance (USFWS 2015, p. E94).

In the 2005 conservation status assessment (USFWS 2005) the Pahsimeroi River Core Area final rank was "at risk". While not the most imperiled (at high risk), the core area was considered at risk because of very limited and/or declining numbers, range, and/or habitat, making bull trout in this core area vulnerable to extirpation. The bull trout 5-year review (USFWS 2008) also determined the core area to be "at risk" overall.

The Service has issued one biological opinion specific to this core area for a bank stabilization project at the Upper Pahsimeroi Fish Hatchery. This opinion found that the action analyzed was not likely to jeopardize the coterminous U.S. population of bull trout. The amount or extent of take of bull trout caused by this Federal action is estimated by the Service to be nonlethal take of two bull trout, caused by capture and handling during fish salvage. The project completion report indicated no bull trout were captured or handled during fish salvage.

Impacts to bull trout habitat from past livestock grazing and water diversions (primarily for agriculture) are prevalent in this core area (USFWS 2002b, pp. 35, 37). Improper livestock grazing has resulted in reduced stream bank stability and altered vegetative communities. Extensive irrigation development has caused the lower reaches of many tributaries of the

Pahsimeroi River, and portions of the Pahsimeroi River itself, to become dewatered annually. Low or no flow conditions have disconnected tributaries from the mainstem Pahsimeroi (USFWS 2002b, p. 39; USFWS 2015, p. E94). Historic mining has altered bull trout habitat and negatively impacted water quality in this area (USFWS 2002b, p. 40; Assessment, pp. 46-47). Reported road density is considered moderate, at 0.7 mi/mi^2 (USFWS 2005, p. 48). Collectively, these changes have reduced the quantity and quality of bull trout habitat.

Upper Salmon River Core Area

The Upper Salmon River Core Area encompasses 2,410 square miles and extends from the mouth of the Pahsimeroi River to the headwaters in the Sawtooth Mountains, including the mainstem Salmon River and tributaries (USFWS 2002b, p. 13, USFWS 2015, p. E95). This core area has 3,251 miles of streams and at least 18 local populations (USFWS 2015, p. E95). Migratory bull trout are present in all or nearly all local populations in this core area (USFWS 2002b, p. 66; USFWS 2015, p. E95).

In 2005, IDFG reported population numbers for the Upper Salmon River Core Area (IDFG 2005, p. 32) that were based on an extensive modeling effort (IDFG 2005 and High et al. 2008). A corrected table (K. Meyer, IDFG, pers. comm., March 11, 2009) showed an approximate population of 31,461 (± 10,804) bull trout (adults and young) for the core area. Using an assumption that 10 percent of the total number is comprised of adult fish (K. Meyer, IDFG, pers. comm., March 11, 2009), that would suggest an adult population in the core area of approximately 3,100 adults (±1,000). Recent information provided by IDFG indicates an increasing trend in bull trout abundance within this core area (USFWS 2015, p. E95).

In the 2005 conservation status assessment (USFWS 2005) the Upper Salmon River Core Area final rank was "at potential risk" because of limited and/or declining numbers, range, and/or habitat, even though bull trout may be locally abundant in some portions of the core area. The bull trout 5-year review (USFWS 2008) also determined the core area to be "at potential risk" overall.

The Service has issued 17 biological opinions addressing Federal actions specific to this core area: three for mining operations (Grouse Creek Mine, Honey Girl/Lumberjack Mine, and Thompson Creek Mine Expansion), three for water diversions (East Fork of the Salmon River #13, Lower Canyon of the Salmon River, and Upper Salmon), six for grazing in specific allotments (Morgan Creek-Prairie Basin, Cape Horn, Challis Creek, Herd Creek, Squaw Creek, and Garden Creek), two for bridge replacements (Younger bridge and East Fork Salmon River bridge), and three for restoration projects (East Fork Salmon River Bank Stabilization and Yankee Fork Pond Series 2 and 3). Each of these opinions found that the actions analyzed were not likely to jeopardize the coterminous U.S. population of bull trout. The aggregate amount or extent of take of bull trout and bull trout redds caused by these Federal actions is estimated by the Service to be lethal take of 143 bull trout, nonlethal take of 530 bull trout, and 19 to 76 bull trout redds. Take of redds was anticipated to result from livestock trampling, while take of adult and juvenile bull trout was anticipated to result from entrainment or stranding at water diversions. Surveys conducted from 2010 to date have not found any take of bull trout redds caused by the actions addressed in the opinions. Limited surveys have found take (nonlethal) of 11 bull trout due to entrainment, and subsequent salvage, at a diversion.

Impacts to bull trout habitat from past livestock grazing and water diversions (primarily for agriculture) are prevalent in this core area (USFWS 2002b, pp. 34, 37). Valley bottom roads, and historic mining and logging roads, continue to negatively impact bull trout habitat (USFWS 2002b, p. 42). Road density in this core area is 0.5 mi/mi^2 (USFWS 2005, p. 49). Historic mining has altered bull trout habitat and negatively impacted water quality in this area. Additionally, private land development associated with patented mining claims is occurring and could lead to further impacts to bull trout habitat (USFWS 2002b, pp. 44-45). Residential and recreational development in this core area has resulted in chemical and nutrient pollutants released into bull trout habitat, filling of flood channels, and diversion of water from bull trout habitat (USFWS 2002b, pp. 48-49).

Little Lost River Core Area

The Little Lost River Core Area encompasses 622,440 acres, and lies in a closed basin bordered by the Lost River and Lemhi Mountain Ranges, within the Upper Snake River basin (USFWS 2015, p. E107). The Little Lost River core area has at least 10 local populations, and supports both resident and fluvial bull trout populations (USFWS 2015, p. E107).

In 2005, IDFG reported population numbers for the Little Lost River Core Area (IDFG 2005, p. 32) that were based on an extensive modeling effort (IDFG 2005 and High et al. 2008). A corrected table (K. Meyer, IDFG, pers. comm., March 11, 2009) showed an approximate population of 45,124 (± 23,772) bull trout (adults and young) for the core area. Using an assumption that 10 percent of the total number is comprised of adult fish (K. Meyer, IDFG, pers. comm., March 11, 2009), that would suggest an adult population in the core area of approximately 4,500 adults (±2,300). Although bull trout density has declined in some areas, available data indicate a stable to increasing population trend in this core area (USFWS 2002d, p. 30; Schoby and Garren, IDFG data, 2011; USFWS 2015, p. E107).

In the 2005 conservation status assessment (USFWS 2005) the Little Lost River Core Area final rank was "at risk". While not the most imperiled (at high risk), the core area was considered at risk because of very limited and/or declining numbers, range, and/or habitat, making bull trout in this area vulnerable to extirpation. The bull trout 5-year review (USFWS 2008) also determined the core area to be "at risk" overall.

The Service has issued three biological opinions addressing ongoing Federal actions specific to this core area: one for a water diversion (Sawmill Creek), and two for livestock grazing (Pass Creek Allotment and Mill Creek Allotment). Each of these opinions found that the actions analyzed were not likely to jeopardize the coterminous U.S. population of the bull trout. The aggregate amount or extent of take of bull trout and bull trout redds caused by these Federal actions is estimated by the Service to be at the scale of three to eight bull trout, and 17 bull trout redds. Take of redds was anticipated to result from livestock trampling, while take of adult and juvenile bull trout was anticipated to result from entrainment or stranding at water diversions. Surveys conducted from 2010 to date have not found any take of bull trout redds caused by the actions addressed in the opinions. Limited surveys have found take (nonlethal) of 26 bull trout due to entrainment, and subsequent salvage, at a diversion.

Past improper livestock grazing has had an extensive impact on bull trout habitat in the core area. Improper grazing has led to unstable stream channels, increased sedimentation in streams, and decreased amounts of riparian vegetation (USFWS 2002d, pp. 13-14). Water diversions for agriculture have occurred in the core area since the 1870s, and have contributed to a reduced quality and quantity of bull trout habitat (USFWS 2002d, pp. 14-15). Overall road density in the core area is 0.4 mi/mi^2 (USFWS 2005, p. 48), although road density is much higher is some parts of the core area.

Establishment of Baseline Conditions for Bull Trout

As mentioned above in the *Status of the Species* section, the survival and recovery needs of the bull trout can be described generally as cold stream temperatures, clean water quality, complex channel characteristics, and large patches of habitat that are well connected. Therefore, to determine the overall effect of a proposed action on the bull trout for purposes of a jeopardy analysis, it is logical to try and ascertain how, and to what extent, those basic needs are likely to be impacted by a proposed action. But first, a baseline condition, inclusive of conditions in the action area, of those habitat parameters needs to be described to form the context for evaluating the potential impacts of the proposed action on bull trout.

One tool that was developed to assist in describing the condition of watersheds and streams on which bull trout depends is entitled *A Framework to Assist in Making Endangered Species Act Determinations of Effect for Individual or Grouped Actions at the Bull Trout Subpopulation Watershed Scale* [3] (Appendix 9 in Lee et al. 1997). It is commonly referred to as the "Matrix of Pathways and Indicators" and, at its most basic level, is a table which identifies the important elements or indicators of a bull trout's habitat. Using this table assists in consistent organization and assessment of current conditions and in judging how those indicators may be impacted by a proposed action (Lee et al. 1997, p. 9-6). The Forest included a general matrix analysis for the non-wilderness portions of each subbasin in the action area in the Assessment (pp. 13, 17, 20-21, 24, 27, 30, 33, 35-36). These are summarized in Table 4 below.

Table 4. Summary of Pathway Conditions for the Action Area

Pathway	Functioning Appropriately	Functioning at Risk	Functioning at Unacceptable Risk
Population Characteristics		X	
Watershed Conditions		X	
Water Quality	X[1]	X	
Flow/Hydrology		X	
Integration of Species and Habitat Conditions		X	

[1] Only Middle Salmon-Chamberlain subbasin.

[3] This document was adapted from a National Marine Fisheries Service document called *Making Endangered Species Act Determinations of Effect for Individual or Grouped Actions at the Watershed Scale* (NMFS 1996).

Description of Baseline Conditions
In summary, substantial portions of some bull trout core areas are within designated wilderness, but the bull trout and its habitat in the action area have been impacted by many ongoing and past activities. Impacts of water diversions and livestock grazing are widespread in the action area. Water quality in several core areas has been negatively affected by past mining activities. Although effects of historic logging are not extensive in the action area, impacts are considerable in some core areas. Likewise, effects of residential and recreational development of private lands, although not extensive, are considerable in some areas.

The action area contains approximately 49,150 acres of inventoried invasive plant infestations on 3,951 sites. The Assessment indicates invasive plant infestations are a factor influencing watershed conditions in four subbasin in the action area (Upper Salmon, Pahsimeroi, Middle Salmon-Panther, and Lemhi). Overall, invasive plant infestations in the action area are only one potential variable affecting the bull trout's population status in the action area and other variables and circumstances appear to play a larger role.

B. Status of Bull Trout Designated Critical Habitat in the Action Area

The action area falls within the Upper Snake Recovery Unit (USFWS 2015, p. E1). Portions of the action area overlap two of the 32 critical habitat units (CHUs) in the Upper Snake Recovery Unit, the Salmon River Basin CHU and the Little Lost River CHU (75 FR 63935).

The Little Lost River CHU is essential for maintaining bull trout distribution within this unique geographic region of the Upper Snake Recovery Unit. This CHU occurs within a hydrologically closed system in the southeasternmost portion of the Upper Snake Recovery Unit, and includes 55.4 miles of stream designated as critical habitat (USFWS 2010, p. 795). No critical habitat subunits (CHSUs) have been identified in this CHU.

The action area also includes seven of the ten CHSUs identified in the Salmon River Basin CHU. This CHU encompasses the entire Salmon River basin, extending across central Idaho from the Snake River to the Idaho-Montana border. The Salmon River Basin CHU is the largest CHU in the Upper Snake Recovery Unit, and includes 4,583.5 miles of stream and 4,160.6 acres of lake and reservoir surface area designated as critical habitat. Large portions of this CHU occur within the Frank Church River of No Return Wilderness. The Salmon River Basin CHU contains the largest populations of bull trout in the Upper Snake Recovery Unit. Bull trout populations in this CHU exhibit adfluvial, fluvial, and resident life history strategies (USFWS 2010, p. 673). The seven CHSUs in the action area are described below.

Middle Fork Salmon River
This CHSU contains the largest number of local populations, a high number of individuals, a large amount of habitat, and few threats. Bull trout populations in this CHSU exhibit both resident and fluvial life history strategies. Designated critical habitat in the Middle Fork Salmon River CHSU includes 1,271.1 miles of stream and 224.6 acres of lake surface area (USFWS 2010, p. 715).

Middle Salmon-Panther River

This CHSU contains many individuals, a large amount of habitat, and moderate threat level. The Middle Salmon-Panther River CHSU provides a migratory corridor between multilple CHSUs, and bull trout populations in this CHSU exhibit both resident and fluvial life history strategies. Designated critical habitat in this CHSU includes 615.6 miles of stream (USFWS 2010, p. 745).

Lake Creek

This CHSU contains a moderate number of individuals, exposed to a moderate threat level. The Lake Creek CHSU occurs within Lake Creek, which is isolated from other CHSUs and CHUs, and provides a rare adfluvial life history form in the Upper Snake Recovery Unit. Designated critical habitat in this CHSU includes 8.0 miles of stream and 177.9 acres of lake surface area (USFWS 2010, p. 759).

Opal Lake

This CHSU contains a moderate number of individuals, exposed to a moderate threat level. The Opal Lake CHSU occurs within Opal Lake, which is isolated from other bull trout populations, and provides a rare adfluvial life history form in the Upper Snake Recovery Unit. Designated critical habitat in this CHSU includes 2.2 miles of stream and 14.8 acres of lake surface area (USFWS 2010, p. 759).

Lemhi River

The Lemhi River CHSU occurs in the easternmost extent of the Upper Snake Recovery Unit. This CHSU has many individuals, a large amount of habitat, and few threats. Bull trout populations in this CHSU exhibit both resident and fluvial life history strategies. Designated critical habitat in the Lemhi River CHSU includes 234.3 miles of stream (USFWS 2010, p. 767).

Pahsimeroi River

This CHSU contains many individuals, a moderate amount of habitat, and moderate threat level. Designated critical habitat in this CHSU includes 204.0 miles of stream (USFWS 2010, p. 773). Bull trout populations in this CHSU exhibit both resident and fluvial life history strategies.

Upper Salmon River

The Upper Salmon River CHSU contains many individuals, a large amount of habitat, and few threats. Bull trout populations in this CHSU exhibit resident, fluvial, and adfluvial life history strategies. This CHSU includes 705.6 miles of stream and 3,104.2 acres of lake surface area designated as critical habitat (USFWS 2010, p. 779).

Physical or biological features (PBFs) are used to describe habitat features that are essential to the conservation of the bull trout. Table 5 below displays the PBFs and associated diagnostic pathway/indicators that relate to each PBF. The baseline conditions of the diagnostic pathway/indicators were presented above in Table 4.

Table 5. Pathways/indicators PBF cross walk

Diagnostic Pathway/indicator	PBF 1 – Springs, seeps, groundwater	PBF 2 – Migratory habitats	PBF 3 – Abundant food base	PBF 4 – Complex habitats	PBF 5 – Water Temperature	PBF 6 – Substrate features	PBF 7 – Natural hydrograph	PBF 8 – Water quality and quantity	PBF 9 – Predators and competition
Water Quality									
Temperature		x	x		x			x	
Sediment		x	x			x		x	
Contaminants	x	x	x					x	
Habitat Access									
Physical Barriers	x	x	x						x
Habitat Elements									
Embeddedness	x		x			x			
LWD				x		x			
Pool Frequency			x	x		x			
Large Pools				x	x				
OffChannel Habitat				x					
Refugia		x			x				x
Channel									
Width:Depth		x		x	x				
Streambank	x			x	x	x			
Floodplain Connect	x		x	x	x		x	x	
Flow/Hydrology									
Peak/Base Flows	x	x			x		x	x	
Drainage Network	x						x	x	
Watershed									
Road Density	x				x		x		
Disturb. History				x			x	x	x
Riparian Area	x		x	x	x		x		
Disturb. Regime				x			x	x	

Factors affecting the environmental baseline of bull trout critical habitat in the action area are similar to those described for bull trout populations and habitat in the action area. See pages 34 through 45 above. In summary, the baseline as presented in Table 4, indicates that the pathways in most subbasins are functioning at risk. The only pathway functioning appropriately is the water quality pathway in the Middle Salmon River-Chamberlain subbasin. No pathways are functioning at unacceptable risk. Condition of PBFs relies on the condition of the associated indicators.

IV. EFFECTS OF THE PROPOSED ACTION

A. Direct and Indirect Effects of the Proposed Action

The implementing regulations for section 7 define "effects of the action" as "the direct and indirect effects of an action on the species together with the effects of other activities that are interrelated or interdependent with that action, which will be added to the environmental baseline" (USFWS 1986, p. 19958). "Indirect effects" are caused by or result from the agency action, are later in time, but are still reasonably certain to occur (USFWS 1986, p. 19958).

The non-treatment elements are integral to successful implementation of the Program, but they are not expected to result in any effects to any aquatic species or habitats listed under the Act. The following analysis focuses on the treatment elements of the Program.

Near-stream activities associated with any of the treatment elements have the potential to displace bull trout in the action area. However, the effects to bull trout would be minimal because disturbance would be localized and any fish present would be able to easily move away to other suitable areas. Such movement is likely to be of short duration and is not likely to interfere with normal feeding, breeding, or sheltering behavior of bull trout. Therefore, effects to bull trout from disturbance are considered insignificant.

1. Rehabilitation and Restoration

The most extensive direct ground disturbances associated with the Program would occur during rehabilitation and restoration activities. These activities are unlikely to affect sediment levels in streams or lakes because design criteria limiting these activities to areas with slopes of less than 45 percent and landtype erosion hazard ratings of low or moderate would prevent large scale erosion from occurring during and after these treatments (Assessment, pp. 74-75). Riparian areas with invasive plant infestations would likely be experiencing increased erosion as a result of the infestations. The additional ground disturbance related to rehabilitation and restoration activities within riparian areas would likely have minimal additional effects on erosion or water quality because of the design criteria that limits potential for erosion. Rehabilitation and restoration activities within riparian areas are expected to have a minimal effect on existing riparian vegetation because these activities would only occur where invasive plant infestations have already replaced most or all native vegetation. Effects to bull trout and its designated critical habitat from rehabilitation and restoration activities are considered insignificant in the short term, and may be beneficial in the long term.

2. Control and Management

a. Manual and Mechanical Control

Manual and mechanical control treatments may result in a short-term increase in the amount of bare ground where methods such as hand pulling occur. The Forest indicates that commonly, dead plant material from plants that were manually or mechanically removed breaks down and covers the soil surface, providing a protective litter layer. However, where this does not occur, increased amounts of bare ground could result in a temporary increase in soil erosion. Because manual and mechanical control can only be effectively used for small infestations, any impacts would be highly localized, and it is likely that soil or bare ground exposed by these isolated impacts would be limited in extent. Because design criteria for manual and mechanical control methods will greatly reduce potential treatment-related erosion, the effects to bull trout and its designated critical habitat from manual and mechanical control are considered insignificant in the short term, and may be beneficial in the long term.

b. Biological Control

The release of biological control agents (plant predators or pathogens) to control invasive plants is expected to have no adverse effect on bull trout or its designated critical habitat. Biological control methods would not affect sediment loads in streams or lakes because ground-disturbing activities would not occur with this treatment method. Because there are no biological control agents proposed for use on the Forest that are known to attack non-target plants, no negative effects to native riparian vegetation or riparian function is expected. Additionally, the biological control agents proposed for use would not compete for food with aquatic organisms. Some plant predators (insects) proposed for use may provide an incidental food source for fish where infestations occur near stream channels.

c. Chemical Control

Chemical control treatments may result in a temporary increase in soil erosion due to a short-term increase in the amount of bare ground following invasive plant removal. Increased sediment delivery to streams or lakes would be minimal because no broadcast or aerial application of herbicide would occur in a riparian area, so there would be no impacts to riparian vegetation from these application methods. Spot spraying could occur in riparian areas, but would be used to target an individual plant or small infestation, and would not result in large areas of bare ground. Sufficient vegetation is expected to remain in riparian areas to reduce potential treatment-related sediment effects to streams or lakes. Therefore, effects to bull trout and its designated critical habitat from increased sediment input to streams caused by chemical control treatments are considered insignificant.

Chemical control methods are more likely to result in potential toxicological effects to bull trout as a result of water contamination, rather than physical changes to fish habitat. The effects of herbicides to bull trout and its designated critical habitat depend on many factors, including toxicity of an herbicide to bull trout, and level, or likelihood, of exposure. The toxicological effects and ecological risks to bull trout are not fully known for all herbicides, formulations, and adjuvants in the proposed action. Similarly, a quantitative estimate of exposure of bull trout to herbicides is not possible. Exact treatment locations and amounts of chemicals to be applied each year are not definitively known. Given the incomplete information available, we rely on extrapolation or inference from published studies of similar chemicals on surrogate fish species. Because there is considerable uncertainty regarding many herbicide effects, worst-case scenarios, along with the most probable outcomes, were considered to ensure the analysis errs in favor of the listed species (Assessment, pp. 90-102).

Effects to fish from herbicides include the following toxicological endpoints:

- direct mortality at any life stage
- increase or decrease in growth
- changes in reproductive behavior
- reduction in the number of eggs produced, fertilized, or hatched
- developmental abnormalities, including behavioral deficits or physical deformities
- reduced ability to osmoregulate or adapt to salinity gradients
- reduced ability to tolerate shifts in environmental variables (e.g., temperature or increased stress)
- increased susceptibility to disease
- increased susceptibility to predation
- changes in migratory behavior

These endpoints are generally considered to be important for the fitness of salmonids and other fish species. The ecological significance of sublethal effects depends on the degree to which they influence the survival and reproductive potential of individual fish, and the viability and genetic integrity of wild populations.

Bull trout can also be affected through herbicides effects on the aquatic environment and non-target species. The likelihood of adverse indirect effects is dependent on environmental concentrations, bioavailability of the chemical, and persistence of the herbicide in bull trout habitat. For most herbicides, including chemicals in the proposed action, there is little information available on environmental effects, such as negative impacts to primary production, nutrient dynamics, or the trophic structure of macrinvertebrate communities. Most available information on potential environmental effects must be inferred from laboratory assays; however, a few observations of environmental effects are reported in the literature. Due to the shortage of information, there are uncertainties associated with the following factors: (1) the fate of herbicides in streams, (2) the resiliency and recovery of aquatic communities, (3) the site-specific foraging habits of bull trout and the vulnerability of key prey species, (4) the effects of herbicide mixtures that include adjuvants or other ingredients that may affect species differently than the active ingredient, and (5) the mitigating or exacerbating effects of local environmental conditions.

Effects of contaminants on ecosystem structure and function are key to determining a chemical's cumulative risk to aquatic organisms (Preston 2002). Additionally, aquatic plants and macroinvertebrates are generally more sensitive than fish to the acutely toxic effects of herbicides. Therefore, chemicals can potentially impact the structure of aquatic communities at concentrations that fall below the threshold for direct impairment in bull trout. Because the integrity of the aquatic food chain is an essential biological requirement for bull trout, the possibility that herbicide applications will limit productivity of stream or lakes is an unknown risk of the proposed action.

The potential effect of herbicides on prey species of bull trout is also an important concern. Bull trout are opportunistic feeders and prey on terrestrial and aquatic insects, macro zooplankton, mysids, and small fish. Generally, insects and crustaceans are more acutely sensitive to toxic effects of environmental contaminants than fish or other vertebrates. However, with the exception of *Daphnia*, the impacts of herbicides on bull trout prey taxa have not been widely investigated.

The Forest prepared risk assessments for each herbicide proposed for use, and a risk quotient and level of concern was determined for rainbow trout and *Daphnia*. Effects to rainbow trout can be representative of potential effects to listed salmonids, while effects to *Daphnia* can be representative of potential impacts to a food source of freshwater fishes. All but three of the herbicides proposed for use in the Program are reported as having low levels of concern to rainbow trout; dicamba, picloram, and triclopyr are reported as having a moderate level of concern. A moderate level of concern to *Daphnia* is reported for 2,4-D amine, dicamba, picloram, and triclopyr. All other herbicides proposed for use are reported as having a low level of concern to *Daphnia* (Assessment, p. 89). Dicamba and picloram would not be used in riparian areas. Only aquatic formulations of 2,4-D amine or triclopyr would be used in riparian areas, and no broadcast application of these herbicides would occur (Assessment, pp. 70-71).

The proposed action includes numerous mandatory design criteria and BMPs to avoid or minimize water contamination from herbicides (Assessment, pp. 66-70, Appendices D-H). These criteria include stream and riparian buffers where chemical use is restricted or prohibited by limiting the application method, and amount and type of herbicide that may be used. The likelihood of herbicide entering the water depends of the mechanism of entry and the method of herbicide application. Mechanisms of potential entry of herbicides to aquatic ecosystems during ground-based or aerial treatment of terrestrial weeds include direct application, wind drift, surface runoff and leaching through soils, and accidental spills.

Direct Application

Accidental ground application of herbicides into streams or lakes could occur if Forest personnel inadvertently spray the water while spraying weeds located near the edge of the water. The Service anticipates this would occur infrequently and be of short duration. Because dyes are added to the herbicides, it would be readily apparent to the applicator that spray had entered the water. Applicators could quickly adjust their aim to avoid spraying the water. Design criteria and BMPs require spot spraying techniques in riparian areas and exclude broadcast application. Applicators are required to use directional application techniques to direct herbicide away from water. Implementation of the design criteria and BMPs limits the likelihood of direct application of herbicides into water. Water contamination with herbicide via this exposure pathway is expected to occur infrequently, be of short duration, and involve small amounts of herbicide.

Direct aerial application of herbicides into streams and lakes could occur only if design criteria and BMPs are not adhered to. The Forest has specified that design criteria are mandatory. Design criteria require that all live water (perennial streams, flowing intermittent streams, lakes, ponds, springs, and wetlands) have a 300 foot no application buffer. The buffer would be identified prior to aerial application of herbicide. A GPS system would be used in spray helicopters and each treatment unit mapped prior to flight to ensure that only areas marked for treatment are treated. The areas where herbicide had been applied would be apparent because of the dyes added to the herbicides. Additionally, constant communication would be maintained between the helicopter and the project leader during spraying operations, and ground observers in various locations would visually monitor deposition of herbicide. Because of the design criteria and BMPs required to be implemented as part of the Program, the Service expects direct aerial application of herbicide to streams and lakes is unlikely to occur.

Wind Drift

Herbicides can move through the atmosphere as spray drift, which occurs during herbicide application, and volatilization (i.e., the passing off of vapor), which occurs after application. Spray drift is the movement of the herbicide, generally via spray droplets, from the target area to an unintended area; it is dependent on sprayer parameters such as nozzle orifice size, boom height and pressure, and wind speed. Volatilization is dependent on the physical properties of the herbicide, primarily vapor pressure. None of the herbicides proposed for use in the Program have significant volatilization potential (Assessment, p.65).

Spray drift cannot be completely eliminated, but can be minimized (Felsot 2001). Risk of contamination during ground-based application of herbicides is less than during aerial application because application occurs more slowly and applicators can quickly recognize any application problems and adjust their application techniques. Spot-spraying is the only ground-based application technique that would be used in riparian areas, and use of directional application techniques to direct herbicide away from water is required. Further, applicators are required to monitor wind speed and direction, and equipment and spray parameters, throughout an herbicide application. No herbicide would be applied in sustained wind conditions of 5 mph in riparian areas or in any wind conditions exceeding product label directions. Applicators are required to obtain a weather forecast for the area prior to initiating a spraying project to ensure no extreme precipitation or wind events are predicted to occur during or immediately after spraying. Because of the implementation of design criteria and BMPs, herbicide reaching the water is expected to occur infrequently and involve small amounts.

Aerial spraying near aquatic and riparian zones may represent the greatest potential for exposure of aquatic organisms to chemical contaminants through wind drift. The mandatory design criteria and BMPs for the Program minimize the potential for wind drift in several ways. Dyes are added to the herbicides so it is apparent where herbicides are being deposited. Additionally, applicators are required to monitor wind speed and direction, and equipment and spray parameters, throughout an herbicide application. No herbicide would be applied in sustained wind conditions of 5 mph or in any wind conditions exceeding product label directions, whichever is less. Herbicide would not be applied during inversions, or below minimum relative humidity, or above maximum temperature, as stated on the product label. Applicators are required to obtain a weather forecast for the area prior to initiating a spraying project to ensure no extreme precipitation or wind events are predicted to occur during or immediately after spraying. Applicators are required to use low pressure and larger droplet size to the extent possible. Aerial spray units (and lakes, perennial streams, flowing intermittent streams, seeps, ponds, springs, and wetlands in proposed aerial units) would be identified prior to spraying to ensure only appropriate portions of the unit are aerially treated. A GPS system would be used in spray helicopters, and each treatment unit mapped before the flight, to ensure that only areas marked for treatment are treated. All live water would have a 300 foot no application buffer. Drift monitoring cards would be placed out to 300 feet from, and perpendicular to, perennial streams to monitor herbicide presence (Assessment, Appendix H).

The design criteria address several of the most important factors to minimize drift, including: (1) a required 300 foot buffer around live water, (2) use of larger droplet size to the extent possible, and (3) applying herbicide only in appropriate weather conditions, considering wind speed and direction, inversions, relative humidity and temperatures (Rashin and Graber 1993). The Service finds the design criteria and BMPs limit the expected frequency, duration, and amount of herbicide reaching a stream or lake.

<u>Surface Runoff and Leaching through Soils</u>

Post-application precipitation events can potentially mobilize herbicides deposited on foliage or soil through runoff or leaching. Factors affecting herbicide movement through runoff or leaching include physical properties of the herbicide (i.e., persistence in the environment, water solubility, movement in soil) and environmental conditions (i.e., soil type, distance to a waterbody, timing of precipitation following herbicide application). Contaminants can be filtered out of water to varying degrees by sorption onto plants, debris, and soils encountered in the flow path. In general, the amount of filtering increases with the distance from the treated area to the nearest water. The potential concentration of herbicide reaching surface waters or groundwater is not known, and depends on the degree of filtering that occurs in the distance the herbicide travels before reaching water.

Vegetative cover, soil type, degree of surface disturbance and compaction, and land slope determine whether rainfall infiltrates the soil or runs off a site. Undisturbed forests and grasslands are typically associated with infiltration-dominated sites. The overland transport of herbicides applied to smaller weed infestations occurring on this type of landscape is expected to be minimal. Many weed infestations on the Forest are associated with roads, trails, paths, and other areas where the soil has been disturbed and/or compacted. Road prisms, road cuts, and road fills are runoff-dominated features, and may enhance runoff by concentrating flows on compacted road surfaces and in ditches (Assessment, p. 90). Large weed-infested areas where native vegetation has been lost could increase the potential for surface runoff.

Highly soluble herbicides, resistant to biotic and abiotic degradation (e.g., picloram) readily leach through the soil. Other herbicides, while highly soluble, bind well with organic matter in soils (e.g., 2,4-D amine and glyphosate), and therefore, are not readily leached. Herbicides leached through the soil may contact subsurface flows. Some herbicide would be lost to chemical breakdown and metabolism by plants and other organisms, and some would be filtered out as it percolates through the soil.

The design criteria and BMPs address several important factors affecting herbicide movement through runoff or leaching. Application of certain chemicals is limited, both in the distance from streams and the number of applications. Only spot spraying would occur in riparian areas, and directional application techniques would be used to direct herbicide away from water. Applicators will select the most suitable herbicide and adjuvant (as appropriate) combination for the setting and apply the lowest effective use rates. Wherever possible, there will be no storing or mixing of herbicides within 100 feet of any live water or over shallow groundwater. Applicators are required to obtain a weather forecast for the area prior to initiating a spraying project to ensure no extreme precipitation or wind events are predicted to occur during or immediately after spraying. Local weather conditions must be checked daily, and site-specific conditions must be monitored during herbicide application. All live water (perennial streams, flowing intermittent streams, lakes, ponds, springs, and wetlands) will have a 300 foot no application buffer for all aerial application. Implementation of the design criteria and BMPs is mandatory and will minimize water contamination with herbicides. The Service expects that herbicide reaching surface water or groundwater would occur infrequently, be of short duration, and be small amounts.

<u>Accidental Spills</u>

Generally, the herbicides used in the Program would be applied in a liquid solution. Minor amounts of liquids could drip from spray equipment throughout the treatment season, but this amount is expected to be well below the typical application rate and have no significant effects to water quality. Some mixing of chemicals may be required, and liquids would be transferred from one container to another. Liquids could spill during mixing or transferring chemicals. To minimize potential adverse impacts, design criteria require chemicals to be mixed and loaded at least 100 feet from water, wherever possible. Spills that occur 100 feet from water are not expected to significantly affect water quality because of the limited quantity, frequency, and duration of the spill, and the presence of a 100 foot buffer from water.

Where it is not possible to be 100 feet from water, a spill could result in localized high concentrations of herbicide in the water. There could be adverse effects (sublethal) to bull trout if any were unable to avoid the area affected by the chemical spill. Similarly, the Service expects PBF 8 (water quality) would be adversely affected due to chemical contamination in the portion of the stream in close proximity to the spill. PBF 3 (food base) may be adversely affected by direct mortality of aquatic invertebrates in the affected area, resulting in a small scale reduction of available food for bull trout. The area of stream affected by the chemical spill is likely to be relatively small in extent because the amount of herbicide and adjuvant spilled would only be the amount needed for that particular project, and the applicator would have a spill kit available to quickly respond to the spill. A spill that reaches the water is expected to occur infrequently due to the mandatory design criteria and BMPs.

Although there are design criteria to address transporting of chemicals to treatment areas, the potential for a transportation-related spill cannot be eliminated. While transporting herbicides and adjuvants over water by watercraft, the chemicals must be in water-tight, floatable containers. Ground transportation of chemicals to treatment areas does not require water-tight containers, but transport vehicles would, by necessity, cross streams or use roads or trails in close proximity to streams. The potential for a transportation-related spill is reduced by application of the following design criteria and BMPs: (1) only the amount of herbicide and adjuvant needed for a project would be transported, (2) the containers will be secured to prevent the likelihood of a spill, and (3) periodic checks of the containers while en route are required. If a transportation-related spill into a waterbody occurs in a bull trout-occupied stream, localized adverse effects to bull trout and its habitat are anticipated.

3. Summary of the Effects from the Proposed Action

Within the 3,100,000 acre action area, there are approximately 49,150 acres of inventoried invasive plant infestations on 3,951 sites in nine 4th field HUCs (approximately 1.6% of the non-wilderness Forest lands). Only eight on these HUCs contain occupied bull trout habitat. The Forest indicates that invasive plant infestations are a factor influencing watershed conditions in four of these HUCs (Upper Salmon, Pahsimeroi, Middle Salmon-Panther, and Lemhi). This indicates that some amount of the 3,951 infestation sites is concentrated in these HUCs, but the exact number is unknown. The Forest's Assessment does not include any information that suggests that the frequency, duration, severity, or scale of potential sedimentation or water quality impacts caused by the Program are likely to be widespread on the bull trout.

Rehabilitation and restoration activities would have the most extensive direct ground disturbances associated with the Program. Sedimentation effects to bull trout and its habitat from these activities are likely to be widely dispersed, and of low severity. Control and management activities include manual and mechanical control, biological control, and chemical control. Sedimentation effects to bull trout and its habitat from manual and mechanical control are expected to be highly localized, widely dispersed, and of low severity. No adverse effects to bull trout and its habitat are expected from biological control. Potential adverse effects from chemical control (including sedimentation and water quality effects) are expected to be infrequent, widely dispersed, of short duration, and low severity. In the long term, the proposed Program is likely to improve watershed conditions by controlling or eliminating invasive plant infestations on the Forest, which is likely to benefit bull trout.

The Service finds that while there is a potential for adverse effects to bull trout from the Program that would be detectable at individual sites in bull trout-occupied streams, it is unlikely that these potential effects would be discernable at a local population scale or at the scale of any of the nine core areas (which include approximately 80 local populations) within the action area because the effects would be infrequent, localized, and widely dispersed across the core areas.

B. Effects of Interrelated or Interdependent Actions

The implementing regulations for section 7 define interrelated actions as those that are a part of a larger action and depend on the larger action for their justification. Interdependent actions are those that have no independent utility apart from the action under consideration. No interrelated or interdependent actions have been identified in this consultation.

V. CUMULATIVE EFFECTS

The implementing regulations for section 7 define cumulative effects to include the effects of future State, tribal, local, or private actions that are reasonably certain to occur in the action area considered in this Opinion. Future Federal actions that are unrelated to the proposed action are not considered in this section because they require separate consultation pursuant to section 7 of the Act. No cumulative effects have been identified in this consultation.

VI. CONCLUSION

A. Bull Trout

After reviewing the current status of the bull trout, the environmental baseline for the action area, the effects of the proposed action, and any cumulative effects, it is the Service's Biological Opinion that the Forest's proposed implementation of an adaptive integrated invasive plant management program on non-wilderness Forest lands is not likely to jeopardize the coterminous U.S. population of the bull trout. The Service's rationale for this determination is presented below.

Implementation of the treatment elements of the Program near streams and riparian areas occupied by bull trout could cause some disturbance of bull trout or impact sediment levels and/or water quality. Any impacts from the proposed action are not likely to occur evenly across the Forest due to the limited extent of invasive plant infestations within the eight 4^{th} field HUCs occupied by bull trout, and only a portion of the invasive plant-infested areas are near streams and riparian areas. Potential sedimentation effects of rehabilitation and restoration treatments, or control and management treatments that result in areas of bare soil, would be infrequent, localized, short-term, and of low severity. As described above in the *Effects of the Proposed Action* section, chemical concentrations causing direct mortality to bull trout are unlikely to occur as a result of this action because of the limited amount of chemicals proposed for use in any treatment area. However, water contamination as a result of surface runoff or leaching should a heavy precipitation event occur following herbicide application, or an accidental spill of chemicals, could cause delayed mortality or sublethal effects to bull trout. Because effects are expected to be infrequent, widely dispersed across the nine bull trout core areas, and are not concentrated in any one bull trout local population, the Service finds the level of impact is unlikely to appreciably reduce the viability of bull trout populations in the action area.

For the above reasons, the Service concludes that the anticipated level of effects caused by the proposed Program to bull trout and its habitat over the term of the proposed action, taking into account the environmental baseline and cumulative effects in the action area, is likely to be compatible with sustaining the viability of the nine bull trout core areas, and the local populations of the bull trout within those core areas. Habitat quality and quantity for the bull trout on the Forest are likely to be maintained or improved under the proposed action because of the expected low severity of adverse effects to habitat, and the likelihood that invasive plant control will improve watershed conditions in the action area.

B. Designated Critical Habitat

After reviewing the current status of the designated critical habitat for bull trout, the environmental baseline for the action area, the effects of the proposed action, and any cumulative effects, it is the Service's Biological Opinion that the Forest's proposed implementation of an adaptive integrated invasive plant management program on non-wilderness Forest lands is not likely to result in destruction or adverse modification of designated critical habitat for bull trout. The Service's rationale is presented below.

Because the proposed Program covers a broad geographic area, and activities are not concentrated near streams and riparian areas, the Service anticipates baseline habitat conditions for bull trout would be maintained or improved over the term of the action. The Service anticipates minor reductions in PBF 3 (food base) and PBF 8 (water quality) due to water contamination caused by surface runoff or leaching should a heavy precipitation event occur following herbicide application, or by accidental spills of herbicides. These effects are expected to be limited, localized, and not occur evenly across the action area.

The Service concludes that the level of adverse effects to bull trout critical habitat in the action area is not likely to cause a further degradation of those physical and biological features in streams where they are below objectives, and some improvement in habitat conditions is expected to result from implementation of the proposed action. The affected critical habitat would be likely to maintain its capability to support the bull trout and to serve its intended conservation role for the species. If the adverse effects of the proposed action are not substantial within the action area, then they are unlikely to be discernible at the designated critical habitat rangewide scale.

VII. INCIDENTAL TAKE STATEMENT

Section 9 of the Act and Federal regulation 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 essential behavioral patterns, including breeding, feeding, or sheltering. Harass is defined by the Service as an intentional or negligent act or omission which creates the likelihood of injury to wildlife by annoying it to such an extent as to significantly disrupt normal behavior patterns which include, but are not limited to, breeding, feeding, or sheltering.

Incidental take is defined as take that is incidental to, and not the purpose of, the carrying out of an otherwise lawful activity. Under the terms of section 7(b)(4) and section 7(o)(2), taking that is incidental to and not intended as part of the agency action is not considered to be prohibited taking under the Act provided that such taking is in compliance with the terms and conditions of an Incidental Take Statement. The measures described below are non-discretionary, and must be undertaken by the Forest so that they become binding conditions of any grant or permit issued to the applicant, as appropriate, for the exemption in section 7(o)(2) to apply.

A. Amount or Extent of Take Anticipated

Based on the results presented in the *Effects of the Action* analysis above, the Service finds that incidental take of the bull trout is likely to occur in the form of harm caused by sublethal effects of herbicide exposure.

Because the proposed action applies to a broad geographic area (approximately 3,100,000 acres of non-wilderness Forest lands) and specific information on the locations of each invasive plant-infested area, timing and type of all proposed treatments, site-specific features affecting herbicide transport and handling, and presence or absence of bull trout in each stream reach is not available, the Service is unable to estimate a specific amount of incidental take. As discussed in the *Effects of the Action* section above, although the Service finds that take would occur infrequently, and be widely distributed across the nine bull trout core areas, the potential for take cannot be eliminated. Because the available information is insufficient for the Service to quantify the amount of take anticipated, we describe the expected extent of take as the acreage treated with herbicide within 100 feet of live water.

The Service does not expect all herbicide application within 100 feet of water to result in take of bull trout, but herbicide application near water has the greatest potential for unintentional introduction of herbicide into water. The array of mandatory design criteria and BMPs that would be implemented as part of the proposed action greatly reduces the potential for take of bull trout. Consequently, the Service anticipates the total amount of take will be low over the 10-year term of the action.

As described in the Assessment, a maximum of 16,000 acres could be treated each year with chemical control methods. Based on records since 2003, the Forest has annually treated between

944 and 4,500 acres with ground-based herbicide application, 2 to 45 percent of which occurred within 100 feet of live water. The Forest has indicated it is likely that no more than 5,500 acres per year (during the 10-year term of the action) would be treated with ground-based herbicide application. The Forest estimates that approximately 45 percent of this treatment acreage would occur within 100 feet of live water. Based on the Forest's estimates, the extent of incidental take is limited to no more than 2,475 acres per year of herbicide application within 100 feet of live water. If the Forest treats more than 2,475 acres within 100 feet of live water in any given year, the extent of take is exceeded and reinitiation of consultation is required. Further, because the analysis of effects anticipates potential delayed mortality as a result of sublethal effects of herbicide, but no direct mortality, reinitiation of consultation is required should direct mortality of any bull trout result from implementation of the proposed action.

B. Effect of the Take

In the accompanying Biological Opinion, the Service determined that this level of anticipated take is not likely to jeopardize the coterminous United States population of the bull trout.

C. Reasonable and Prudent Measures

The Service finds that compliance with the proposed invasive plant management program, including full implementation of design criteria and BMPs, as outlined in the Assessment, is essential to minimizing the impacts of incidental take of the bull trout on the Forest.

The Service also finds that the following Reasonable and Prudent Measures are necessary and appropriate to minimize the impacts of incidental take of the bull trout reasonably certain to be caused by the proposed action.

Reasonable and Prudent Measure 1 – The Forest shall minimize the potential for harm to bull trout from herbicide application.

Reasonable and Prudent Measure 2 – The Forest shall report on the number of acres treated annually within 100 feet of live water.

D. Terms and Conditions

In order to be exempt from the prohibitions of section 9 of the Act, the Forest must comply with the following terms and conditions which implement the reasonable and prudent measures described above and outline required reporting/monitoring requirements. These terms and conditions are not discretionary.

Term and Condition 1 to implement Reasonable and Prudent Measure 1:

The Forest shall determine where invasive plant infestations occur in proximity to bull trout-occupied streams and require applicators to use the least toxic suitable herbicides and adjuvants possible in those areas.

Term and Condition 2 to implement Reasonable and Prudent Measure 1:

The Forest shall ensure all chemical storage, chemical mixing, and post-application equipment cleaning is completed in such a manner as to prevent contamination of any riparian area, perennial or intermittent waterway, unprotected ephemeral waterway, or wetland.

Term and Condition 1 to implement Reasonable and Prudent Measure 2:

The Forest shall conduct reporting of incidental take as follows. By March 1 of each year for the term of the proposed action, the Forest shall report to the Service the actual number of acres treated within 100 feet of live water, the application method, the chemicals used (herbicide formulations, adjuvants, and surfactant), and location of treatment sites. The report shall be submitted to the Team Leader of the Service's Eastern Idaho Field Office in Chubbuck, Idaho.

VIII. CONSERVATION RECOMMENDATIONS

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

The Service recommends that the Forest avoid applying herbicides after August 15 within 20 feet of stream reaches supporting bull trout spawning to minimize disruption of spawning behavior.

IX. REINITIATION-CLOSING STATEMENT

This concludes formal consultation on the Forest's proposal to implement an invasive plant management program within non-wilderness Forest lands in Lemhi, Custer, and Butte Counties, Idaho. As provided in 50 CFR §402.16, reinitiation of formal consultation is required where discretionary Federal agency involvement or control over the action has been maintained (or is authorized by law) and if: (1) the amount or extent of incidental take is exceeded; (2) new information reveals effects of the agency action that may affect listed species or critical habitat in a manner or to an extent not considered in this Opinion; (3) the agency action is subsequently modified in a manner that causes an effect to the listed species or critical habitat that was not considered in this Opinion; or (4) a new species is listed or critical habitat designated that may be affected by the action. In instances where the amount or extent of incidental take is exceeded, any operations causing such take must cease pending reinitiation.

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