United States Department of the Interior

U.S. Fish and Wildlife Service

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MAY 2 5 2012

Memorandum

To: Manager, Cottonwood Field Office, U.S. Bureau of Land Management, Cottonwood, Idaho

From: State Supervisor, Idaho Fish and Wildlife Office, U.S. Fish and Wildlife Service, Boise, Idaho

Subject: 2011–2022 Noxious Weed Control Program—Latah, Clearwater, Nez Perce, Lewis, Idaho, and Adams Counties, Idaho—Biological Opinion
In Reply Refer to: 01EIFW00-2012-F-0088 Internal Use: CONS-100b

Russ Holder for Brian Kelly

Enclosed are the U.S. Fish and Wildlife Service's (Service) Biological Opinion (Opinion) and concurrence on the U.S. Bureau of Land Management's (Bureau) determinations of effect on species listed under the Endangered Species Act (Act) of 1973, as amended, for the proposed 2011-2022 Noxious Weed Control Program (Program) on Bureau administered lands in Latah, Clearwater, Nez Perce, Lewis, Idaho, and Adams counties, Idaho. In a letter dated December 1, 2011, and received by the Service on December 5, the Bureau requested formal consultation on the determination under section 7 of the Act that the proposed Program is likely to adversely affect the bull trout (*Salvelinus confluentus*) and its critical habitat, the Spalding's catchfly (*Silene spaldingii*), and the MacFarlane's four-o'clock (*Mirabilis macfarlanei*). The Bureau determined that the proposed Program is not likely to adversely affect the Canada lynx (*Lynx canadensis*) and the northern Idaho ground squirrel (*Spermophilus brunneus brunneus*) and requested our concurrence with these determinations. For candidate species, the Bureau determined that the proposed Program will have no impact on the white bark pine (*Pinus albicaulis*), and may impact the yellow-billed cuckoo (*Coccyzus americanus*) and North American wolverine (*Gulo gulo luscus*) but is not likely to lead to a trend toward federal listing or cause a loss of viability of the population or species. The Service acknowledges these determinations.

The enclosed Opinion and concurrence are based primarily on our review of the proposed action, as described in your October 2011 Biological Assessment (Assessment), and the anticipated effects of the action on listed species, and were prepared in accordance with section 7 of the Act. Our Opinion concludes that the proposed Program will not jeopardize the survival and recovery of the bull trout, Spalding's catchfly, and MacFarlane's four-o'clock and will not destroy or adversely modify bull trout critical habitat. A complete record of this consultation is on file at this office.

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

Attachment

cc: NOAA, Grangeville (Brege)
IDFG, Lewiston (Hennekey)

BIOLOGICAL OPINION
FOR THE
COTTONWOOD BLM 2011–2022 NOXIOUS WEED CONTROL PROGRAM

01EIFW00-2012-F-0088

May 2012

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

Supervisor Russell L. Holder for Brian T. Kelly

Date 5/25/12

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1. BACKGROUND AND INFORMAL CONSULTATION

1.1 Introduction

The U.S. Fish and Wildlife Service (Service) has prepared this Biological Opinion (Opinion) on the effects of the proposed 2011–2022 Noxious Weed Control Program (Program) on the bull trout (*Salvelinus confluentus*) and its critical habitat, Spalding's catchfly (*Silene spaldingii*), and MacFarlane's four-o'clock (*Mirabils macfarlanei*). In a letter dated December 1, 2011, and received December 5, the U.S. Bureau of Land Management, Cottonwood Field Office (Bureau) requested formal consultation with the Service under section 7 of the Endangered Species Act (Act) of 1973, as amended, for its proposal to implement the action. The Bureau determined that the proposed action is likely to adversely affect the bull trout and its critical habitat, the Spalding's catchfly, and the MacFarlane's four-o'clock. As described in this Opinion, and based on the Biological Assessment (USBLM 2011, entire) developed by the Bureau, and other information, the Service has concluded that the action, as proposed, is not likely to jeopardize the continued existence of these species or destroy or adversely modify bull trout critical habitat.

The Bureau has also determined the action is not likely to adversely affect the Canada lynx (*Lynx canadensis*) and the northern Idaho ground squirrel (*Spermophilus brunneus brunneus*). In this document, the Service is providing concurrence with those determinations.

1.2 Consultation History

The last consultation we completed on noxious weed treatments with the Bureau was in 2005 when we provided a letter of concurrence for the annual weed treatment program (OALS 1-4-05-I-634). Between 2006 and 2011 we reviewed numerous iterations of a draft assessment for a multi-year treatment program but the Bureau did not finalize an Assessment. During 2011 the Service and the Bureau have had the following communications/coordination on the proposed Program.

July 8, 2011	The Service received a draft Assessment from the Bureau via email.
July 18, 2011	The Service participated in a conference call with the Bureau and U.S. NOAA Fisheries Service (USNOAA) to discuss the draft Assessment.
July 22, 2011	The Service received a revised draft Assessment from the Bureau via email. Revisions to the Assessment were based on comments from the Services made during the July 18 conference call.
August 4, 2011	The Service participated in a conference call with the Bureau and USNOAA to review the revised draft Assessment.
September 21, 2011	The Service received a revised Assessment from the Bureau via email.
October 4, 2011	The Service participated in a conference call with the Bureau and USNOAA to review the revised draft Assessment.

October 5, 2011	The Service received a revised Assessment from the Bureau via email. The Bureau incorporated comments made by the Service during the October 4 conference call.
October 11, 2011	The Service sent an email to the Bureau stating agreement with the contents of the Assessment and effects determinations for listed species.
April 11, 2012	The Service sent a draft Opinion to the Bureau for review and comment.
May 8, 2012	The Service received comments on the draft Opinion from the Bureau via email.

1.3 Informal Consultations

The Bureau Cottonwood Field Office (CFO) proposes a Program to treat noxious weeds on Bureau managed lands in the Cottonwood Field Office Area (CFOA) for a 10-year period ending in 2022. The Bureau will use chemicals (herbicides), manual, mechanical, biological, and cultural weed control methods. The Program includes Best Management Practices (BMPs) for minimizing resource impacts. Refer to section 2.1 of this Opinion for a description of the proposed action.

1.3.1 Canada Lynx

Service concurrence that the Program is not likely to adversely affect the Canada lynx is based on the following rationales supporting our conclusion that effects will be insignificant and/or discountable.

1. No noxious weed control actions will occur within one mile of any known occupied lynx denning sites.
2. No noxious weed control treatments will be authorized that may have significant effects to key lynx prey species such as the snowshoe hare (*Lepus americanus*).
3. The majority of herbicide treatments will occur in low elevation grasslands which do not provide suitable lynx habitat.
4. The herbicides proposed for use have a low to non-existent potential to bio-accumulate thus reducing risks to lynx.
5. All weed control actions will be consistent with the Lynx Conservation Assessment and Strategy (LCAS) (Ruediger et al. 2000, entire).

1.3.2 Northern Idaho Ground Squirrel

Service concurrence that the Program is not likely to adversely affect the northern Idaho ground squirrel is based on the following rationales supporting our conclusion that effects will be insignificant and/or discountable.

1. Although the CFOA contains suitable habitat for the northern Idaho ground squirrel, squirrel occurrence has not been documented. The Bureau will survey areas of suitable habitat for the presence of squirrels prior to any noxious weed treatments.

2. If northern Idaho ground squirrels are located within the CFOA, the Bureau will avoid conducting weed treatments during the squirrels' above ground activity period (which is site specific but typically occurs from late March to mid September).
3. The Bureau will avoid significant ground disturbing activity in areas with colonies of northern Idaho ground squirrels or in suitable habitat at all times of the year.
4. By reducing the encroachment of noxious weeds into suitable squirrel habitat, the Program is expected to benefit the northern Idaho ground squirrel in the long-term.

2. BIOLOGICAL OPINION

2.1 Description of the Proposed Action

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

2.1.1 Action Area

The Bureau proposes to treat noxious weeds within the Cottonwood Field Office area (CFOA) which encompasses 132,556 acres in Latah, Clearwater, Nez Perce, Lewis, Idaho, and Adams counties, Idaho. Bureau lands included within the CFOA that may be impacted by the Program occur in the nine 4th field Hydrologic Units (HUC) and 86 associated 6th field HUCs shown in Table 1[1].

Table 1. 4th Field Hydrologic Units encompassing the CFOA and number of 6th Field HUCs with proposed noxious weed treatments within each subbasin.

Subbasin Name 4th Field HUCs	Hydrologic Unit Number	Number of 6th Field HUCs with proposed noxious weed treatments
Lower Snake River	17060703	5
Snake River	17060701	7
Lower Salmon River	17060209	29
Little Salmon River	17060210	12
Middle Salmon River	17060207	5
South Fork Salmon River	17060208	1
Clearwater River	17060306	15
Middle Fork Clearwater River	17060304	1
South Fork Clearwater River	17060305	11

[1] Ninety-nine percent (plus) of the noxious weed treatments are proposed in these nine subbasins. Potentially treatments may also occur on 18 acres in the North Fork Clearwater River subbasin (below Dworshak Reservoir) and on 26 acres in the North Fork Payette River subbasin, but none are currently proposed (Johnson 2012, pers. comm.). We are not expecting significant effects to listed species from treatments within these two subbasins.

2.1.2 Proposed Action

The following description of the proposed action is excerpted from the description provided in the Assessment (USBLM 2011, pp. 20-31) with minor modifications for content clarity and consistency. Refer to the Assessment for a complete Program description.

The Program will be implemented between 2012 and 2022 and includes chemical (herbicide) treatment of noxious weed and invasive plants on approximately 800 acres annually (approximately 400 acres of aerial and 400 acres of ground application) within the CFOA. Other annual weed control actions include manual control (5 acres), mechanical treatments (up to 50 acres), biological releases (20 sites), and cultural control measures (e.g., vehicle closures, certified weed free hay, etc.). Biological control research is also planned for a few selected sites. Invasive plant control Program evaluation, monitoring, and reporting criteria have also been identified for the proposed Program. Each of these control methods are discussed separately below.

2.1.2.1 Chemical Weed Treatments

Herbicide applications are scheduled and designed to minimize potential impacts to non-target plants and animals, while remaining consistent with the objectives of the Program. The rates of application (i.e., pounds of active ingredient (AI) per acre) depend on the target species; the presence and condition of non-target vegetation; soil type; persistence of chemical in soils; depth to the water table; presence of other water sources, riparian areas, and special status plants; and, the requirements specified on the herbicide label.

2.1.2.1.1 Herbicides

The Bureau has identified 10 herbicides that may be used during Program implementation (Table 2). These herbicides are: clopyralid, glyphosate, picloram, 2,4-D, metsulfuron methyl, dicamba, imazapic, chlorsulfuron, imazapyr and sulfometuron methyl. Herbicides targeting broad-leaf plants may be used singly or in combination (tank mixes) to more effectively target specific weed species. The majority of the acreage will be treated using picloram and 2,4-D separately or as a mix. Other broadleaf herbicides will be utilized to a much lesser degree. Aquatic approved formulations of herbicides for use within 15 feet of water bodies include glyphosate (Rodeo) and imazapyr (Habitat). Habitat is commonly used for controlling Russian olive (*Elaeagnus angustifolia*), salt cedar (*Tamarix* spp.), Japanese knotweed (*Polygonum cuspidatum*), and purple loosestrife (*Lythrum salicaria*). Since they are non-selective, only spot treatment will be used in order to avoid removal of non-target plant species. Other formulations of glyphosate (Roundup, Glyphomate 41, etc.) may be used as a broadcast treatment to prepare a site for revegetation activities. The herbicide names given in the Table 2 are some of the more common. Other formulations of the active ingredient may be used and include less common trade named products.

Table 2. Herbicides Proposed for Use and Typical Active Ingredient (AI) Rates

Active Ingredient	Product Name	Application Rate Lbs AI/Acre
Clopyralid	Transline	0.49
Glyphosate[1]	Rodeo[1]	2.0
Picloram	Tordon	0.375
2,4,-D	Weedar 64	2.0
Metsulfuron Methyl	Escort	0.075
Dicamba	Banvel	2.0
Imazapic	Plateau	0.0625
Chlorsulfuron	Telar	0.094
Imazapyr[1]	Arsenal, Chopper, Stalker, Habitat[1]	0.75
Sulfometuron methyl	Oust[2]	0.05

[1]Aquatic approved formulation available.

Noxious weed control treatments will occur in an estimated total of 86 6th field HUCs. Tables 1 – 9 in Appendix B of the Assessment provide estimates of the maximum acreage that may be treated within each 6th field HUC annually. The acreages identified in Appendix B total approximately 1,600 acres, while annual estimated herbicide treatment acres will generally be less than 800 acres because not all drainages will be treated for the maximum amount annually. Treatment acres are estimates of the maximum that may occur and minor changes may occur for some watersheds (i.e., less or no herbicide treatments, additional herbicide treatments, or treatments in watersheds not listed). Total treatment acres (estimated maximum) within 6th field HUCs ranges from 0.5 acres to 200 acres. All noxious weed control measures will be conducted in accord with identified standards and project specific requirements (i.e., BMPs) listed in Appendix A of this Opinion). All herbicide applications will be in compliance with the restrictions and conditions shown in Table 3.

[2] Currently the Bureau is prohibited from using the Oust active ingredient (AI) sulfometuron methyl in Idaho. If the AI is again approved for use on Bureau lands in Idaho, the AI would be used in accordance with the herbicide label which allows for roadside, industrial turf, forestry and similar site applications. Currently the label does not allow for rangeland applications. If the use of the AI is permitted for rangeland applications in the future, any use of the AI for that purpose or for conifer reforestation projects will be analyzed at the project level and the Bureau will initiate individual project consultation with the Services (Johnson 2012, pers. comm.). See Appendix B of this Opinion for authorized uses of Oust.

Table 3. Buffers, maximum wind speed, application methods, and herbicide restriction associated with aquatic habitats, riparian areas, and wetland resources.

Buffer	Maximum Wind Speed	Herbicide Application Method	Herbicides Authorized based on Aquatic Level of Concern (see Appendix C of this Opinion for definition)
<15 feet from live water or shallow water tables	5 mph	backpack sprayer, hand-pump sprayer, wicking, wiping, dipping, painting, and injecting selective spraying/treatment of target species only (e.g., spot treatment of individual plants)	aquatic approved herbicides and surfactants only
15-100 feet from live waters or shallow water tables; or within riparian areas	8 mph	ground/spot spraying (no broadcast boom spraying), wicking, wiping, dipping, painting, injecting selective spraying of target species only (e.g., spot treatment of individual plants)	low
0 - 100 feet from live waters or shallow water tables	n/a	No application of picloram will be authorized	n/a
>100 feet from live waters and areas outside riparian areas	n/a	wicking, dipping, painting, and injecting	low and moderate
>100 feet and areas outside riparian areas	8 mph	all ground/broadcast spraying	low and moderate
>150 feet from ponds, lakes, springs, wetlands	5 mph	aerial	low and moderate
>100 feet from intermittent streams – dry channel (non-fish-bearing)	5 mph	aerial	low and moderate
>200 feet from intermittent streams – wet channel (non-fish-bearing)	5 mph	aerial	low and moderate
>200 feet from perennial streams (non-fish bearing)	5 mph	aerial	low and moderate
>300 feet from fish bearing streams	5 mph	aerial	low and moderate

2.1.2.1.2 Carriers

Carriers are used to dilute or suspend herbicides during application and allow for proper placement of the herbicide. Water is the only carrier that will be used during Program implementation and is generally effective with a wide range of herbicides.

2.1.2.1.3 Spray Additives/Adjuvants/Surfactants

Spray additives can be included in formulated herbicides, or can be added to the spray mixture to improve mixture effectiveness. Adjuvants are classified by their uses rather than their chemistry, although chemical properties determine their suitability for use with different herbicides. Adjuvants include surfactants, antifoaming agents, compatibility agents, crop oil or crop oil concentrates, activators, and drift control agents. Surfactants that are planned for use in CFO include: (1) Agri-Dex™; (2) LI-700™; (3) Kinetic™, and (4) Competitor™. These four adjuvants are approved by the Washington Department of Ecology for aquatic use in Washington.

For ground application methods surfactants are mixed at a rate of four pints per one-hundred gallons of tank mix. Spot spraying is the main method of application except for limited restoration projects (e.g., rehabilitation of weed infested agriculture lands) which occur in upland areas. For aerial applications, four to eight pints of surfactant are used per acre.

2.1.2.1.4 Dye Additives

Spray dyes are often added to the tank mix to colorize the spray formulation so the applicator can easily distinguish treated areas and see the spray pattern of the equipment being used. As needed, spray dyes will be used in sensitive areas (e.g., Riparian Conservation Areas (RCAs), near listed plants, etc.) to allow for more accurate application. The use of dyes will help to limit overspray from reaching non-target plants and prevent re-application to target plants already treated. The CFO applicators use a blue colorant which photodegrades in a period of approximately one week. This dye is added to the spray tank at approximately 8 fluid ounces per one-hundred gallons of water.

2.1.2.1.5 Application Methods

Liquid or granular forms of herbicides will be applied either from the air or on the ground. Ground application will include both mechanized and hand equipment to either broadcast or spot treat sites. Typical herbicide application rates (active ingredient/acre) are identified in Table 2. It should be noted that the quantity of active ingredient applied per acre will generally be lower than, but not exceed, the quantities depicted in Table 2.

Ground Based Application

Mechanized equipment used for ground based herbicide treatments includes vehicle mounted slip tanks and All Terrain Vehicle (ATV) mounted sprayers. The sprayers typically have a tank capacity of 15 to 200 gallons. They also have spray booms capable of various spray widths for use in broadcast applications. The typical broadcast spray widths of the above mentioned equipment range from eight feet for an ATV sprayer boom to approximately fifty feet on a pickup mounted tank. Broadcast spraying is not utilized in RCAs and is mainly limited to road rights-of-way and rehabilitation sites.

This same equipment is also equipped with handguns used for spot treatments. A vast majority of the acreage treated by ground methods in the CFOA will be spot application where operators use the hand gun to selectively apply herbicides to target vegetation.

Ground based application will also be accomplished by hand methods including backpack sprayers, handpump sprayers, hand-spreading granular formulations, wicking, wiping, dripping, painting, or injecting herbicides. Highly specific treatment of individual plants can be accomplished through these methods.

Only ground based herbicide treatments will occur within the RCAs identified in Table 3. Non-herbicide treatments will also occur in RCAs (Table 4) and in upland areas.

Aerial Application

Proposed aerial applications will be made from helicopters using boom-mounted nozzles for liquids or rotary broadcasters for granular formulations. Aerial application is commonly used to treat larger infested areas and those areas located in the remote rugged terrain commonly found in the canyon grasslands. No aerial application of herbicides will occur within the modified RCAs identified in Table 4 below and will only occur under the conditions shown in Table 3. Helicopter application will use paper markers to indicate spray strips and areas sprayed. Avoidance of sensitive areas (e.g., RCAs) will be achieved through two methods: (1) marking buffers with bright colored ribbon (flagging) prior to application; and (2) using GPS systems located on-board the helicopter applying herbicides. An electronic file containing the GPS coordinates of sensitive/buffered areas is downloaded to the navigational computer. Pilots can then accurately position themselves and avoid sensitive/buffered areas. Post treatment monitoring of applications made in this manner has shown it to be accurate within five meters.

Table 4. RCA buffers for aerial herbicide treatments. No aerial herbicide application will occur within these buffers. RCAs for non-fish bearing streams are modified (wider) than those contained in the Cottonwood Resource Management Plan (RMP) (USBLM 2009).

Water Body Description	Distance
Fish bearing streams	300 feet slope distance either side of stream channel (600 feet, including both sides of stream), or outer edges of 100-year floodplain, or outer edge or riparian vegetation, whichever is greatest.
Perennial stream, non-fish-bearing stream	200 feet slope distance either side of stream channel (400 feet, including both sides of stream), or outer edges of 100-year floodplain, or outer edge or riparian vegetation, whichever is greatest. (Bureau RMP -2009 = 150 feet, aerial mod. to 200 feet)
Intermittent stream, non-fish-bearing stream WET CHANNEL	200 feet slope distance either side of stream channel (400 feet, including both sides of stream), or outer edges of 100-year floodplain, or outer edge of riparian vegetation, whichever is greatest. (Bureau RMP – 2009 = 150 feet, aerial mod. to 200 feet)
Intermittent stream, non-fish-bearing stream DRY CHANNEL	100 feet slope distance either side of stream channel (200 feet, including both sides of stream), or outer edges of 100-year floodplain, or outer edge of riparian vegetation, whichever is greatest.
Ponds, lakes, reservoirs, and wetlands (no size criteria)	Consist of the body of water or wetland and the area to the outer edges of the riparian vegetation, or to the extent of the seasonally saturated soil; or 150 feet slope distance from the edge of the maximum pool elevation of constructed ponds and reservoirs or from the edge of the wetland, pond or lake, whichever is greatest.

2.1.2.2 Manual Control

Manual control treatments will be conducted on approximately 5 acres annually. Hand-operated power tools and hand tools are used in manual vegetation treatments to cut, clear, mow, or prune herbaceous and woody species. In manual treatments, workers will cut plants above ground level; pull, grub, or dig out plant root systems to prevent subsequent sprouting and re-growth; scalp at ground level or remove competing plants around desired vegetation; or place mulch around desired vegetation to limit the growth of competing vegetation.

The manual method of vegetation treatment is labor intensive and costly when compared to herbicide application. However, it can be extremely species selective and can be used in areas of sensitive habitats or areas that are inaccessible to ground vehicles. Manual control may occur in a variety of areas and is often used in sensitive areas to avoid adverse effects to non-target species (e.g., special status plants, non-target riparian plants) or water quality.

2.1.2.3 Mechanical Control

Mechanical weed control treatments may occur on up to approximately 50 acres annually; however, fewer acres than this will generally be treated on an annual basis. It is estimated that 90 percent of the treatments areas will occur in areas outside of RCAs. However, if mechanical treatments are proposed in RCAs a no treatment buffer of 100 to 200 feet will be used in the majority of cases. Regardless of which buffer is used, treatments will not occur in areas that will impact riparian habitats and will not occur in areas where the treatments may result in significant sediment delivery to streams or rivers.

Mechanical noxious weed control activities include the use of wheel tractors, crawler-type tractors, or specially designed vehicles with attached implements for mechanical vegetation treatments (e.g., plows, discs, harrow, and rangeland drill). Mechanical control activities will typically occur on old agricultural areas or livestock feeding sites with moderate slopes (less than 20 percent). All soil disturbing mechanical control activities will include associated rehabilitation measures such as seeding and planting of desirable species, as described below.

Site Restoration, Seedings, and Plantings

Noxious weeds commonly invade areas composed primarily of annual species that cannot compete with aggressive invader species. Consequently, after weeds are controlled on a site it is beneficial to establish desirable vegetation which will compete with noxious weeds, restrict or prevent additional infestations, and help prevent soil erosion and further soil nutrient loss. Most rehabilitation projects will occur on formerly cultivated areas or flat areas where equipment can be operated. These cultivated areas primarily occur on moderate sloped toeslopes and upslope bench areas. Annually, several sites, ranging in size from one to 50 acres, may be rehabilitated. Site restoration will be designed to result in no or discountable potential for adverse erosion and sediment delivery to streams with special status fish. The following methodology has been used to accomplish successful rehabilitation projects and will be the prescribed method for future projects. The exact treatments may vary depending on season and herbicide treatments needed.

The site will initially be prepared for seeding by decreasing the seedbank of unwanted plants through ground application of herbicides. Glyphosate will be applied mid-spring to arrest winter annual forb and grass competition (i.e., cheatgrass (*Bromus tectorum*) and yellow starthistle (*Centaurea solstitialis*). This not only reduces the seed-bank but begins to conserve soil moisture which is critical to establishing new seedings. A second late spring/early summer herbicide application may be required if late germinating plants such as puncturevine (*Tribulus terrestris*) and witchgrass (*Panicum* spp.) occur on the site. These plants will not have emerged before the first glyphosate treatment and are released due to lack of competition from winter annuals. After green-up in the fall, a third treatment will be applied just prior to seeding in order to further arrest annual competition. After the final herbicide treatment, the site will be seeded to perennial grasses utilizing a rangeland drill or broadcast seeder. If the seed is broadcast, a harrow will be used to provide seed coverage. Previous experience with rehabilitation in this area shows that the spring after seeding, a flush of weedy forbs will occur as a result of the disturbance. A post seeding, spring application of an approved broadleaf herbicide (e.g., 2,4-D or clopyralid) will be required to reduce this flush of competition and favor successful grass establishment.

2.1.2.4 Biological Control

Biological control will include the use of insects, pathogens, or other disease vectors of the target plant. Biological methods of vegetation treatment use living organisms to selectively suppress, inhibit, or control herbaceous and woody vegetation. Biological weed control activities include the release of insect agents which are parasitic and "host specific" to target noxious weeds. Approximately 20 biological releases will be made within the CFOA per year. Biological control is not used to eradicate a weed species. Since this is a predator/prey relationship the goal is to reduce the target organism to a level considered acceptable.

Agents that may be utilized by the CFO include those for yellow starthistle, Dalmation toadflax (*Linaria dalmatica*), leafy spurge (*Euphorbia esula*), rush skeletonweed (*Chondrilla juncea*), spotted knapweed (*Centaurea stoebe*), diffuse knapweed (*Centaurea diffusa*), and purple loosestrife (*Lythrum salicaria*). As biological control agents become approved for release against additional weed species, they will be considered for use as part of the Program. This approval process is well regulated and includes specific input by USDA Animal and Plant Health Inspection Service (APHIS), USDA, Agricultural Research Service (ARS), the Service, and other agencies. Before being approved for release, potential biological control agents are well studied and tested to assure they are host specific and will not move to off-target plant species.

2.1.2.5 Cultural Control

Cultural control will include preventing weed introduction and/or minimizing the rate of spread by requiring the following actions on public lands within the CFOA:

- Clean all ground surface disturbing equipment moving into or out of weed infested areas before and after use.
- Use only certified, noxious weed-free grains, hay or pellets for feeding domestic animals and wildlife; and inspect all feeding sites during and following use.
- Use only certified noxious weed-free seed, along with weed-free hay, straw, mulch, or other vegetation material for site stability and revegetation projects.
- Use only noxious weed-free gravel and fill material from inspected sites.
- Revegetate disturbed areas as soon as practical; use temporary fencing if required to assure new seedling establishment.
- Evaluate current and proposed vegetation management practices (i.e., livestock grazing, prescribed burning, and seeding), and implement practices to restore desired plant communities.
- Close areas to vehicle access if vehicles are the primary cause of introduction and/or spread of noxious weeds. Area or road closures will require site specific analysis and coordination with the CFO Travel Plan.

2.1.2.6 Listed Plant Weed Control Activities

Spalding's Catchfly – Noxious Weed Control: Currently, 15 known populations of Spalding's catchfly occur on Bureau lands in the Lower Snake River and Lower Salmon River subbasins. If new populations are located on public lands the appropriate invasive plant control measures may occur. It is proposed to use herbicides and manual control methods for the control of weedy vegetation occurring within and adjacent to populations of Spalding's catchfly. Total acres treated within the perimeter of Spalding's catchfly subpopulations is expected to range between 1 to 35 acres; and adjacent areas within 300 feet of population perimeter are expected to be less than 40 acres annually. Treatments within the perimeter of populations will primarily consist of spot treatments with backpack sprayers. All herbicide treatments will be in accord with the Noxious Weed Control Standards and Project Criteria (i.e., BMPs) listed in Appendix D of the Assessment (and Appendix A of this Opinion)..

***MacFarlane's Four-O'Clock – Noxious Weed Control*:**

Noxious weed infestations have been identified as a major threat to populations of MacFarlane's four o'clock. It is proposed to use herbicides and manual control methods for the control of weedy vegetation occurring within and adjacent to populations of MacFarlane's four-o'clock. Currently, five known populations of MacFarlane's four-o'clock occur on Bureau lands in the Lower Salmon River. If new populations are located on public lands, invasive plant control measures may occur. Total acres treated within the perimeter of MacFarlane's four-o'clock subpopulations is expected to range between 1 to 55 acres; and adjacent areas within 300 feet of population perimeter are expected to be less than 40 acres annually. Treatments within the perimeter of populations will primarily consist of spot treatments with backpack sprayers. All herbicide treatments will be in accord with the Noxious Weed Control Standards and Project Criteria (i.e., BMPs) listed in Appendix D of the Assessment (and Appendix A of this Opinion).

2.1.2.7 Other Projects

During the life of the Program, there may be other small rehabilitation projects that are proposed. These individual projects will normally be less than 20 acres in size and will be accomplished in the same manner as described above. Such projects may include follow-up weed control activities associated with a variety of restoration. These projects will not exceed 50 acres annually within the CFOA (Johnson 2012, *in litt.*). Other examples of restoration projects which may include invasive vegetation treatments are listed as follows: wetland restoration, riparian restoration, stream improvements, road decommissioning, and culvert replacement. As needed, site specific environmental analysis will be conducted for restoration actions, which will tier to this document for application of herbicides.

2.1.2.8 Noxious Weed Control Standards and Project Criteria - BMPs

To minimize resource impacts during Program implementation, the Bureau will follow all standards and project criteria (referred to BMPs in the rest of this Opinion) contained in Appendix D of the Assessment and included in Appendix A of this Opinion.

2.1.2.9 Monitoring and Adaptive Management

2.1.2.9.1 Monitoring

The Bureau will be monitoring the effectiveness of the Program on both a *site-specific* treatment level and on a *landscape* level.

Site-specific treatment level monitoring will involve assessing the effectiveness of the treatment agent or control method on a specific patch of noxious weeds. Follow-up treatments will occur as staffing and funding permit. Treatment with biological controls will be monitored through a coordinated effort with U.S. Department of Agriculture (USDA), Idaho Department of Agriculture, Nez Perce Biocontrol Center, and Bureau employees. Monitoring may be required over multiple years to determine treatment effectiveness. Monitoring of chemical, physical, and cultural control methods will be conducted on randomly selected sites within one to two months of treatment through visual observation of target species' relative abundance/site dominance compared to pre-treatment conditions. Sequential monitoring of these sites will occur in subsequent years.

Landscape level effectiveness monitoring will be accomplished over the ten-year period by tracking noxious weed occurrence through Geographic Information System (GIS) mapping within the CFOA. Noxious weed patches will be inventoried, mapped and tracked through GIS to monitor the amount of the CFOA land base with noxious weeds and how weed control measures have worked over the ten-year period.

Landscape level inventory and monitoring is expected to reveal new populations of noxious weeds, which will be mapped and evaluated for control or eradication. Management of these newly discovered sites will occur under the guidelines as described in the preceding proposed action, which will include an assessment of impacts to listed and proposed species and critical habitat as required under the Act.

2.1.2.9.2 Adaptive Management

The noxious weed control Program is a long-term endeavor to control weeds where and when practicable. However, because there are areas of scientific and management uncertainty, management actions will need to be refined over time to meet the basic objective of noxious weed control activities, which is systematically reducing weed abundance, extent, and spread throughout the CFOA. Annual site-specific monitoring will assess the effectiveness of specific control measures on weed species relative to application rate/method and area. Management actions may require refinement or change over time as data from specific effectiveness monitoring is analyzed.

Landscape level management will be reevaluated on a ten-year cycle. Information from weed inventories and results from treatments will be mapped spatially and the Bureau will use this information to assess Program objectives.

2.1.2.9.3 Annual Monitoring Reports

The acreage treated, herbicides used, and the monitoring results from the previous year activities will be included in an annual monitoring report submitted to the Services. These reports will be submitted after the field season and prior to the next field season. The Bureau will include these reports in supplements to its subbasin biological assessments.

The annual reports will include actual number of acres treated, the chemicals used, application method, and location of treatments sites. Key components of the report will include:

- Implementation and effectiveness monitoring of weed control activities.
- Non-target plant mortality in riparian areas will be monitored to determine if mortality of non-target plants is affecting riparian functions.
- As needed, spray cards, dye or other type of indicators will be used at the edge of riparian area and/or water's edge on a small sample (i.e., minimum of five sites) of treatment projects. This monitoring will provide visual verification that application methods are minimizing risk to listed fish.
- Include pertinent comments or recommendations in regards to weed control activities.

There are other areas of monitoring that have not been fully addressed due to uncertainty over how to monitor, funding for monitoring and how to interpret the results. The Bureau will further investigate the effectiveness and practicality of conducting some level of water quality monitoring to detect cumulative (i.e., levels of chemicals in the system from various upstream private, state, and federal landowners/managers) and baseline levels of herbicides and possibly to establish the effectiveness of the spray drift buffers.

Based on annual treatment evaluations and with the likely development of new control methods and technology, changes in existing uses or use of new noxious weed treatments may be authorized and warranted. Any changes to the proposed action, as described in the Assessment, will be analyzed for impacts to listed/proposed species and critical habitat, and consultation will be reinitiated as appropriate.

2.1.2.9.4 Annual Weed Treatment Proposals

Program noxious weed control measures have been identified above. The Program will adhere to the herbicides proposed for use and the BMPs. However, additional 6th field HUCs may have treatments or acreage proposed for treatment may change. Annually, such changes will not result in more than an additional 200 acres of treatment and no more than 15 acres of RCA treatments within a watershed (6th Field HUC). Expected annual herbicide weed control treatments occurring within the CFOA will be typically less than 800 acres and consequently less for each watershed. Proposed annual herbicide treatments will be submitted to Bureau biologists by March 1 each year and will be submitted to the Services by April 1 each year.

2.1.2.10 Cooperative Partnerships:

Within the CFOA, the Bureau is a cooperative partner in four Weed Management Areas (WMAs). The cooperative partnerships undertaken through these WMAs make individual and cooperative efforts more effective. Partners include Federal, State, County, private organizations, and private landowners. The cooperative WMAs that the Bureau are partners in are listed below along with the year partnership was established:

- Clearwater River Basin Weed Management Area (1996)
- Tri-State Weed Management Area (1995)
- Salmon River Weed Management Area (1994)
- Joseph Plains Weed Management Area (2000)

The cooperative WMAs provide an opportunity for coordinating weed control efforts within a specific project area and provide more efficient methods of control, restoration, and monitoring. When a federal agency is a cooperator in WMAs, it does not necessarily mean the Bureau is the action agency for non-federal lands. However, it does provide the Bureau the opportunity of identifying potential listed species concerns and issues on private land and recommending noxious weed control BMPs that will reduce risk to listed species and their habitats. In the past, prior to private land aerial herbicide application, the Bureau has cooperated in conducting surveys for listed plants and mapping and marking the perimeter of populations on private lands (with private land owner permission). The Bureau has also conducted monitoring of MacFarlane's four-o'clock on private lands (with private land owners permission). Noxious weed control efforts on non-federal lands can proceed without Bureau approval or funding. However, the Bureau recognizes that the federal listing of species requires the Bureau to ensure that all actions it authorizes or funds are not likely to jeopardize the continued existence of the species or result in the destruction or adverse modification of critical or proposed critical habitat of listed species.

2.2 Analytical Framework for the Jeopardy and Adverse Modification Determinations

2.2.1 Jeopardy Determination

In accordance with policy and regulation, the jeopardy analysis in this Opinion relies on four components:

1. The *Status of the Species*, which evaluates the species rangewide condition, the factors responsible for that condition, and its survival and recovery needs.
2. The *Environmental Baseline*, which evaluates the condition of the species in the action area, the factors responsible for that condition, and the relationship of the action area to the survival and recovery of the species.
3. The *Effects of the Action*, which determines the direct and indirect impacts of the proposed Federal action and the effects of any interrelated or interdependent activities on the species.
4. *Cumulative Effects*, which evaluates the effects of future, non-Federal activities in the action area on the species.

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

The jeopardy analysis in this Opinion places an emphasis on consideration of the rangewide survival and recovery needs of the species and the role of the action area in the survival and recovery of the species as the context for evaluating the significance of the effects of the proposed Federal action, taken together with cumulative effects, for purposes of making the jeopardy determination.

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

2.2.2 Adverse Modification Determination

This Opinion does not rely on the regulatory definition of "destruction or adverse modification" of critical habitat at 50 CFR 402.02. Instead, we have relied upon the statutory provisions of the Act to complete the following analysis with respect to critical habitat.

In accordance with policy and regulation, the adverse modification analysis in this Opinion relies on four components:

1. The *Status of Critical Habitat*, which evaluates the rangewide condition of designated critical habitat in terms of primary constituent elements (PCEs), the factors responsible for that condition, and the intended recovery function of the critical habitat overall.
2. The *Environmental Baseline*, which evaluates the condition of the critical habitat in the action area, the factors responsible for that condition, and the recovery role of the critical habitat in the action area.

3. The *Effects of the Action*, which determines the direct and indirect impacts of the proposed Federal action and the effects of any interrelated or interdependent activities on the PCEs and how that will influence the recovery role of affected critical habitat units.
4. *Cumulative Effects*, which evaluates the effects of future, non-Federal activities in the action area on the PCEs and how that will influence the recovery role of affected critical habitat units.

For purposes of the adverse modification determination, the effects of the proposed Federal action on critical habitat are evaluated in the context of the rangewide condition of the critical habitat, taking into account any cumulative effects, to determine if the critical habitat rangewide will remain functional (or will retain the current ability for the PCEs to be functionally established in areas of currently unsuitable but capable habitat) to serve its intended recovery role for the species.

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

2.3 Bull Trout and Critical Habitat

2.3.1 Status of the Species and Critical Habitat

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

2.3.1.1 Listing Status

The coterminous United States population of the bull trout was listed as threatened on November 1, 1999 (64 FR 58910). The threatened bull trout occurs in the Klamath River Basin of south-central Oregon, the Jarbidge River in Nevada, north to various coastal rivers of Washington to the Puget Sound, east throughout major rivers within the Columbia River Basin to the St. Mary-Belly River, and east of the Continental Divide in northwestern Montana (Cavender 1978, pp. 165-166; Bond 1992, p. 4; Brewin and Brewin 1997, pp. 209-216; Leary and Allendorf 1997, pp. 715-720). The Service completed a 5-year Review in 2008 and concluded that the bull trout should remain listed as threatened (USFWS 2008, p. 53).

The bull trout was initially listed as three separate Distinct Population Segments (DPSs) (63 FR 31647, 64 FR 17110). The preamble to the final listing rule for the U.S. coterminous population of the bull trout discusses the consolidation of these DPSs, plus two other population segments, into one listed taxon and the application of the jeopardy standard under Section 7 of the Act relative to this species (64 FR 58930):

> Although this rule consolidates the five bull trout DPSs into one listed taxon, based on conformance with the DPS policy for purposes of consultation under Section 7 of the Act, we intend to retain recognition of each DPS in light of available scientific information relating to their uniqueness and significance. Under this approach, these

DPSs will be treated as interim recovery units[3] with respect to application of the jeopardy standard until an approved recovery plan is developed. Formal establishment of bull trout recovery units will occur during the recovery planning process.

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

2.3.1.1.1 Reasons for Listing

Though wide ranging in parts of Oregon, Washington, Idaho, and Montana, bull trout in the interior Columbia River basin presently occur in only about 45 percent of the historical range (Quigley and Arbelbide 1997, p. 1177; Rieman et al. 1997, p. 1119). Declining trends due to the combined effects of habitat degradation and fragmentation, blockage of migratory corridors, poor water quality, angler harvest and poaching, entrainment into diversion channels and dams, and introduced nonnative species (e.g., brook trout, *Salvelinus fontinalis*) have resulted in declines in range-wide bull trout distribution and abundance (Bond 1992, p. 4; Schill 1992, p. 40; Thomas 1992, pp. 9-12; Ziller 1992, p. 28; Rieman and McIntyre 1993, pp. 1-18; Newton and Pribyl 1994, pp. 2, 4, 8-9; Idaho Department of Fish and Game 1995, *in litt*, pp. 1-3). Several local extirpations have been reported, beginning in the 1950s (Rode 1990, p. 1; Ratliff and Howell 1992, pp. 12-14; Donald and Alger 1993, p. 245; Goetz 1994, p. 1; Newton and Pribyl 1994, p. 2; Berg and Priest 1995, pp. 1-45; Light et al. 1996, pp. 20-38; Buchanan and Gregory 1997, p. 120).

Land and water management activities such as dams and other diversion structures, forest management practices, livestock grazing, agriculture, road construction and maintenance, mining, and urban and rural development continue to degrade bull trout habitat and depress bull trout populations (USFWS 2002a, p. 13).

2.3.1.2 Species Description

Bull trout (*Salvelinus confluentus*), member of the family Salmonidae, are char native to the Pacific Northwest and western Canada. The bull trout and the closely related Dolly Varden (*Salvelinus malma*) were not officially recognized as separate species until 1980 (Robins et al. 1980, p. 19). Bull trout historically occurred in major river drainages in the Pacific Northwest from the southern limits in the McCloud River in northern California (now extirpated), Klamath River basin of south central Oregon, and the Jarbidge River in Nevada to the headwaters of the Yukon River in the Northwest Territories, Canada (Cavender 1978, p. 165-169; Bond 1992, p. 2-3). To the west, the bull trout's current range includes Puget Sound, coastal rivers of British Columbia, Canada, and southeast Alaska (Bond 1992, p. 2-3). East of the Continental Divide bull trout are found in the headwaters of the Saskatchewan River in Alberta and the MacKenzie River system in Alberta and British Columbia (Cavender 1978, p. 165-169; Brewin and Brewin

[3] We will use the term population segment in reference to these interim recovery units throughout this Opinion to avoid confusion with other uses of the term recovery unit.

1997, pp. 209-216). Bull trout are wide spread throughout the Columbia River basin, including its headwaters in Montana and Canada.

2.3.1.3 Life History

Bull trout exhibit resident and migratory life history strategies throughout much of the current range (Rieman and McIntyre 1993, p. 2). Resident bull trout complete their entire life cycle in the streams where they spawn and rear. Migratory bull trout spawn and rear in streams for 1 to 4 years before migrating to either a lake (adfluvial), river (fluvial), or, in certain coastal areas, to saltwater (anadromous) where they reach maturity (Fraley and Shepard 1989, p. 1; Goetz 1989, pp. 15-16). Resident and migratory forms often occur together and it is suspected that individual bull trout may give rise to offspring exhibiting both resident and migratory behavior (Rieman and McIntyre 1993, p. 2).

Bull trout have more specific habitat requirements than other salmonids (Rieman and McIntyre 1993, p. 4). Watson and Hillman (1997, p. 248) concluded that watersheds must have specific physical characteristics to provide habitat requirements for bull trout to successfully spawn and rear. It was also concluded that these characteristics are not necessarily ubiquitous throughout these watersheds, thus resulting in patchy distributions even in pristine habitats.

Bull trout are found primarily in colder streams, although individual fish are migratory in larger, warmer river systems throughout the range (Fraley and Shepard 1989, pp. 135-137; Rieman and McIntyre 1993, p. 2 and 1995, p. 288; Buchanan and Gregory 1997, pp. 121-122; Rieman et al. 1997, p. 1114). Water temperature above 15°C (59°F) is believed to limit bull trout distribution, which may partially explain the patchy distribution within a watershed (Fraley and Shepard 1989, p. 133; Rieman and McIntyre 1995, pp. 255-296). Spawning areas are often associated with cold water springs, groundwater infiltration, and the coldest streams in a given watershed (Pratt 1992, p. 6; Rieman and McIntyre 1993, p. 7; Rieman et al. 1997, p. 1117). Goetz (1989, pp. 22, 24) suggested optimum water temperatures for rearing of less than 10°C (50°F) and optimum water temperatures for egg incubation of 2 to 4°C (35 to 39°F).

All life history stages of bull trout are associated with complex forms of cover, including large woody debris, undercut banks, boulders, and pools (Goetz 1989, pp. 22-25; Pratt 1992, p. 6; Thomas 1992, pp. 4-5; Rich 1996, pp. 35-38; Sexauer and James 1997, pp. 367-369; Watson and Hillman 1997, pp. 247-249). Jakober (1995, p. 42) observed bull trout overwintering in deep beaver ponds or pools containing large woody debris in the Bitterroot River drainage, Montana, and suggested that suitable winter habitat may be more restrictive than summer habitat. Bull trout prefer relatively stable channel and water flow conditions (Rieman and McIntyre 1993, p. 6). Juvenile and adult bull trout frequently inhabit side channels, stream margins, and pools with suitable cover (Sexauer and James 1997, pp. 368-369).

The size and age of bull trout at maturity depend upon life history strategy. Growth of resident fish is generally slower than migratory fish; resident fish tend to be smaller at maturity and less fecund (Goetz 1989, p. 15). Bull trout normally reach sexual maturity in 4 to 7 years and live as long as 12 years. Bull trout are iteroparous (they spawn more than once in a lifetime), and both repeat- and alternate-year spawning has been reported, although repeat-spawning frequency and post-spawning mortality are not well documented (Leathe and Graham 1982, p. 95; Fraley and Shepard 1989, p. 135; Pratt 1992, p. 8; Rieman and McIntyre 1996, p. 133).

Bull trout typically spawn from August to November during periods of decreasing water temperatures. Migratory bull trout frequently begin spawning migrations as early as April, and have been known to move upstream as far as 250 kilometers (km) (155 miles (mi)) to spawning grounds (Fraley and Shepard 1989, p. 135). Depending on water temperature, incubation is normally 100 to 145 days (Pratt 1992, p.1) and, after hatching, juveniles remain in the substrate. Time from egg deposition to emergence may exceed 200 days. Fry normally emerge from early April through May depending upon water temperatures and increasing stream flows (Pratt 1992, p. 1).

The iteroparous reproductive system of bull trout has important repercussions for the management of this species. Bull trout require two-way passage up and downstream, not only for repeat spawning, but also for foraging. Most fish ladders, however, were designed specifically for anadromous semelparous (fishes that spawn once and then die, and therefore require only one-way passage upstream) salmonids. Therefore, even dams or other barriers with fish passage facilities may be a factor in isolating bull trout populations if they do not provide a downstream passage route.

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

2.3.1.3.1 Population Dynamics

The draft bull trout Recovery Plan (USFWS 2002a, pp. 47-48) defined core areas as groups of partially isolated local populations of bull trout with some degree of gene flow occurring between them. Based on this definition, core areas can be considered metapopulations. A metapopulation is an interacting network of local populations with varying frequencies of migration and gene flow among them (Meefe and Carroll 1994, p. 188). In theory, bull trout metapopulations (core areas) can be composed of two or more local populations, but Rieman and Allendorf (2001, p. 763) suggest that for a bull trout metapopulation to function effectively, a minimum of 10 local populations are required. Bull trout core areas with fewer than 5 local populations are at increased risk of local extirpation, core areas with between 5 and 10 local populations are at intermediate risk, and core areas with more than 10 interconnected local populations are at diminished risk (USFWS 2002a, pp. 50-51).

The presence of a sufficient number of adult spawners is necessary to ensure persistence of bull trout populations. In order to avoid inbreeding depression, it is estimated that a minimum of 100 spawners are required. Inbreeding can result in increased homozygosity of deleterious recessive alleles which can in turn reduce individual fitness and population viability (Whitesel et al. 2004, p. 36). For persistence in the longer term, adult spawning fish are required in sufficient numbers to reduce the deleterious effects of genetic drift and maintain genetic variation. For bull trout, Rieman and Allendorf (2001, p. 762) estimate that approximately 1,000 spawning adults within any bull trout population are necessary for maintaining genetic variation indefinitely. Many local bull trout populations individually do not support 1,000 spawners, but this threshold may be met by the presence of smaller interconnected local populations within a core area.

For bull trout populations to remain viable (and recover), natural productivity should be sufficient for the populations to replace themselves from generation to generation. A population that consistently fails to replace itself is at an increased risk of extinction. Since estimates of population size are rarely available, the productivity or population growth rate is usually estimated from temporal trends in indices of abundance at a particular life stage. For example, redd counts are often used as an indicator of a spawning adult population. The direction and magnitude of a trend in an index can be used as a surrogate for growth rate.

Survival of bull trout populations is also dependent upon connectivity among local populations. Although bull trout are widely distributed over a large geographic area, they exhibit a patchy distribution even in pristine habitats (Rieman and McIntyre 1993, p. 7). Increased habitat fragmentation reduces the amount of available habitat and increases isolation from other populations of the same species (Saunders et al. 1991, p. 22). Burkey (1989, p. 76) concluded that when species are isolated by fragmented habitats, low rates of population growth are typical in local populations and their probability of extinction is directly related to the degree of isolation and fragmentation. Without sufficient immigration, growth of local populations may be low and probability of extinction high. Migrations also facilitate gene flow among local populations because individuals from different local populations interbreed when some stray and return to nonnatal streams. Local populations that are extirpated by catastrophic events may also become reestablished in this manner.

In summary, based on the works of Rieman and McIntyre (1993, pp. 9-15) and Rieman and Allendorf (2001, pp 756-763), the draft bull trout Recovery Plan identified four elements to consider when assessing long-term viability (extinction risk) of bull trout populations: (1) number of local populations, (2) adult abundance (defined as the number of spawning fish present in a core area in a given year), (3) productivity, or the reproductive rate of the population, and (4) connectivity (as represented by the migratory life history form).

2.3.1.4 Status and Distribution

As noted above, in recognition of available scientific information relating to their uniqueness and significance, five population segments of the coterminous United States population of the bull trout are considered essential to the survival and recovery of this species and are identified as: (1) Jarbidge River, (2) Klamath River, (3) Coastal-Puget Sound, (4) St. Mary-Belly River, and (5) Columbia River. Each of these segments is necessary to maintain the bull trout's distribution, as well as its genetic and phenotypic diversity, all of which are important to ensure the species' resilience to changing environmental conditions.

A summary of the current status and conservation needs of the bull trout within these units is provided below. A comprehensive discussion of these topics is found in the draft bull trout Recovery Plan (USFWS 2002a, entire; 2004a, b; entire).

Central to the survival and recovery of the bull trout is the maintenance of viable core areas (USFWS 2002a, p. 54). A core area is defined as a geographic area occupied by one or more local bull trout populations that overlap in their use of rearing, foraging, migratory, and overwintering habitat, and, in some cases, their use of spawning habitat. Each of the population segments listed below consists of one or more core areas. One hundred and twenty one core areas are recognized across the United States range of the bull trout (USFWS 2005, p. 9).

A core area assessment conducted by the Service for the 5 year bull trout status review determined that of the 121 core areas comprising the coterminous listing, 43 are at high risk of extirpation, 44 are at risk, 28 are at potential risk, 4 are at low risk and 2 are of unknown status (USFWS 2008, p. 29).

2.3.1.4.1 Jarbidge River

This population segment currently contains a single core area with six local populations. Less than 500 resident and migratory adult bull trout, representing about 50 to 125 spawners, are estimated to occur within the core area. The current condition of the bull trout in this segment is attributed to the effects of livestock grazing, roads, angler harvest, timber harvest, and the introduction of nonnative fishes (USFWS 2004a, p. iii). The draft bull trout Recovery Plan identifies the following conservation needs for this segment: (1) maintain the current distribution of the bull trout within the core area, (2) maintain stable or increasing trends in abundance of both resident and migratory bull trout in the core area, (3) restore and maintain suitable habitat conditions for all life history stages and forms, and (4) conserve genetic diversity and increase natural opportunities for genetic exchange between resident and migratory forms of the bull trout. An estimated 270 to 1,000 spawning fish per year are needed to provide for the persistence and viability of the core area and to support both resident and migratory adult bull trout (USFWS 2004a, p. 62-63). Currently this core area is at high risk of extirpation (USFWS 2005, p. 9).

2.3.1.4.2 Klamath River

This population segment currently contains three core areas and 12 local populations. The current abundance, distribution, and range of the bull trout in the Klamath River Basin are greatly reduced from historical levels due to habitat loss and degradation caused by reduced water quality, timber harvest, livestock grazing, water diversions, roads, and the introduction of nonnative fishes. Bull trout populations in this unit face a high risk of extirpation (USFWS 2002b, p. iv). The draft bull trout Recovery Plan (USFWS 2002b, p. v) identifies the following conservation needs for this unit: (1) maintain the current distribution of the bull trout and restore distribution in previously occupied areas, (2) maintain stable or increasing trends in bull trout abundance, (3) restore and maintain suitable habitat conditions for all life history stages and strategies, and (4) conserve genetic diversity and provide the opportunity for genetic exchange among appropriate core area populations. Eight to 15 new local populations and an increase in population size from about 3,250 adults currently to 8,250 adults are needed to provide for the persistence and viability of the three core areas (USFWS 2002b, p. vi).

2.3.1.4.3 Coastal-Puget Sound

Bull trout in the Coastal-Puget Sound population segment exhibit anadromous, adfluvial, fluvial, and resident life history patterns. The anadromous life history form is unique to this unit. This population segment currently contains 14 core areas and 67 local populations (USFWS 2004b, p. iv; 2004c, pp. iii-iv). Bull trout are distributed throughout most of the large rivers and associated tributary systems within this unit. With limited exceptions, bull trout continue to be present in nearly all major watersheds where they likely occurred historically within this unit. Generally, bull trout distribution has contracted and abundance has declined, especially in the southeastern part of the unit. The current condition of the bull trout in this population segment is attributed to the adverse effects of dams, forest management practices (e.g., timber harvest and associated road building activities), agricultural practices (e.g., diking, water control structures, draining of wetlands, channelization, and the removal of riparian vegetation), livestock grazing, roads, mining, urbanization, angler harvest, and the introduction of nonnative species. The draft bull trout Recovery Plan (USFWS 2004b, pp. ix-x) identifies the following conservation needs for this unit: (1) maintain or expand the current distribution of bull trout within existing core areas, (2) increase bull trout abundance to about 16,500 adults across all core areas, and (3) maintain or increase connectivity between local populations within each core area.

2.3.1.4.4 St. Mary-Belly River

This population segment currently contains six core areas and nine local populations (USFWS 2002c, p. v). Currently, bull trout are widely distributed in the St. Mary River drainage and occur in nearly all of the waters that were inhabited historically. Bull trout are found only in a 1.2-mile reach of the North Fork Belly River within the United States. Redd count surveys of the North Fork Belly River documented an increase from 27 redds in 1995 to 119 redds in 1999. This increase was attributed primarily to protection from angler harvest (USFWS 2002c, p. 37). The current condition of the bull trout in this population segment is primarily attributed to the effects of dams, water diversions, roads, mining, and the introduction of nonnative fishes (USFWS 2002c, p. vi). The draft bull trout Recovery Plan (USFWS 2002c, pp. v-ix) identifies the following conservation needs for this unit: (1) maintain the current distribution of the bull trout and restore distribution in previously occupied areas, (2) maintain stable or increasing trends in bull trout abundance, (3) maintain and restore suitable habitat conditions for all life history stages and forms, (4) conserve genetic diversity and provide the opportunity for genetic exchange, and (5) establish good working relations with Canadian interests because local bull trout populations in this unit are comprised mostly of migratory fish whose habitat is mainly in Canada.

2.3.1.4.5 Columbia River

The Columbia River population segment includes bull trout residing in portions of Oregon, Washington, Idaho, and Montana. Bull trout are estimated to have occupied about 60 percent of the Columbia River Basin, and presently occur in 45 percent of the estimated historical range (Quigley and Arbelbide 1997, p. 1177). This population segment currently contains 97 core areas and 527 local populations. About 65 percent of these core areas and local populations occur in Idaho and northwestern Montana.

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

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

The draft bull trout Recovery Plan (USFWS 2002a, p. v) identifies the following conservation needs for this population segment: (1) maintain or expand the current distribution of the bull trout within core areas, (2) maintain stable or increasing trends in bull trout abundance, (3) maintain and restore suitable habitat conditions for all bull trout life history stages and strategies, and (4) conserve genetic diversity and provide opportunities for genetic exchange.

2.3.1.4.5.1 Columbia River Recovery/Management Units

Achieving recovery goals within each management unit is critical to recovering the Columbia River population segment. Recovering bull trout in each management unit will maintain the overall distribution of bull trout in their native range. Individual core areas are the foundation of management units and conserving core areas and their habitats within management units preserves the genotypic and phenotypic diversity that will allow bull trout access to diverse habitats and reduce the risk of extinction from stochastic events. The continued survival and recovery of each individual core area is critical to the persistence of management units and their role in the recovery of a population segment (USFWS 2002a, p. 54).

The draft bull trout Recovery Plan (USFWS 2002a, p. 2) identified 22 recovery units within the Columbia River population segment. These units are now referred to as management units. Management units are groupings of bull trout with historical or current gene flow within them and were designated to place the scope of bull trout recovery on smaller spatial scales than the larger population segments. Of these 22 management units, three encompass the project action area: Imnaha-Snake Rivers, Salmon River and Clearwater River.

Imnaha-Snake Rivers Management Unit

The Imnaha-Snake Rivers management unit is located in the northeast corner of Oregon and spans the State line into western Idaho. It is defined by a combination of the Imnaha River subbasin and the Snake River subbasin, from the confluence of the Salmon River upriver to Hells Canyon Dam. A large portion of the recovery unit lies within the boundaries of the Wallowa-Whitman National Forest and Hells Canyon National Recreation Area. The recovery unit drains an area of approximately 1,112 square miles. In the draft recovery plan, Service identified three core areas: Imnaha River, Sheep Creek, and Granite Creek. Because no CFO lands occur in any of the watersheds identified as bull trout local populations, we will not address the Imnaha-Snake River management unit further in this Opinion.

Salmon River Management Unit

The Salmon River management unit encompasses the entire Salmon River basin, an area of approximately 14,000 square miles which includes 17,000 miles of streams. Bull trout are distributed throughout most of the unit in 125 local populations located within ten core areas. CFO lands occur in three core areas in the Salmon River management unit: the South Fork Salmon River, Middle Salmon River-Chamberlain, and the Little-Lower Salmon River.

<u>South Fork Salmon River Core Area</u>

The South Fork Salmon River core area includes 27 local populations and five potential local populations (USFWS 2002d, p. 19). Because there are 27 local populations, this core area is at a diminished risk of extinction from stochastic events. Adult abundance is estimated to be greater than 5,000, therefore this core area is at a reduced risk of genetic drift. Because there is no trend data for this core area, the core area is assumed to be at an increased extinction risk until additional information is available. Migratory bull trout are present in all local populations; therefore this core area is at a reduced risk based on this factor (USFWS 2002d, pp. 63-66). In the 5-year Review we ranked this core area as being "At Risk" of extirpation (USFWS 2008, p. 34).

Middle Salmon River–Chamberlain Core Area

Within the Middle Salmon River-Chamberlain core area there are nine local populations and one potential local population (USFWS 2002d, p. 17). Because there are nine local populations, this core area is at intermediate risk of extinction from stochastic events. Adult abundance is estimated at between 500 and 5,000, therefore this core area is at reduced risk of genetic drift. Because there is no trend data for this core area, the core area is assumed to be at an increased extinction risk until additional information is available. Migratory bull trout are present in some but not all local populations; therefore this core area is at intermediate risk for this factor (USFWS 2002d, pp. 63-66). In the 5-year Review we ranked this core area as being "At Potential Risk" of extirpation (USFWS 2008, p. 34).

Little-Lower Salmon River Core Area

The draft bull trout Recovery Plan identifies seven local populations and three potential local populations within the Little–Lower Salmon River core area. The mainstem Salmon and Little Salmon Rivers provide foraging/adult rearing habitat and connectivity between local populations (USFWS 2002d, pp.22, 28-29).

Because there are seven local populations, this core area is at intermediate risk of extinction from stochastic events. Adult bull trout abundance is grossly estimated to be between 500 and 5,000 individuals, indicating that this core area is at reduced risk from deleterious effects associated with genetic drift. The Little-Lower Salmon River core area is one of the few core areas with at least 10 years of population trend data. Based on this data, this core area is thought to be at intermediate risk of extinction. A fourth factor required for bull trout population viability is connectivity (as represented by the presence of the migratory life history form) between local populations within core areas. Migratory bull trout are present in most local populations within the Little-Lower Salmon River core area; therefore this core area is at reduced risk of extinction from loss of connectivity (USFWS 2002d, pp. 63-66). However, in the 5-year Review we ranked this core area as being "At High Risk" of extirpation (USFWS 2008, p. 34).

Clearwater River Management Unit

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

South Fork Clearwater River Core Area

This core area has the most comprehensive data collected for bull trout of the seven core areas within the Clearwater River management unit due to a multi-year study by the Idaho Department of Fish and Game, U.S. Forest Service, and Bureau which documented juvenile distribution in most tributaries and headwater streams (USFWS 2002e, p. 25). There are five local populations and three potential local populations in this core area (USFWS 2002e, p. 27). Because this core area does not have (and is unlikely to achieve) 10 local populations, the core area is at moderate risk of extinction. Current abundance and distribution of bull trout in the core area is considered lower than historic levels. It is estimated that there are at least 500 spawners present (USFWS 2002e, p. 98) so this core area is at an intermediate risk of genetic drift. Population trend data is lacking for the core area, so the draft Recovery Plan determined that until such data is available, the core area is at an increased risk of extinction (USFWS 2002e, pp. 98-99). There is an extremely low incidence of fluvial migratory adults in the core area (USFS 2005, p. 24), but migratory bull trout persist in some local populations so the core area is at an intermediate risk of extinction due to loss of connectivity (USFWS 2002e, p. 99). In the 5-year Review we ranked this core area as being "At Risk" of extirpation (USFWS 2008, p. 34).

Lower-Middle Fork Clearwater River Core Area

Bull trout use the lower (mainstem) Clearwater River, Middle Fork Clearwater River and their tributaries as foraging, migratory, rearing and overwintering habitat. No tributary streams within the core area have current documentation of bull trout spawning. Of the available habitat in tributary streams, Lolo and Clear Creeks potentially provide spawning and rearing habitat, although spawning and rearing have not been documented. Because small juvenile bull trout have been found there, the draft bull trout Recovery Plan identifies Lolo Creek as a local population, the only local population in this core area (USFWS 2002e, p. 39). As there is only one local population present, this core area is at an increased risk of extinction from stochastic events. Due to probable low adult spawner abundance this core area is at an increased risk level for genetic drift. The core area is also at an increased risk of extinction because of low productivity and the absence of migratory bull trout (USFWS 2002e, pp. 96-99). In the 5-year Review we ranked this core area as being "At Risk" of extirpation (USFWS 2008, p. 34).

2.3.1.5 Previous Consultations and Conservation Efforts

2.3.1.5.1 Consultations

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

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

2.3.1.5.2 Regulatory mechanisms

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

2.3.1.5.3 State Conservation Measures

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

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

2.3.1.5.4 Habitat Conservation Plans

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

2.3.1.5.5 Federal Land Management Plans

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

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

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

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

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

2.3.1.6 Conservation Needs

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

The draft bull trout Recovery Plan (USFWS 2002a, p. 62) identifies the following tasks needed for achieving recovery: (1) protect, restore, and maintain suitable habitat conditions for bull trout, (2) prevent and reduce negative effects of nonnative fishes, such as brook trout, and other nonnative taxa on bull trout, (3) establish fisheries management goals and objectives compatible with bull trout recovery, (4) characterize, conserve, and monitor genetic diversity and gene flow among local populations of bull trout, (5) conduct research and monitoring to implement and evaluate bull trout recovery activities, consistent with an adaptive management approach using feedback from implemented, site-specific recovery tasks, (6) use all available conservation programs and regulations to protect and conserve bull trout and bull trout habitats, (7) assess the implementation of bull trout recovery by management units, and (8) revise management unit plans based on evaluations.

Another threat now facing bull trout is warming temperature regimes associated with global climate change. Because air temperature affects water temperature, species at the southern margin of their range that are associated with cold water patches, such as bull trout, may become restricted to smaller, more disjunct patches or become extirpated as the climate warms (Rieman et al. 2007, p. 1560). Rieman et al. (2007, pp. 1558, 1562) concluded that climate is a primary determining factor in bull trout distribution. Some populations already at high risk, such as the Jarbidge, may require "aggressive measures in habitat conservation or restoration" to persist (Rieman et al. 2007, p. 1560). Conservation and restoration measures that will benefit bull trout include protecting high quality habitat, reconnecting watersheds, restoring flood plains, and increasing site-specific habitat features important for bull trout, such as deep pools or large woody debris (Kinsella 2005, entire).

2.3.1.7 Bull Trout Critical Habitat

2.3.1.7.1 Legal Status

Ongoing litigation resulted in the U.S. District Court for the District of Oregon granting the Service a voluntary remand of the 2005 critical habitat designation. Subsequently the Service published a proposed critical habitat rule on January 14, 2010 (75 FR 2260) and a final rule on October 18, 2010 (75 FR 63898). The rule became effective on November 17, 2010. A justification document was also developed to support the rule and is available on our website (http://www.fws.gov/pacific/bulltrout). The scope of the designation involved the species' coterminous range, which includes the Jarbidge River, Klamath River, Coastal-Puget Sound, St. Mary-Belly River, and Columbia River population segments (also considered as interim recovery units)[4].

Rangewide, the Service designated reservoirs/lakes and stream/shoreline miles in 32 critical habitat units (CHU) as bull trout critical habitat (see Table 5). Designated bull trout critical habitat is of two primary use types: (1) spawning and rearing; and (2) foraging, migrating, and overwintering (FMO).

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

Table 5. Stream/shoreline distance and reservoir/lake area designated as bull trout critical habitat by state.

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

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

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

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

2.3.1.7.2 Conservation Role and Description of Critical Habitat

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

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

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

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

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

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

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

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

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

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

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

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

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

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

2.3.1.7.3 Current Rangewide Condition of Bull Trout Critical Habitat

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

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

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

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

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

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

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

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

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

2.3.2 Environmental Baseline of the Action Area

This section assesses the effects of past and ongoing human and natural factors that have led to the current status of the species, its habitat and ecosystem in the action area. Also included in the environmental baseline are the anticipated impacts of all proposed Federal projects in the action area that have already undergone section 7 consultations, and the impacts of state and private actions which are contemporaneous with this consultation.

2.3.2.1 Status of Bull Trout in the Action Area

The CFOA occurs within three bull trout management units: the Imnaha-Snake River, Salmon River, and Clearwater River. These are discussed separately below.

2.3.2.1.1 Imnaha-Snake River Management Unit

No local or potential local populations in the Imnaha-Snake management unit occur on CFO managed lands. Because Program implementation is not likely to impact bull trout in this management unit, we will not address it further in this Opinion.

2.3.2.1.2 Salmon River Management Unit

Of the nine local populations and one potential local population in the Middle Salmon River-Chamberlain core area, California Creek and Warren Creek are the only local populations that have CFO ownership. The South Fork Salmon River core area includes 27 local populations and five potential local populations. Upper Lake Creek is the only local population that has CFO ownership within the South Fork Salmon River core area. The Little-Lower Salmon River core area includes seven local populations and three potential local populations, and CFO ownership occurs in all of the local or potential local population watersheds. The Little-Lower Salmon River core area local populations include Slate Creek, John Day Creek, Rapid River, Boulder Creek, Hard Creek, Lake/Lower Salmon, and Partridge Creek. Potential local populations in the Little-Lower Salmon River core area include Hazard Creek, Elkhorn Creek, and French Creek (Table 6).

As shown in Table 6, the only strong populations in the Middle Salmon-Chamberlain, South Fork Salmon, and Little-Lower Salmon River core areas are Slate Creek (upper Little Slate Creek), and Rapid River. No information was found on the status of bull trout populations in upper Lake Creek. However, Burns et al. (2005, p. 21) report the following for the Secesh River subwatershed: "Spawning and rearing habitat for bull trout occurs throughout the area, and fluvial bull trout are known to ascend Pete Creek and Threemile Creek, small tributaries of Lake Creek, a principal tributary of the Secesh River…." Burns et al. (2005, p. 13) state that for Lake Creek "the small size of the system, its inherent instability, and the presence of brook trout suggests lowered bull trout viability." We found limited specific information on the status of the remaining populations: California, Warren, Partridge, Boulder, Hazard, Elkhorn, and French Creeks.

Table 6. Local and potential local populations potentially affected by the Program in the Middle Salmon River-Chamberlain, South Fork Salmon, and Little-Lower Salmon River core areas. Also shown are population status (where available), habitat condition based on road density, threats, and brook trout presence/absence.

Local or Potential Local (PLP) Populations by Core Area	Status	Habitat Condition based on Road Density (mi/sq.mi.)	Threats – Source	Brook Trout Presence N = No, Y = Yes, U=Unknown	Critical Habitat SR = Spawning and Rearing FMO = Feeding, Migrating, and Overwintering
Middle Salmon-Chamberlain Core Area					
California[1]	Depressed[7]	High (0.66)	Illegal harvest (low impact), legacy timber harvest, roads, agriculture/grazing, legacy mining, and current mining	Y[1]	FMO
Warren[1]	Depressed[7]	High (0.87)	Diversion, illegal harvest (low impact), legacy timber harvest, roads, agriculture/grazing, legacy mining, and current mining	Y[1]	SR
South Fork Salmon Core Area					
Upper Lake (Secesh R.)	Stronghold (South Fork Salmon) [2]	Moderate (1-3)[7]	Legacy timber harvest and roads[3]	Y[4]	SR
Little-Lower Salmon Core Area					
Slate Creek[5]	Small and stable in upper Little Slate/Depressed in remainder of watershed	Moderate (1.97)	Excess sediment – Road crossings, dredge mining	Y[6]	SR
John Day Creek[5]	Depressed	Moderate (2.55)	Excess sediment – road crossings	N[6]	SR
Rapid River[5]	Strong	High (0.56)	Minimal threats identified - residences, pastures, fish hatchery, and roads in lower watershed only[7]	Y	SR
Partridge Creek[6]	Depressed[7]	High (<1.0)	Current timber harvest and roads	N	SR
Boulder Creek[6]	Depressed[7]	Moderate (1-3)	Current timber harvest and roads, illegal harvest, culvert passage barrier*	N	SR
Hard Creek[6]	Depressed[7]	Moderate (1-3)	Current roads	Y[7]	SR
Lake	Depressed[2]	High (<1)	None identified	Y[2]	SR

Local or Potential Local (PLP) Populations by Core Area	Status	Habitat Condition based on Road Density (mi/sq.mi.)	Threats – Source	Brook Trout Presence N = No, Y = Yes, U=Unknown	Critical Habitat SR = Spawning and Rearing FMO = Feeding, Migrating, and Overwintering
Hazard Creek (PLP)	Depressed[7]	Moderate (1-3)[7]	Current roads, lower and upper portions of watershed[7]	N[6]	SR
Elkhorn Creek (PLP)	No information	High (<1)	Legacy timber harvest and current roads, hydrodiversion partial (barrier) in lower reach	Y[2]	SR
French Creek (PLP)	Depressed[7]	Moderate (1-3)	Legacy timber harvest, current roads, illegal harvest (low impact)	Y[6]	SR

CBBTTAT 1998a
[2]Burns et al. 2005
[3]Idaho Department of Environmental Quality 2002
[4]USFWS 2002
[5]USFS 2007
[6] CBBTTAT 1998b
[7] Johnson 2009, pers. comm..

2.3.2.1.3 Clearwater River Management Unit

CFO lands occur in the South Fork Clearwater River and Lower and Middle Fork Clearwater River core areas. Of the five local populations in the South Fork Clearwater River core area, CFO lands are located in the Red River and Crooked River local populations. CFO lands are also located in the American River potential local population. In the Lower-Middle Fork Clearwater River core area, CFO lands are located in the Lolo Creek local population.

As shown in Table 7 for the South Fork Clearwater core area, the only population designated as strong is in upper Crooked River. The populations in Red River and American River are considered depressed. The Lolo Creek local population (Lower-Middle Fork Clearwater River core area) is also considered depressed.

Table 7. Local and potential local populations potentially affected by the Program in the South Fork Clearwater River and Lower-Middle Fork Clearwater River core areas. Also shown are population status (where available), habitat condition based on road density, threats, and brook trout presence/absence.

Local or Potential Local (PLP) by Core Area	Status[1]	Habitat Condition based on Road Density (mi/sq.mi.)[1]	Threats – Source[2]	Brook Trout Presence[3] N = No, Y = Yes, U=Unknown	Critical Habitat in Action Area SR = Spawning and Rearing FMO = Feeding, Migrating, and Overwintering
South Fork Clearwater River Core Area					
Red River	Depressed	Low (4.2)	Excess sediment, channel modification, barrier – Stream side roads, road crossings, dredge mining	Y	FMO (11.6 miles); SR (16.9 miles)
Crooked River	Strong in upper watershed/ Depressed in lower	Moderate (2.4)	Channel modification, lack of woody debris, excess sediment – Road crossings, streamside roads, dredge mining	Y	FMO 2.2 miles; SR 9.6 miles
American River (PLP)	Depressed	Moderate (1.4)	Excess sediment, channel modification – Road crossings, streamside roads, grazing, dredge mining	Y	Lower American - FMO Kirks Fork – SR Elk Creek – FMO Little Elk Creek – SR EF American – SR Upper American- FMO
Lower-Middle Fork Clearwater Core Area					
Lolo Creek	Depressed	Low (3.9) (USFS 2007)	Legacy and current timber harvest, roads, and agriculture/grazing,	Y	No

[1]Road Density is an average for the 5th Field HUC based on density in 6th Field HUCs (from USFS 2007).
Habitat condition based on road density : <1 = High, 1-3 – Moderate, and >3 = Low.
[2]Only includes threats ranked as being of high risk to any life stage in any 6th Field HUC with bull trout (from USFS 2007).
[3]Brook trout presence for 5th Field HUC is indicated if brook trout are found in any 6th Field HUC with bull trout (from USFS 2007).

2.3.2.2 Factors Affecting Bull Trout in the Action Area

As previously described in the Status of the Species section of this Opinion, bull trout distributions, abundance, and habitat quality have declined range-wide primarily from the combined effects of habitat degradation and fragmentation, blockage of migratory corridors, poor water quality, angler harvest, poaching, entrainment, and introduced non-native fish species such as the brook trout.

Land and water management activities that depress bull trout populations and degrade habitat include dams and other water diversion structures, forest management practices, livestock grazing, agriculture, road construction and maintenance, mining, and urban and rural development. All of these activities have occurred or are occurring in the action area to varying degrees with resulting adverse impacts on bull trout and bull trout habitat. The bull trout draft Recovery Plan (USFWS 2002d, pp. 31-54; 2002e, pp. 42-82) contains detailed discussions on these activities and effects within each core area.

Road building and land management activities have been extensive in some watersheds containing local and potential populations. Because of the numerous ecological effects of road construction and associated activities, such as timber harvest, (Jones et al. 2000, p.76, Trombulak and Frissell 2000, p.18) road density can be used as an indicator of watershed condition. Road density of less than one mile of road per square mile of watershed indicates high watershed condition, one to three miles indicates moderate condition, and greater than three miles indicates low condition (National Marine Fisheries Service 1996, entire). There appears to be an inverse relationship between watershed road density and bull trout occurrence in that bull trout typically do not occur where road densities exceed 1.7 miles per square mile (USFWS 2002a, p. 18). Bull trout population strongholds occur most often in undisturbed/roadless areas (Quigley and Arbelide 1997, p. 1183; Kessler et al. 2001, p. ES-1).

2.3.2.2.1 Middle Salmon River-Chamberlain, South Fork Salmon River, and Little-Lower Salmon River Core Areas

Table 6 shows that in the Middle Salmon River-Chamberlain, South Fork Salmon, and the Little-Lower Salmon River core areas all bull trout populations are exposed to threats such as timber harvest and road building. No threats were identified in Lake Creek and upper Rapid River is considered pristine. Based on road density, habitat conditions for bull trout populations are ranked as high in California Creek, Warren Creek, Rapid River, Partridge Creek, Lake Creek, Hazard Creek, and Elkhorn Creek. Conditions are ranked as moderate for Slate Creek, John Day Creek, Boulder Creek, Hard Creek, and French Creek. Brook trout, an exotic species which competes and hybridizes with bull trout, are present in all watersheds except Partridge, Boulder, Hard, and Hazard Creeks.

2.3.2.2.2 South Fork Clearwater River and Lower-Middle Fork Clearwater River Core Areas

All affected local and potential local populations in South Fork Clearwater River core area are exposed to high level threats. These threats and risks include excess sediment, channel modification, lack of instream woody debris, and passage barriers. The sources for these threats include road crossings, streamside roads, and dredge mining (Table 7). Based on road density, habitat conditions for bull trout populations in this core area are ranked as moderate for Crooked and American Rivers and low for Red River and Lolo Creek. Brook trout, an exotic species which competes and hybridizes with bull trout, are present in all watersheds (Table 6).

2.3.2.2.3 Summary

With few exceptions (e.g., Rapid River), bull trout population status in the affected core areas is depressed based on available information. All the core areas have some populations exposed to high level threats, primarily excess sediment from streamside roads and road crossings. The South Fork Clearwater River core area is in the worst condition, with all affected populations exposed to multiple high level threats.

The Service has completed section 7 consultations on many federal actions in the action area that will have beneficial effects on bull trout. These projects have included instream restoration, riparian restoration, road decommissioning, bank stabilization, fish screen installation on irrigation diversions, and passage barrier removal. Much of this work has or will occur in the South Fork Clearwater River core area, the core area with the most degraded habitat conditions.

2.3.2.3 Status of Bull Trout Critical Habitat in the Action Area

Tables 6 and 7 above show bull trout critical habitat within the CFOA that may be impacted by noxious weed treatments. Critical habitat within the action area occurs in the Salmon River and Clearwater River Critical Habitat Units (CHUs) and more specifically in the Middle Salmon River-Chamberlain, South Fork Salmon River, Little-Lower Salmon River, South Fork Clearwater River, and the Lower-Middle Fork Clearwater River Critical Habitat Subunits (CHSUs). All local and potential local populations of bull trout identified in Tables 6 and 7 contain critical habitat with the exception of Lolo Creek which was not designated as critical habitat.

2.3.2.4 Factors Affecting Bull Trout Critical Habitat in the Action Area

The same factors affecting the species discussed in section 2.3.2.2 are affecting bull trout critical habitat in the action area.

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

2.3.3 Effects of the Proposed Action

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

2.3.3.1 Direct and Indirect Effects of the Proposed Action on Bull Trout

The Service expects that effects to bull trout from non-herbicide weed treatments (i.e., manual, mechanical, biological, and cultural control treatments) will be insignificant. Significant effects to bull trout are also not expected from ground-based herbicide treatments located more than 100 feet from bull trout streams due primarily to implementation of the BMPs incorporated into the Program.

Similarly, we are not expecting adverse effects to bull trout from aerial application of herbicides on up to 400 acres per year located primarily in the canyon grasslands. Aerial application will only occur in areas outside of the buffers shown in Tables 3 and 4. The Bureau will also use BMPs (e.g., using larger nozzle sizes to minimize drift, using herbicides of low and moderate aquatic concern, using herbicides of low volatility, and only applying herbicides when wind speed is less than 5 miles per hour) to reduce the risk of herbicides reaching bull trout habitat from aerial spraying. This conclusion that effects to bull trout from aerial application of herbicides is supported by modeling presented in the Assessment (USBLM 2011, pp. 37-40).

Helicopter spraying operations will require the use of large amounts of helicopter fuel and herbicides. The Bureau will develop and implement an emergency spill plan and plans for the transport and storage of fuel and herbicides to reduce the risk of an accidental spill. A catastrophic spill of fuels or herbicides reaching waters with listed species would have the potential for significant adverse effects to bull trout and critical habitat; however, there is a low probability of this occurring due the development and implementation of the above mentioned plans.

The Service assumes that herbicide treatments within 100 feet of streams have greater potential for delivering herbicides to aquatic systems than treatments greater than 100 feet from streams or in upland sites, and therefore pose a greater risk to bull trout. Risks to bull trout from herbicide treatments are directly correlated with probability of herbicide exposure and the presence of bull trout. Therefore, this effects analysis will focus on those treatments within 100 feet of streams within local or potential local populations of bull trout (i.e., those streams with the highest probability of bull trout presence and the presence of eggs, alevins and fry) as shown in Tables 8 and 9. Only ground-based application methods and spot treatment of noxious weeds with herbicides rated low for aquatic level of concern will be authorized for use within 100 feet of streams. This will minimize but not eliminate the potential for adverse effects to bull trout.

Table 8. Treatments within 100 feet of streams within local populations on CFOA lands within the Salmon River Management Unit, Middle Salmon-Chamberlain Core Area, South Fork Salmon Core Area.

Local or Potential Local (PLP) Populations by Core Area	Total Acres of Herbicide Treatments within 100 feet of Streams (includes acres of treatments in all streams within local population)
Middle Salmon-Chamberlain Core Area	
California[1]	0.5
Warren[1]	0.2
South Fork Salmon Core Area	
Upper Lake (Secesh R.)	0.5
Little-Lower Salmon Core Area	
Slate Creek	0.5
John Day Creek[5]	0.5
Rapid River[5]	0.1
Partridge Creek[6]	0.2
Boulder Creek[6]	0.2
Hard Creek[6]	0.5
Lake	0.3
Hazard Creek (PLP)	0.2
Elkhorn Creek (PLP)	0.5
French Creek (PLP)	0.2
Total Acres	**4.4**

Table 9. Treatments within 100 feet of streams within local populations on CFOA lands within the Salmon River Management Unit, South Fork Clearwater River Core Area, Lower-Middle Fork Clearwater River Core Area.

Local or Potential Local (PLP) Populations by Core Area	Total Acres of Herbicide Treatments within 100 feet of Streams (includes acres of treatments in all streams within local population)
South Fork Clearwater River Core Area	
Crooked River	0.5
Red River	1.0
American River (PLP)	6.9
Lower-Middle Fork Clearwater River Core Area	
Lolo Creek	1.3
Total Acres	**9.7**

Herbicides may affect bull trout directly through toxic effects to fish themselves, or indirectly through impacts on macroinvertebrate prey species or through effects to habitat components such as native streamside vegetation (Norris et al. 1991; pp. 216-222, 286-288). Adjuvants, compounds added to herbicide formulations to improve herbicide effectiveness or facilitate application or mixing (e.g., surfactants, wetting agents, or dyes), may also be toxic to bull trout. However, the Program will only use water as a carrier and surfactants approved for aquatic use which will minimize risk to bull trout to an insignificant level from the use of adjuvants.

Bull trout may directly contact an herbicide in the water, sediment, or food. Herbicides may enter the water (and sediment or food) through direct application, volatilization, drift, mobilization in ephemeral streams (including roadside ditches), overland flow, and leaching with each of these routes resulting in a different exposure magnitude and duration. Herbicides may contact salmonid terrestrial food sources (e.g., insects) which may subsequently enter streams and be consumed by bull trout (Norris et al. 1991, p. 219). Of these delivery routes, direct application and drift may result in the highest aquatic herbicide concentrations (Norris et al. 1991, p. 217).

Herbicides volatilize and drift when they enter a gaseous phase and are transported on air currents resulting in potential delivery to bull trout habitat. Volatility is dependent upon the molecular weight of the herbicide and will increase with increasing temperature and soil moisture (Tu et al. 2001, p. 6.8). Volatilization will be minimized with the use of nonvolatile herbicide formulations (e.g., 2,4-D amines are much less volatile than 2,4-D esters), avoiding application of herbicides during hot days, using spray nozzles with larger orifices that produce larger spray droplets, using drift control agents, and spraying during calm conditions. Ground application minimizes drift because spray nozzles can be in close proximity to target species and to the ground. Only ground based application of herbicides will be used within 100 feet of streams.

Herbicide delivery to surface waters by overland flow and leaching is primarily dependent upon total rainfall occurring within a few days of initial application (Tu et al. 2001, p. 6.9). Under the proposed action, herbicide application is not permitted when heavy precipitation is occurring or is imminent (i.e., about to occur). However, if heavy precipitation does occur within a few days of treatment, some herbicide may be introduced into bull trout habitat (Wood 2001, pp. 22-23).

The amount of herbicide introduced to a stream by runoff or leaching after a precipitation event is dependent upon a number of factors including adsorption characteristics and water solubility of the herbicide, timing of the precipitation event, size of treatment buffer between application site and stream, active ingredient applied per acre, and the soil half-life (an indicator of persistence in soil) of the herbicide. In the Assessment, herbicides were rated on their potential to move towards ground water (this rating will also apply to overland runoff movement) based on soil half-life, sorption coefficient, and water solubility. Of the herbicides proposed for use within 100 feet of streams in the action area, clopyralid, picloram, and dicamba have a very high movement rating; metsulfuron methyl has a high rating; 2,4-D amine, imazapic, and imazapyr have a moderate rating; and glyphosate, which has a high sorption coefficient, has a very low movement rating.

Table 10. Herbicide Movement Rating (excerpted from Assessment-Table 8, p. 35). Refer to the Assessment for reference citations, except those marked by asterisk.

Herbicide	Herbicide Movement Rating	Soil Half-Life (days)	Water Solubility (mg/l)	Sorption Coefficient (soil Koc)
Clopyralid	Very High	40	300,000	6
Glyphosate	Very Low	47	900,000	24,000
Picloram	Very High	90	200,000	16
2,4-D	Moderate	10	100	100
Metsulfuron Methyl	High	30	9500	35
Dicamba	Very High	14	400,000	2
Imazapic	Moderate*	113	36,000**	112*
Chlorsulfuron	Low-Very High 2/	14-325 2/	125-7,000 2/	40 3/
Imazapyr	Moderate	138	13,000	73
Sulfometuron Methyl	Moderate	20	70	78

1/ Derived from Vogue et al. (1994). This database relies heavily on the SCS/ARS/CES Pesticide Properties Database for Environmental Decision Making (Wauchope et al., 1992).
2/ pH Dependant
3/ At pH 7
*USFS 2008, p. 29
**Tu et al. 2001, p. 6-15

Despite the use of some herbicides with high and very high movement ratings (Table 10), the risks to bull trout will be reduced because only aquatically approved herbicides or herbicides of low aquatic concern will be used within 100 feet of streams (Table 11). Level of aquatic concern is based on the Risk Quotient (1/20 LC_{50}/EEC) which assigns the following ratings: low concern for values greater than 10, moderate concern for values between one and 10, and high concern for values less than one. Picloram and sulfometuron methyl (Oust) are of moderate concern. BMPs specify that no picloram will be applied within 100 feet of streams. Currently the Bureau is prohibited from using Oust.

In general, as an additional proposed protection measure to reduce risk to bull trout, only aquatically approved herbicides will be used within 15 feet of water. These herbicides include glyphosate formulations without surfactants (e.g., Rodeo) and limited use of aquatically approved formulations of imazapyr.

Table 11. Aquatic level of concern for herbicides that may be used during Program implementation (excerpted from Assessment–Table 7, p. 33). Refer to the Assessment for reference citations.

Active Ingredient	Product Name	Application Rate lb AI/Acre (Maximum)	EEC (ppm)	Toxicity 96-hour LC50 (mg/L)	Safety Factor 1/20 LC50 (mg/L) 1/	Risk Quotient (1/20 LC50/EEC) and Level of Concern 1/	Soil Half Life (Range in Days) 2/
Clopyralid	Transline	0.6	0.110	104	5.2	23.6 Low	30 (12 – 70)
Glyphosate	Rodeo	2.0	0.552	>1000 (used 1000)	50.0	68.1 Low	47 (21 – 60)
Picloram	Tordon	0.50	0.184	13	0.65	3.5 Moderate	90 (24 – 277)
2,4-D	Weedar 64	2.0	0.734	250	12.5	17.0 Low	10 (2 – 16)
Metsulfuron Methyl	Escort	0.075	0.023	>150 (used 150)	7.5	163.0 Low	120 (14– 180)
Dicamba	Banvel	2.0	0.367	1000 (used 1000)	50	68.1 Low	14 (3– 35)
Imazapic	Plateau	0.187	0.276	>100(used 100)	5.0	72.5 Low	113 (113)
Chlorsulfuron	Telar	0.141	0.052	>122(used122)	6.1	117.31 Low	160
Imazapyr	Arsenal, Chopper, Stalker	0.187	0.069	>100(used 100)	5.0	72.46 Low	138 (30– 210)
Sulfometuron methyl	Oust	0.38	0.140	12.5	0.63	4.5 Moderate	9 (5– 552)

1/ Refer to Appendix F for the worksheet used for assessing levels of concern for aquatic species associated with herbicide applications.

2/ Soil half-life for herbicides are from USDI-BLM (1991) Table 3-6. They are the most representative values reported in days, followed by the range in days. Soil half-life for imazapic is from Ta (1997). Those that are considered non-persistent, are those with a half-life <30 days; moderately persistent are those with a half-life of 30 to 100 days; persistent are those with a half life >100 days.

Direct exposure of bull trout to herbicides may result in lethal and sublethal effects depending upon the toxicity and concentration of the particular herbicide as well as the duration of exposure. Adherence to the BMPs (Opinion, Appendix A) and the very limited number of acres treated within 100 feet of bull trout streams are expected to substantially reduce the amount of any herbicide or herbicide/adjuvant mixture from reaching surface waters and potentially affecting bull trout. Also, herbicides, should they be delivered to bull trout streams, are expected to be rapidly diluted downstream of the entry point (Norris et al. 1991, p. 217). The predicted aquatic concentrations of herbicides are far below the No Observed Effect Level (NOEL). No mortality of bull trout is expected from proposed herbicide treatments. However, there is some uncertainty about the effectiveness of the BMPs and the amount of chemical expected to reach the water. It cannot be concluded with certainty that no herbicides will reach streams inhabited by bull trout and result in sublethal effects.

In general, there is a paucity of information available on the sublethal effects of the herbicides proposed for use, but sublethal behavioral effects have been documented for a wide variety of other environmental pollutants including various metals and organic pollutants. For a review see Scott and Sloman (2004, entire). The Assessment (USBLM, pp. 40-64) provides some information on sublethal effects of the herbicides proposed for use. A review of the recent literature provided very little additional information. Changes in growth, behavior, reproduction, resistance to stress, migration, biochemistry, and physiology are potential responses of bull trout to sublethal herbicide exposure (Norris et al. 1991, p. 277). Based on available information, glyphosate formulations approved for aquatic use (e.g., Rodeo) appear to pose the lowest risk of sublethal effects to bull trout.

Indirect effects of herbicide treatments on bull trout may include habitat effects and effects to macroinvertebrate prey species. Herbicide treatments may decrease streamside vegetation cover and result in increases in stream temperature. In the action area, treatments within 100 feet of bull trout streams involve a very small area within each watershed and any effects to water temperature from the alteration of streamside vegetation are expected to be insignificant. Herbicide treatments of noxious weeds may also have beneficial effects on bull trout by facilitating the reestablishment of native plant communities that provide shade, habitat complexity, streambank stability, and habitat for invertebrate prey species.

Indirect effects to bull trout may occur through direct effects to aquatic microorganisms. Glyphosate at expected environmental concentrations (EEC) was found to significantly affect carbon uptake in two diatom species (DeLorenzo et al. 2001, p. 93). Effects to microorganisms can result in effects at higher trophic levels (DeLorenzo et al. 2001,p. 95), potentially including effects to bull trout.

Although herbicides may directly affect aquatic microorganisms and thereby potentially affect higher trophic levels, effects are not expected through the process of bioaccumulation. Bioaccumulation of a chemical in an aquatic organism is the sum of the quantity of chemical absorbed from the water (bioconcentration) and the quantity taken in through dietary uptake (biomagnification) (Epaminondas et al. 2002, p. 645). Because the herbicides proposed for use in the action area are relatively water soluble, bioaccumulation is not expected (Norris et al. 1991, p. 220).

In summary, depending on the herbicide and location where it is used, the proposed action may adversely affect bull trout through sublethal effects and alterations of the aquatic food web. Herbicide application during low, late summer/early fall base flows in bull trout spawning areas will pose the highest risk because of the potential for higher herbicide concentration (due to low water volumes) and the extended presence of vulnerable bull trout life stages. Similarly, applications adjacent to mainstem rivers pose a lesser risk to bull trout than applications in smaller tributaries because of the relatively greater volume of water. The timing and exact location of herbicide treatments is not specified in the Assessment, therefore the Service assumes that applications may occur in bull trout spawning areas during low flows. These applications may affect fluvial and resident adults, rearing juveniles, fry, alevins, and eggs.

Although, as shown in the Environmental Baseline section of this Opinion, many of the local and potential local populations of bull trout in the action area are depressed, the proposed herbicide treatments will have little impact on population status. The amount of acres treated within 100 feet of streams in any given bull trout watershed, or the total amount of acres treated in a watershed (riparian and upland) is a very small percentage of the total watershed area. Herbicide treatments may benefit bull trout by reducing noxious weed populations and enhancing populations of native riparian plant species.

2.3.3.1.1 Matrix of Pathways and Indicators

The Matrix of Pathways and Indicators (MPI) (USNOAA 1996, entire) for bull trout is used to evaluate and document baseline habitat conditions and aid in determining whether a project is likely to adversely affect or result in the incidental take of bull trout.

Due to the programmatic nature of the Bureau's proposed noxious weed treatments and proposed treatments occurring in 86 6th Field HUC watersheds, it is not feasible to use the MPI to document baseline condition or effects of the action at the watershed scale. The Assessment (pp. 65-70) does contain a a very general description of the anticipated effects to MPI indicators. This discussion is summarized below.

Effects to Watershed Condition Indicators

Chemical control of noxious weeds is expected to result in no measurable effect to *peak/base flow*, *water yield*, or *sediment yield*. No large scale changes in land cover conversions or stand structure (e.g., timber to grass, shrubs to grass) will result from chemical noxious weed control. No adverse effects or changes to water yield or flow regimes are expected from chemical control of noxious weeds. Long term beneficial effects from reduction of noxious weeds and increase in desirable vegetation (e.g., native species) will result in improved watershed conditions. Risk for adverse effects to non-target vegetation is lowest with back pack or hand operated sprayers and highest with helicopter spraying. Beneficial effects are expected from the reduction of noxious weeds encroaching on and/or invading riparian areas, wetlands, and streams.

Effects to Channel Condition, Water Quality, and Habitat Condition Indicators

A reduction of noxious weeds in riparian areas and along streambanks will benefit native plant species and may potentially result in improved *streambank stability* and *riparian condition* in the long term. Effects to *water temperature*, *suspended sediment*, and *deposited sediment* from herbicide application are expected to be insignificant. Chemical control is expected to have a low, but not discountable, risk for water contamination because of the buffers which will be used along riparian areas for helicopter spraying and due to the use of special guidelines for ground based herbicide application within riparian areas and along live waters. Implementation of hazardous materials (fuel and herbicide) transportation, storage, and emergency spill plans will result in a low risk for hazardous material contamination (fuels and herbicides) of ground water and surface water. Although the BMPs will minimize the risk of water contamination during herbicide applications, we expect a short-term degrade in the *chemical contamination/nutrients* indicator.

Effects to Harassment and Take Indicators

The Bureau expects no effect to the *harassment* indicator form Program implementation. As previously stated in this Opinion, no bull trout mortality is expected to result from herbicide applications. However, we do expect that individual bull trout may experience sublethal adverse effects from exposure to herbicides during treatments within 100 feet of occupied habitat.

2.3.3.2 Effects of Interrelated or Interdependent Actions on Bull Trout

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

2.3.3.3 Direct and Indirect Effects of the Proposed Action on Bull Trout Critical Habitat

Bull trout critical habitat expected to be impacted by the Program is shown in Tables 6 and 7 above.

As discussed in section 2.3.3.1.1, the Matrix of Pathways and Indicators (MPI) (USNOAA 1996, entire) for bull trout is used to evaluate and document baseline habitat conditions and aid in determining whether a project is likely to adversely affect or result in the incidental take of bull trout.

Analysis of the affected MPI habitat indicators can provide a thorough evaluation of the existing baseline condition and potential project impacts to the PCEs of bull trout critical habitat (see Table 12 below).

As shown in Table 12, the Program will result in short-term delivery of herbicides to bull trout critical habitat which will degrade the chemical contamination/nutrients habitat indicator. A degrade in the chemical contamination/nutrient indicator will result in short-term adverse effects to PCEs 1 (springs, seeps, groundwater sources), 2 (migration habitats), 3 (abundant food base), and 8 (water quality). PCE 9 (low levels of non-native species) is absent in the action area due to the presence of brook trout in most affected streams, and will therefore not be affected by the Program. The Program will maintain the condition of the remaining indicators and result in insignificant or discountable effects to the associated PCEs. All effects are expected to be short-term and the BMPs incorporated into the Program will reduce the magnitude of anticipated effects. By reducing populations of invasive species and facilitating the establishment of desirable plants in RCAs and uplands, the Program is expected to result in long term beneficial effects to bull trout critical habitat.

Table 12. Anticipated effects to the PCEs of critical habitat from Program implementation.

	Primary Constituent Elements (PCEs)	Associated Habitat Indicators	Environmental Baseline Present or Absent	Effects of the Actions (Restore, Maintain, or Degrade)	Determination of Effect
1	Springs, seeps, groundwater sources, and subsurface water connectivity (hyporehic flows) to contribute to water quality and quantity and provide thermal refugia.	Flood plain connectivity, changes in peak/base flows, cobble embeddedness, road density, streambank stability, chemical contamination/nutrients	Present	Short-term degrade – chemical contamination/ nutrients	LAA – short term
2	Migration habitats with minimal physical, biological, or water quality impediments between spawning, rearing, overwintering, and freshwater and marine foraging habitats, including but not limited to permanent, partial, intermittent, or seasonal barriers.	Temperature, sediment, chemical contamination/nutrients, physical barriers, peak/base flow, width/depth ratio, refugia	Present	Short-term Degrade – chemical contamination/ nutrients	LAA short term
3	An abundant food base, including terrestrial organisms of riparian origin, aquatic macroinvertebrates, and forage fish.	Floodplain connectivity, riparian vegetation condition, pool frequency and quality, cobble embeddedness, temperature, chemical contaminants and nutrients	Present	Short-term degrade – chemical contamination/ nutrients	LAA short term
4	Complex river, stream, lake, reservoir, and marine shoreline aquatic environments and processes with features such as large wood, side channels, pools, undercut banks and un-embedded substrates, to provide a variety of depths, gradients, velocities, and structure.	Large woody debris, pool frequency and quality, width/depth ratio, off-channel habitat, streambank stability, riparian vegetation condition, floodplain connectivity, disturbance history and regime, refugia	Present	Maintain	NLAA

	Primary Constituent Elements (PCEs)	Associated Habitat Indicators	Environmental Baseline Present or Absent	Effects of the Actions (Restore, Maintain, or Degrade)	Determination of Effect
5	Water temperatures ranging from 2 to 15 °C (36 to 59 °F), with adequate thermal refugia available for temperatures that exceed the upper end of this range. Specific temperatures within this range will vary depending on bull trout life-history stage and form; geography; elevation; diurnal and seasonal variation; shade, such as that provided by riparian habitat; and local groundwater influence.	Temperature, refugia, pool frequency and quality, width/depth ratio, change in peak/base flows, streambank stability, floodplain connectivity, road density	Present	Maintain	NLAA
6	In spawning and rearing areas, substrate of sufficient amount, size, and composition to ensure success of egg and embryo overwinter survival, fry emergence, and young-of-the-year and juvenile survival. A minimal amount of fine sediment, generally ranging in size from silt to coarse sand, embedded in larger substrates, is characteristic of these conditions. The size and amounts of fine sediment suitable to bull trout will likely vary from system to system.	Sediment, cobble embeddedness, large woody debris, pool frequency and quality, streambank stability	Present	Mantain	NLAA
7	A natural hydrograph, including peak, high, low, and base flows within historic and seasonal ranges or, if flows are controlled, minimal flow departures from a natural hydrograph.	Peak/base flow, road density, riparian vegetation condition, floodplain connectivity	Present	Maintain	NLAA

	Primary Constituent Elements (PCEs)	Associated Habitat Indicators	Environmental Baseline Present or Absent	Effects of the Actions (Restore, Maintain, or Degrade)	Determination of Effect
8	Sufficient water quality and quantity such that normal reproduction, growth, and survival are not inhibited.	Floodplain connectivity, change in peak/base flow, temperature, sediment, chemical contaminant and nutrients	Present	Short-term degrade (Chemical contamination/ nutrients)	LAA short-term
9	Sufficiently low levels of occurrence of nonnative predatory (e.g., lake trout, walleye, northern pike, smallmouth bass); interbreeding (e.g., brook trout); or competing (e.g., brown trout) species that, if present, are adequately temporally and spatially isolated from bull trout.	Physical barriers	Absent (brook trout present in most affected streams within bull trout populations)	Maintain	No Effect

2.3.3.4 Effects of Interrelated or Interdependent Actions on Bull Trout Critical Habitat

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

2.3.4 Cumulative Effects

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

2.3.4.1 Cumulative Effects on Bull Trout

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

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

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

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

2.3.4.2 Cumulative Effects on Bull Trout Critical Habitat

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

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

2.3.5 Conclusion

2.3.5.1 Conclusion for Bull Trout

The Service has reviewed the current status of bull trout, the environmental baseline for the action area, the effects of the proposed action, and the cumulative effects. The Service concludes that direct and indirect effects to bull trout will be limited to sublethal harm to eggs, alevins, fry, juveniles, and adults. These effects are anticipated to only occur in 17 identified bull trout local or potential local populations within the action area and should be minimized by the BMPs incorporated into the Program. In addition, the total acres treated within 100 feet of streams within bull trout populations is very small. We therefore conclude that the probability of adverse sub-lethal effects to individual bull trout from proposed herbicide treatments, while not insignificant or discountable, is low. By reducing noxious weed populations and enhancing populations of native riparian plants, herbicide treatments may benefit bull trout.

Therefore, it is the Service's biological opinion that proposed herbicide treatments within the action area, are not likely to impact the continued existence of the Middle Salmon River-Chamberlain, Little-Lower Salmon River, South Fork Clearwater River and the Lower-Middle Fork Clearwater River core areas; the Clearwater and Salmon River management units; or the Columbia River population segment. Therefore we conclude that the proposed action will not jeopardize the coterminous population of bull trout.

2.3.5.2 Conclusion for Bull Trout Critical Habitat

The Service has reviewed the current status of bull trout critical habitat, the environmental baseline in the action area, effects of the proposed action, and cumulative effects, and it is our conclusion that the proposed action is not likely to destroy or adversely modify designated critical habitat for bull trout. The project will result in short-term adverse effects to PCEs 1 (springs, seeps, groundwater sources), 2 (migration habitats), 3 (abundant food base), and 8 (water quality). We expect that Program BMPs should reduce the magnitude of adverse effects, but not eliminate them. The project will not impact the functionality of critical habitat in the action area; the Middle Salmon River-Chamberlain, South Fork Salmon River, Little-Lower Salmon River, South Fork Clearwater River, and Lower-Middle Fork Clearwater River CHSUs; or the Salmon River and Clearwater River CHUs; or, by extension, critical habitat rangewide in providing for the conservation of the bull trout.

2.3.6 Incidental Take Statement

Section 9 of the Act and Federal regulations pursuant to section 4(d) of the Act prohibit the take of endangered and threatened species, respectively, without specific exemption. Take is defined as to harass, harm, pursue, hunt, shoot, wound, kill, trap, capture or collect, or to attempt to engage in any such conduct. Harm in the definition of take in the Act means an act which actually kills or injures wildlife. Such act may include significant habitat modification or degradation that results in death or injury to listed species by significantly impairing essential behavioral patterns, including breeding, feeding, or sheltering. Harass is defined by the Service as an intentional or negligent act or omission which creates the likelihood of injury to listed species by annoying it to such an extent as to significantly disrupt normal behavior patterns which include, but are not limited to, breeding, feeding, or sheltering.

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

The Bureau has a continuing duty to regulate the activity covered by this incidental take statement. If the Bureau fails to assume and implement the terms and conditions, the protective coverage of section 7(o)(2) may lapse. In order to monitor the impact of incidental take, the Bureau must report the progress of the action and its impact on the species to the Service as specified in the incidental take statement [50 CFR §402.14(i)(3)].

2.3.6.1 Form and Amount or Extent of Take Anticipated

The Service expects that any bull trout (inclusive of all life stages) in the immediate vicinity of herbicide treatments within 100 feet of streams, within the populations listed in Table 13, may be subject to take in the form of harm due to the potential sub-lethal effects of herbicide exposure. The Service believes that the risk of take will be minimized considerably through application of the BMPs, to be applied during implementation of the proposed action, which may reduce, but not eliminate, impacts to bull trout. In addition, the total acreage of herbicide treatments within 100 feet of streams is very small at both the stream and watershed scale. As a result, the Service anticipates the total amount of take will be low during the 10 year implementation period.

Because the Bureau has not identified all precise treatment locations in advance, the Service cannot predict the exact sites where take may occur. We will use acres of treatment within 100 feet of bull trout streams within the populations identified in Table 13 as a surrogate for anticipated take. Annually, the Bureau will apply herbicides to 14.1 acres within 100 feet of these bull trout streams. In subsequent years during the 10-year life of the Program the same acres may be treated annually. However, for this Incidental Take Statement, the Service assumes that a different 14.1 acres (within the same local and potential local populations of bull trout) will be treated each year for 10 years. Therefore, as surrogate for take, a total of 141 acres of herbicide treatments within 100 feet of streams within the identified populations of bull trout is authorized during the 10-year life of the Program.

The Bureau will exceed the authorized level of take if any of the following occurs:

1. The Bureau treats more than a total of 14.1 acres within 100 feet of streams within the bull trout populations shown in Table 13 in any given year without Service approval; or,
2. The Bureau treats more than 141 acres within 100 feet of the streams within the bull trout populations shown in Table 13 during the 10-year duration of the Program; or,
3. The Program results in any bull trout (inclusive of all life stages) mortality.

Table 13. Acres of herbicide treatment within 100 feet of streams in bull trout local or potential local populations.

Core Area and Local or Potential Local Bull Trout Populations	Acres
Middle Salmon – Chamberlain – California	0.5
Middle Salmon – Chamberlain – Warren	0.2
Middle Salmon – Chamberlain – Fall	0.0
South Fork Salmon – Upper Lake	0.5
Little – Lower Salmon – Slate Creek	0.5
Little – Lower Salmon – John Day Creek	0.5
Little Lower Salmon – Rapid River	0.1
Little Lower Salmon – Partridge Creek	0.2
Little Lower Salmon – Boulder Creek	0.2
Little Lower Salmon – Hard Creek	0.5
Little Lower Salmon – Lake Creek	0.3
Little Lower Salmon – Hazard Creek	0.2
Little Lower Salmon – Elkhorn Creek	0.5
Little Lower Salmon – French Creek	0.2
SF Clearwater – Crooked River	0.5
SF Clearwater – Red River	1.0
SF Clearwater – American River	6.9
Lower-MF Clearwater – Lolo Creek	1.3
Total Acres	**14.1**

2.3.6.2 Effect of the Take

Herbicide applications within 100 feet of streams is anticipated to harm bull trout within the populations shown in Table 13. This anticipated take may be reduced because of BMPs to avoid and reduce adverse effects are included in the proposal, and, at the watershed scale, the total area treated within 100 feet of affected streams is very small. Although individual bull trout, including adults, juveniles, fry, and eggs may be harmed, the probability that proposed herbicide applications will eliminate bull trout in any affected populations is insignificant. Local bull trout densities and distribution are not expected to be altered. The Program will not impair productivity or population numbers of bull trout in the Clearwater or Salmon River management units or in the Columbia River population segment. As we concluded in the accompanying Opinion, the anticipated level of take is not likely to jeopardize the continued existence of the bull trout across its range.

2.3.6.3 Reasonable and Prudent Measures

The Service believes that the following reasonable and prudent measure is necessary and appropriate to further minimize take resulting from the proposed herbicide treatments during the 10-year duration of the Program:

- Minimize the potential for harm to bull trout from herbicide treatments.

2.3.6.4 Terms and Conditions

To be exempt from the prohibitions of section 9 of the Act, the Bureau must comply with the following terms and conditions which implement the reasonable and prudent measures described above. These terms and conditions are non-discretionary.

1. The Bureau will not apply picloram to dry ephemeral streams or dry roadside ditches that drain directly into streams occupied by bull trout and have a high probability of delivering picloram to those streams after the first significant precipitation event.
2. To reduce the risk of spray drift, when spraying herbicides, the Bureau, in addition to observing wind speed restrictions, will use the coarsest droplet size that still provides effective plant coverage and the lowest effective nozzle height above target plants.
3. The Bureau will delay or suspend herbicide treatment if weather forecasts indicate there is a high likelihood of wetting rain (i.e., 60–70 percent probability of more than 0.10 inches of rain) within 12 hours and/or an assessment of weather conditions at treatment sites indicates conditions favorable to wetting rain occurring during the day.
4. The Bureau will ensure all chemical storage, chemical mixing, and post-application equipment cleaning is completed in such a manner as to prevent the potential contamination of any riparian area, perennial or intermittent waterway, unprotected ephemeral waterway, or wetland.

2.3.6.5 Reporting and Monitoring Requirement

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

The Bureau will report to the Service on:

1. Compliance with implementation of the Terms and Conditions.
2. Remedies to address and resolve problems identified in (1), above.
3. Any environmental effects of the action that were not considered in the Assessment or this Opinion.

The Bureau will also notify the Service promptly of any emergency or unanticipated situations in the action area that may be detrimental to bull trout. The Service will then determine if Program activities must cease or may continue, pending resolution of the problem and impacts. The Bureau will implement a monitoring strategy that includes monitoring of non-target plant mortality in riparian areas to determine if mortality of non-target plants is affecting riparian functions. The Bureau will report to the Service the actual number of acres treated within 100 feet of streams within the bull trout populations shown in Table 13, the chemicals used, application method, location of treatment sites, and monitoring results by April 1 of each year. Annually, by April 1, the Bureau will also provide a report to the Service on treatments proposed for that year. Submit all reports, to: U.S. Fish and Wildlife Service, Idaho Fish and Wildlife Office, 1387 S. Vinnell Way, Suite 368, Boise, Idaho 83709.

2.3.7 Conservation Recommendations

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

1. Avoid applying herbicides after July 31 within 15 feet of streams with documented bull trout spawning to minimize the potential for disrupting bull trout spawning behavior.
2. Monitor water quality in selected bull trout streams for herbicide presence after the first significant post-application precipitation event to assess the effectiveness of the BMPs.
3. Evaluate and implement actions to restore native vegetation in treatment areas giving first priority to bull trout spawning and early rearing streams.
4. Continue to survey and monitor bull trout populations and habitat in the action area to gather baseline and population trend information.
5. Ensure that emergency spill plans and plans for fuel and herbicide storage and transport are developed prior to conducting any aerial spraying.

2.4 Spalding's Catchfly

2.4.1 Status of the Species and Critical Habitat

This section presents information about the regulatory, biological and ecological status of the Spalding's catchfly that provides context for evaluating the significance of probable effects caused by the proposed action.

2.4.1.1 Listing Status

Spalding's catchfly was listed as a threatened species under the Act on October 10, 2001 (66 FR 51598). The final listing rule found it "prudent" to designate critical habitat for Spalding's catchfly (66 FR 51605). The Service has not yet designated critical habitat. The Service completed a Recovery Plan for Spalding's catchfly in September 2007.

2.4.1.2 Reasons for Listing

Section 4 of the Act and regulations promulgated to implement the listing provisions of the Act (50 CFR part 424) set forth the procedures for adding species to the Federal lists. A species may be determined to be endangered or threatened due to one or more of the five factors described in section 4(a)(1) of the Act. Four of the five factors apply to Spalding's catchfly: the present or threatened destruction, modification, or curtailment of its habitat or range; disease or predation; the inadequacy of existing regulatory mechanisms; and other natural or manmade factors affecting its continued existence.

Specific factors threatening Spalding's catchfly include invasive non-native plants, small geographically isolated populations or occurrences, changes in fire regime and fire effects, land conversion associated with urban and agricultural development, grazing and trampling by livestock and wildlife species, herbicide and insecticide spraying, off-road vehicle use, insect damage and disease, impacts from drought and global warming, and inadequacy of existing regulatory mechanisms (USFWS 2007, pp. 26-47). Although Spalding's catchfly has protections on Federal lands, there is currently no protection for the species on private lands or on State lands, with the exception of Oregon. The plant is protected on state lands in Oregon.

2.4.1.3 Species Description

A member of the pink or carnation family (Caryophyllaceae), Spalding's catchfly is a very long-lived perennial herb found in semi-arid grassland habitats. It has four to seven pairs of lance-shaped leaves and a spirally arranged inflorescence (group of flowers) consisting of small greenish-white flowers. The foliage is lightly to densely covered with sticky hairs. Plants range from approximately 8 to 24 inches in height (Lichthardt 1997, p. 2). It has a deep taproot three feet or longer in length.

2.4.1.4 Life History

Spalding's catchfly reproduces only by seed; it does not possess rhizomes or other means of vegetative reproduction (Lesica 1993, p. 194). Germination generally occurs in the spring, but may occur in the fall as well. Rosettes are formed the first year, after which vegetative stems are produced. Some flowering may occur during the second year but flowering usually occurs during or after the third season (Lesica 1997, p. 348). Adult plants emerge in spring, usually May, as either a stemmed plant, a rosette, or occasionally as a plant with rosettes and stems. Spalding's catchfly generally flowers from mid-July through August (Gamon 1991, p. 21). Bumblebees, especially *Bombus fervidus*, are the primary pollinators of Spalding's catchfly (Lesica and Heidel 1996, p. 1). Fruits mature in August to September and plants typically become senescent in September.

Spalding's catchfly is dormant during the winter but the species is also known to exhibit prolonged dormancy (i.e., plants may not come up for one to several years). Lesica (1997, p. 356) found that "most plants spent nearly half their summers in dormant condition." Prolonged dormancy has been found associated with the following factors occurring during the season prior to dormancy: (1) flowering, (2) higher summer precipitation, and (3) lower fall precipitation (USFWS 2007, p. 13). However, other studies found that equal numbers of vegetative and reproductive plants became dormant the following year (USFWS 2007, p. 13).

Spalding's catchfly inhabits mesic (i.e., moderately moist) slopes, flats, or swales in grassland, sagebrush-steppe, or open pine forest communities dominated by native perennial bunchgrasses such as Idaho fescue (*Festuca idahoensis*) or Rough fescue (*Festuca scabrella*) (USFWS 2007, p. 6). Spalding's catchfly occurs at elevations ranging from 1,200 to 5,300 feet. These elevations are the lowest and highest recorded range-wide for the species and both occur in the Canyon Grassland physiographic province (USFWS 2007, p. 22). At lower elevations the species is primarily found on north facing slopes, but it also occupies south facing slopes at higher elevations.

2.4.1.5 Population Dynamics

There are currently 99 known populations of Spalding's catchfly. The number of individual plants in each population may range from one to several thousand or more. Sixty-six (67 percent) of these populations contain fewer than 100 individuals each. Twenty-three populations have at least 100 plants. Only 10 populations of Spalding's catchfly have over 500 individuals (USFWS 2007, p. 1). The largest population with over 10,000 plants is at The Nature Conservancy's Dancing Prairie Preserve in Montana, followed by Garden Creek, Idaho, with approximately 4,000 plants. The other eight large populations range from 500 plants at Coal Creek, Washington, to some 2,385 individuals at The Nature Conservancy's Zumwalt Prairie Preserve in Oregon. Approximately 78 percent of the total known individuals of Spalding's catchfly are found within these few large populations. The current estimated total number of plants in the United States is approximately 28,750 individuals (USFWS 2007, p. 9).

The fragmentation of Spalding's catchfly's habitat by human-related activities has reduced the species to a mosaic of small populations (67 percent of the known remaining populations are composed of fewer than 100 individuals) occurring in isolated habitat remnants. Many of these small populations may not be viable into the future because small, fragmented populations with limited gene flow and susceptibility to inbreeding face a greater risk of extinction (Ellstrand and Elam 1993, pp. 217-242, Frankham 2003, pp. S22-S29). Increasing the size and connectivity of the larger remaining Spalding's catchfly populations will be an important component of the recovery strategy for the species. Preserving representative populations across the range of Spalding's catchfly is also a key element of the recovery strategy.

As one of the recovery criteria for Spalding's catchfly, the Service proposes the preservation of 27 key conservation areas across the historical range of the plant with at least 500 catchfly individuals in each area. This goal is intended to preserve the available genetic variability within the species and provide for its long-term persistence (USFWS 2007, pp. 59).

2.4.1.6 Status and Distribution

Spalding's catchfly is found in four counties in Idaho (Idaho, Latah, Lewis, and Nez Perce), four counties in Montana (Flathead, Lake, Lincoln, and Sanders), one county in Oregon (Wallowa), and five counties in Washington (Adams, Asotin, Lincoln, Spokane, and Whitman). Two occurrences in British Columbia, Canada are considered part of the Montana population (USFWS 2007, p. 6).

Within this range, Spalding's catchfly habitat occurs within five physiographic (physical geographic) regions: the Blue Mountain Basins in northeastern Oregon, the Canyon Grasslands of the Snake River and its tributaries (e.g., Salmon River) in Washington and Idaho, the Channeled Scablands in eastern Washington, the Intermontane Valleys of northwestern Montana, and the Palouse Grasslands in west-central Idaho and southeastern Washington. With 4,700 plants in 11 locations, the Canyon Grasslands in the Craig Mountain area contain the largest known occurrences of Spalding's catchfly in Idaho. The Service estimates that there are approximately 28,750 Spalding's catchfly plants within the United States (USFWS 2007, p. 9).

Since Spalding's catchfly was listed in 2001, increased survey efforts in suitable habitat have resulted in the identification of 39 new populations. In 2007 there were 110 Element Occurrence (EO) records[5], plus an additional six sites that have not been designated as an EO, of Spalding's catchfly in 99 populations: 14 in the Blue Mountain Basins, 22 in the Canyon Grasslands, 35 in the Channeled Scablands, 11 in the Intermontane Valleys, and 17 in the Palouse Grasslands. When examined by state and province, there are 22 populations in Idaho, 10.33 in Montana, 17 in Oregon, 49 in Washington, and 0.66 in British Columbia (USFWS 2007, p. 9).

It is expected that more populations of Spalding's catchfly will be found in the future as survey efforts increase. To date, survey effort has been lower on privately owned lands than on publicly managed lands. Yet even with this lower survey effort, over half the known sites and estimated plant numbers occur on privately owned lands. Thirty-two of the known populations of Spalding's catchfly (32 percent) occur on lands that are entirely in private ownership, with an additional 18 populations (18 percent) in partial private ownership. The participation of private landowners, including organizations such as The Nature Conservancy, will therefore be vital in the recovery of this species (USFWS 2007, p. 10).

It is not known how many Spalding's catchfly individuals and how much habitat may have been lost to human related activities during the last 150 years since European settlement of this region. Historical documentation indicates the species was seldom collected (Hitchcock and Maguire 1947, p. 1), but because most land conversions within the plant's historical range took place before botanical surveys had been done, we may never know how extensive or numerous Spalding's catchfly once was. It is assumed that the loss and alteration of large portions of suitable habitat (e.g., 99 percent of the original Palouse Grasslands has been lost) have resulted in a decline in population numbers (USFWS 2007, p. 11). Furthermore, much of the remaining habitat occupied by Spalding's catchfly is fragmented. For example, Spalding's catchfly populations in Oregon are located at least 64 kilometers (40 miles) from the nearest known populations in eastern Washington. When such small populations with few individuals are isolated and genetic exchange is not possible, they become vulnerable to the loss of genetic variation and, ultimately, the loss of the population itself (USFWS 2007, p. 10).

Four population extirpations have been documented since tracking of Spalding's catchfly began in the early 1980's (USFWS 2007, p. 11). At least five other sites that formerly supported the species have been documented as having no plants present at the last visit (USFWS 2007, p. 11). Populations are not necessarily considered extirpated, however, if sites are revisited and Spalding's catchfly is not found, because plants at these sites may be exhibiting prolonged dormancy. Subsequent visits are needed to confirm extirpations at such sites (USFWS 2007, p. 11).

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[5]We defined populations of Spalding's catchfly based on studies suggesting that genetic exchange via pollen transfer will typically not occur over a distance greater than 1.6 kilometers (1 mile).

2.4.1.7 Previous Consultations and Conservation Efforts

The following is adapted from the Spalding's catchfly Recovery Plan (USFWS 2007, pp. 47-57). Refer to the Recovery Plan for more details on any of these items.

2.4.1.7.1 Inventories

Within Idaho, inventories have been conducted in the Craig Mountain Canyon Grasslands at Garden Creek Ranch, the Craig Mountain Wildlife Management Area, CFO livestock allotments, Nez Perce National Forest grazing allotments, and on Nez Perce Tribal lands. In Montana, the Natural Heritage Program visited all existing populations and some suitable habitat in order to complete a status report in 2005. In Oregon, the Nature Conservancy is in the process of inventorying the Zumwalt Prairie Preserve and the Clear Lake Ridge Preserve, and the Wallowa-Whitman National Forest is inventorying active grazing allotments. In Washington, inventories are being conducted on Bureau managed lands, at the Fairfield Air Force Base, at the Turnbull National Wildlife Refuge, Swanson Lake Wildlife Area (Washington State Department of Fish and Wildlife), Wawawai Canyon (Washington State Department of Natural Resources), and on Nez Perce Tribal lands.

2.4.1.7.2 Monitoring Efforts and Demographic Studies

Various trend monitoring and demographic studies have been conducted in the Craig Mountain Canyon Grasslands in Idaho starting in 1998. In Montana, monitoring occurred at Wildhorse Island between 1986 and 1992, and both demographic studies and trend monitoring have been conducted at the Nature Conservancy's Dancing Prairie Preserve since 1987 and 1991 respectively. In Oregon, various monitoring efforts have occurred at Clear Lake Ridge (since 1990) and the Nature Conservancy's Zumwalt Prairie Preserve. In Washington, monitoring has occurred at 10 sites in Lincoln County (since 1995), at Fairchild Air Force Base (since 1995) and in the Blue Mountains (since 2003).

2.4.1.7.3 Invasive Non-native Plant Control

Invasive non-native plant (weed) control actions that potentially benefit Spalding's catchfly include: (1) herbicide weed treatment at Craig Mountain Wildlife Management Area, (2) weed treatments within Cooperative Weed Management Areas, (3) weed control at the Nature Conservancy's Dancing Prairie Preserve in Montana, and (4) weed control by Federal agencies.

Weed control is an ongoing activity on most federally managed lands. Because of its threatened status under the Act, Federal agencies are required to consider Spalding's catchfly in developing guidelines for all weed control activities within the plant's range. Weed control and management specific to Spalding's catchfly has occurred at Craig Mountain, Idaho on CFO managed lands, and at Cow Creek on the Wallowa Whitman National Forest.

2.4.1.7.4 Additional Conservation Actions

Additional conservation actions include seed collection (for storage and propagation), development of management and prescribed burning plans, land acquisition, and establishment of conservation easements.

The Bureau has recently completed planning, environmental analysis, and consultation for the mitigation of trail construction and use impacts to an existing population of Spalding's catchfly.

The off-site mitigation includes the long term protection, conservation, and restoration of an existing populations of Spalding's catchfly at the Lower Otto Creek restoration site. The Bureau has completed fence construction during the winter of 2012 to exclude cattle grazing at the restoration site to provide protection for the population.

2.4.1.8 Conservation Needs

The Service has identified the following as conservation needs for Spalding's catchfly (USFWS 2007, pp. vii-ix):

- Establish 27 populations containing at least 500 reproducing individuals in each. These populations should be distributed in key conservation areas within each of the five physiographic areas.
- Ensure that habitat in all 27 key conservation areas is comprised of at least 80 percent native vegetation.
- Maintain stable or increasing Spalding's catchfly population trends within key conservation areas.
- Develop and implement habitat management plans for each key conservation area.
- Control invasive non-native plants in key conservation areas.
- Conduct prescribed burning to mimic applicable historical fire regimes.
- Use *ex situ* seed banking to preserve range-wide genetic variability.
- Develop a post-delisting monitoring plan.

2.4.1.9 Critical Habitat

The final rule listing Spalding's catchfly as threatened found that the designation of critical habitat was "prudent" (66 FR 51605). However, to date, the Service has not designated critical habitat for the species. We will not address critical habitat for Spalding's catchfly further in this Opinion.

2.4.2 Environmental Baseline of the Action Area

This section assesses the effects of past and ongoing human and natural factors that have led to the current status of the species, its habitat and ecosystem in the action area. Also included in the environmental baseline are the anticipated impacts of all proposed Federal projects in the action area that have already undergone section 7 consultations, and the impacts of state and private actions which are contemporaneous with this consultation.

2.4.2.1 Status of Spalding's Catchfly in the Action Area

The CFOA has 15 populations of Spalding's catchfly, including the largest known population in Idaho at Garden Creek Ranch Preserve. Three known populations of Spalding's catchfly occur within the Lower Snake River subbasin (Corral Creek, Billy Creek, and Rydemski). One known population occurs in the Snake River subbasin (Getta Creek). Eleven known populations occur on Bureau lands in the Lower Salmon River subbasin (Schoolmarm Peak, Lyons Bar, Lower Otto Creek, Pine Bar/Hells Gate Creek, Swartz Bar North, Lee Creek, Hogback Ridge, Rice

Creek, Oxbow, Cottonwood Creek, and Skeleton Creek).

2.4.2.2 Factors Affecting Spalding's Catchfly in the Action Area

As identified in the Status of the Species section, major threats to Spalding's catchfly in the action area include loss of habitat, livestock grazing, fire suppression, impacts from recreation, and weed invasion, as well as accidental herbicide application to control weeds. Genetic complications also threaten the long-term existence of the species. Road and trail construction and maintenance, gravel mining, off-road vehicles, and urban developments are additional threats.

2.4.3 Effects of the Proposed Action

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

2.4.3.1 Direct and Indirect Effects of the Proposed Action on Spalding's Catchfly

The Program proposes to use herbicides, manual control methods, and biological control methods for controlling weedy vegetation within and adjacent to populations of Spalding's catchfly. Mechanical noxious weed control (used for site rehabilitation) will not occur within Spalding's catchfly populations, but may occur in adjacent areas as described below. Total acres treated within the perimeter of Spalding's catchfly subpopulations is expected to range between 1 to 35 acres; and adjacent areas within 300 feet of a population perimeter are expected to be less than 40 acres annually. Treatments within the perimeter of populations will primarily consist of spot treatments with backpack sprayers. Annually the Bureau may aerially spray herbicides on up to 15 acres within 300 to 600 feet from catchfly populations (Johnson 2012, pers. comm.). All herbicide treatments will be in accord with Program BMPs (Appendix A of this Opinion) including the buffers, wind speed, and herbicide restrictions shown in Table 14. Prior to any treatments, surveys will be conducted to mark Spalding's catchfly plants or population perimeters, and as needed flagging or pin flags may be used in sensitive areas. All noxious weed control activities will be administered and/or supervised by a Bureau ecologist, botanist, biologist, or other qualified personnel. Noxious weed control actions will result in long term benefits to Spalding's catchfly populations.

Table 14. Buffers, maximum wind speed, application methods, and herbicide restriction associated with listed plant populations.

Listed Plants	Distance from listed plant populations (buffer)	Average Maximum Wind Speed	Herbicide Application Method for Noxious Weed Control
Mirabilis macfarlanei 1/ Silene spaldingii 1/	Within 0 – 2+ feet of a listed plant.	N/A	Hand control measures for control of target species (i.e., pulling weeds, grubbing).
	2 – 25+ feet from a listed plant.	5 mph	Ground based selective spot spraying of target species with non-residual herbicide. Backpack or handpump applicator with stream or narrow cone nozzle setting as well as wicking and wiping applicators.
	< 25 feet from a listed plant.	N/A	No use of picloram authorized.
	>50 feet from a listed plant	8 mph	All ground application methods.
	> 300 feet from outer perimeter of population	5 mph	Aerial based spraying allowed.

2.4.3.1.1 Chemical Treatments

Two of the most serious threats to Spalding's catchfly include encroachment on populations by noxious weeds and accidental herbicide spraying. Herbicide spraying of noxious weeds will control and/or curtail additional weed infestations which compete with Spalding's catchfly.

<u>Effects to Spalding's catchfly plants</u>

The main adverse effect to Spalding's catchfly expected from Program implementation is accidental exposure to herbicides from either direct spraying or herbicide drift. Such exposure may injure or kill Spalding's catchfly plants. Adhering to the BMPs and buffer, wind speed, and herbicide restrictions shown in Table 14 will reduce but not eliminate the risk of accidental exposure. In addition no herbicide spraying (aerial or ground based) will occur prior to plant surveys being conducted to determine if Spalding's catchfly is present in the treatment area.

Specific measures to reduce the risk to Spalding's catchfly from accidental herbicide exposure include the following:

- Within 25 feet of Spalding's catchfly plants, the use of Tordon (active ingredient picloram), a "long lived" persistent herbicide will not be authorized. Only foliar-contact herbicides will be used. This will reduce risks associated with residual herbicides that persist in the soil and continue to affect newly emerging plants or sprouting perennial shoots (residual pre-emergence herbicide effects).
- Manual weed control will be used in areas less than 2 feet from Spalding's catchfly plants.
- The only herbicide application method authorized within 2 to 25 feet or more from an individual Spalding's catchfly plant would be a wick or wipe applicator, backpack sprayer, or hand-pump sprayer. Backpack and hand-pump sprayers must have a stream or small cone spray nozzle for a smaller application width and a more coarse application

droplet size. Using manual weed control (i.e. pulling, grubbing, and cutting) and selective weed spraying with backpack or hand-pump sprayers will reduce weed infestations within populations of Spalding's catchfly.

- Control of noxious weeds adjacent to Spalding's catchfly populations will also reduce the risk of weeds encroaching into catchfly populations. Chemical control of weeds on areas which provide potential habitat for Spalding's catchfly will reduce weeds that compete with native vegetation. Conducting plant surveys prior to applications will reduce the risk for accidental spraying of unknown populations.
- For aerial herbicide applications within 300 to 600 feet of Spalding's catchfly populations, the Bureau will mark the 300 foot buffer as needed (i.e., if there is not a distinct geographic or topographic feature present delineating the population buffer).

Effects to Watershed Ecological Condition (Habitat Quality)

Chemical control of noxious weeds will reduce competition and benefit native species and habitat quality. Ground based spraying is more selective than aerial spraying and will have insignificant effects on non-target species, with the exception of the significant effects from accidental spraying of Spalding's catchfly as identified above. Aerial spraying is not as selective and non-target species that occur with noxious weeds will be adversely affected (e.g., forbs, shrubs). Beneficial effects will result from control of noxious weeds which may encroach on occupied and potential habitat for Spalding's catchfly. Chemical control of noxious weeds may be used in conjunction with manual and biological control.

Effects to Pollinators

Chemical control of noxious weeds is expected to have insignificant direct effects on pollinators of Spalding's catchfly (e.g., bumblebees (*Bombus* spp.)) and will indirectly benefit Spalding's catchfly by reducing competition with noxious weeds for a limited number of pollinators. Competition between the catchfly and noxious weeds such as yellow starthistle for a limited number of pollinators has the potential to adversely affect both fecundity (i.e., total seed production) and individual plant vigor in some Spalding's catchfly populations. Control of noxious weeds can reduce this competition for pollinators and at the same time help maintain the diverse high quality habitat critical for both Spalding's catchfly and its pollinators.

2.4.3.1.2 Manual Control

Effects to Spalding's catchfly plants

Manual control of noxious weeds within Spalding's catchfly populations will reduce threats from noxious weeds. Manual control activities will have no or insignificant effects on non-target species such as Spalding's catcfhly. The risk of accidentally trampling Spalding's catchfly plants and soil/vegetation disturbance during manual control treatments is considered discountable. When used in proximity to listed plants, manual control of noxious weeds will result in beneficial effects to Spalding's catchfly populations.

Effects to Watershed Ecological Condition (Habitat Quality)

Manual noxious weed control will allow for more species specific weed control when herbicide risks are a concern and will benefit native species and habitat quality. Manual noxious weed control will provide for combined beneficial effects to occupied and potential habitat for Spalding's catchfly.

Effects to Pollinators

Manual control of noxious weeds is expected to have insignificant to no effect on pollinators (e.g., bumblebees (*Bombus* spp.)). This is primarily because of the small acreage of land treated. Manual control measures will target individual plants, scattered plants in localized areas, or small patches of plants. This will reduce competition between Spalding's catchfly and noxious weeds for a limited number of pollinators. Maintaining high-quality habitat for Spalding's catchfly (not just protecting individual plants) consisting of diverse plant communities is critical for attracting pollinators.

2.4.3.1.3 Mechanical Control including Rehabilitation, Seedings, and Plantings

Effects to Spalding's Catchfly Plants

No rehabilitation actions are proposed within Spalding's catchfly populations. Any actions which reduce noxious weed encroachment into potential habitat for listed plants are beneficial.

Effects to Watershed Ecological Condition (Habitat Quality)

Actions to reduce noxious weed infestations will benefit native species and habitat quality for special status plants. No ground disturbing rehabilitation actions are proposed to occur within Spalding's catchfly populations.

Effects to Pollinators

Rehabilitation of small localized areas is expected to have insignificant to no effect on pollinators (e.g., bumblebees - *Bombus* spp.), primarily, because of the small number of acres proposed for treatment. No ground disturbing rehabilitation actions are proposed to occur within populations of Spalding's catchfly.

2.4.3.1.4 Biological Control

Effects to Spalding's Catchfly Plants

Biological control of noxious weeds within Spalding's catchfly populations will reduce threats from noxious weeds. Biological control activities have no effect or insignificant effects on non-target species. Biological control of noxious weeds has very low risk to non-target plant species. Biological control of noxious weeds will result in beneficial effects for Spalding's catchfly populations and also benefit potential habitat for the plants.

Effects to Watershed Ecological Condition (Habitat Quality)

Biological control of noxious weeds will allow for improved integrated weed control, which will benefit native species and habitat quality. Biological control will provide for improved noxious weed control for occupied and potential habitat for Spalding's catchfly. Biological control of noxious weeds is often used in conjunction with chemical and manual control activities except near biological control insect nursery sites.

Effects to Pollinators

Biological control of noxious weeds is expected to have insignificant effects on pollinators for Spalding's catchfly. This is primarily because it will not result in complete control of host species. Biological control insects are normally released in areas that have large numbers of the host plants (e.g., invasive plants and noxious weeds). However, biological control insects may target individual plants, scattered plants in localized areas, or patches of plants. This will reduce competition with other species for a limited number of pollinators. Maintaining high-quality habitat for Spalding's catchfly (not just protecting individual plants) which consists of diverse plant communities is critical for attracting pollinators.

2.4.3.2 Effects of Interrelated or Interdependent Actions on Spalding's Catchfly

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

2.4.4 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.

Future State, Tribal, local, or private actions that are reasonably certain to occur in the action area include livestock grazing, timber harvest, , road construction, road and other facilities maintenance, recreation, prescribed fire, emergency fire rehabilitation, and noxious weed control

Ongoing noxious weed control using herbicide application and other vegetation treatments has the potential to impact Spalding's catchfly in the action area. Private land owners, State of Idaho, Counties, Idaho Transportation Department, and Nez Perce Tribe have in the past and will continue to conduct active spray programs for controlling noxious weeds. In addition, the Idaho Department of Fish and Game uses herbicides to treat weeds in wildlife management areas. The full scope of noxious weed control programs is not known.

An additional cumulative effect to Spalding's catchfly is global climate change. Warming of the global climate seems quite certain. Changes have already been observed in many species' ranges consistent with changes in climate (ISAB 2007, p. iii; Hansen et al. 2001, p. 767). Future climate change may lead to fragmentation of suitable habitats that may inhibit adjustment of plants and wildlife to climate change through range shifts (ISAB 2007, p. iii; Hansen et al. 2001, pp. 768-773). Changes due to climate change and global warming could be compounded considerably in combination with other disturbances such as fire and invasive species. Fire frequency and intensity have already increased in the past 50 years, particularly in the past 15 years, in the shrub steppe and forested regions of the west (ISAB 2007, p. iii). Larger climate-driven fires can be expected in the future. Changing rainfall patterns may result in some regions becoming wetter and others drier. For Spalding's catchfly, decreasing rainfall may result in conditions that do not support the species' mesic grassland habitat, while increasing rainfall may facilitate woody shrub and tree encroachment into catchfly habitat (Hill and Gray 2004, p. 88).

To survive, the catchfly will need to adapt or colonize new areas at higher elevations-moving up 500 meters in elevation may compensate for a 3 degree C increase in average temperature (Given 1994, p. 34). However, because plants are stationary and move slowly through dispersal, colonization, and recruitment, it is thought they cannot move quickly enough to keep up with a shifting climate, and are more susceptible to global warming than are wildlife species (Wilson 1989, p. 114).

2.4.5 Conclusion

The Service has reviewed the current status of Spalding's catchfly, the environmental baseline in the action area, effects of the proposed action, and cumulative effects, and it is our conclusion that the proposed action is not likely to jeopardize the continued existence of the species. While the Program may impact some individual plants in the actions area, the proposed action will not significantly reduce reproduction, numbers, or distribution of the species in the action area, and is therefore not likely to cause any reduction in the likelihood of both the survival and recovery of the species rangewide.

2.4.6 Incidental Take Statement

Because the take prohibitions detailed under section 9(a)(1) of the Act do not apply to listed plants, those sections of the Act dealing with incidental take, Sections 7(b)(4) and 7(0)(2), generally do not apply to listed plants either. Therefore we are not including an Incidental Take Statement for Spalding's catchfly in this Opinion.

However, section 9(a)(2) of the Act prohibits the removal and reduction to possession or the malicious damage of Federally listed endangered plants on areas under federal jurisdiction, or the destruction of endangered plants on non-Federal areas in violation of State law or regulations or in the course of any violation of a State criminal trespass law. Generally, under 50 CFR 17.71, the prohibitions pertaining to endangered plants apply to threatened plants as well.

2.4.7 Conservation Recommendations

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

1. In cooperation with the Service, U.S. Forest Service, State Natural Heritage programs in Idaho and Oregon, and others, the following recommendations should be considered:

   - Develop consistent interagency inventory and monitoring methods.
   - Identify and map populations and suitable habitats. Participate in surveys within suitable habitats and map new populations as found.
   - Follow current monitoring protocols by cooperating in monitoring Spalding's catchfly population trends and habitat conditions.
   - Manage high priority habitat areas and populations to promote species recovery.
   - Participate in research essential to species recovery. Cooperate in determining specific limiting factors in terms of habitat needs and characteristics. Cooperate

in population viability analyses to ensure that recovery criteria objectives are being met.

- Support seed banks in a long-term seed storage facility.
- Work with other agencies to compile a general list of BMPs that would apply to all programs, to the extent that such a list would assist with consultation and species recovery. The intent of implementing BMPs is to avoid/minimize negative effects.
- Support the establishment and maintenance of new populations in suitable Spalding's catchfly habitat. The goal of these activities is to maintain or enhance viable populations.

2. Ensure that ongoing and new Federal actions support or do not preclude species recovery.
3. Promote restoration of suitable habitat following fire, fire rehabilitation, restoration treatments, or other major disturbances.
4. Ensure that fire suppression efforts will be conducted, as possible, to protect Spalding's catchfly habitat.
5. Utilize available funding opportunities to plan and implement noxious weed control treatments to benefit Spalding's catchfly.

2.5 MacFarlane's Four-O'Clock

2.5.1 Status of the Species

This section presents information about the regulatory, biological and ecological status of the MacFarlane's four-o'clock that provides context for evaluating the significance of probable effects caused by the proposed action.

2.5.1.1 Listing Status

The Service first listed MacFarlane's four-o'clock as endangered in 1979 (44 FR 61912). A recovery plan was completed in 1985 (USFWS 1985, entire). At the time of listing, only three populations were known, totaling 20 to 25 individual plants. Since the species was first listed, ten additional populations have been documented in Idaho and Oregon. As a result of recovery efforts and the discovery of additional populations, the Service downlisted MacFarlane's four-o'clock to threatened status on March 15, 1996 (61 FR 10693). The Service completed a revised recovery plan in 2000 (USFWS 2000, entire). Critical habitat has not been designated for this species.

2.5.1.2 Reasons for Listing

Section 4 of the Act and regulations promulgated to implement the listing provisions of the Act (50 CFR part 424) set forth the procedures for adding species to the Federal lists. A species may be determined to be endangered or threatened due to one or more of the five factors described in section 4(a)(1) of the Act. In both the 1979 and 1996 listing rules, all five factors were found to apply to MacFarlane's four-o'clock: the present or threatened destruction, modification, or curtailment of its habitat or range; overutilization for commercial, sporting, scientific, or educational purposes; disease or predation; the inadequacy of existing regulatory mechanisms; and other natural or manmade factors affecting its continued existence.

Some of the factors found to be threatening MacFarlane's four-o'clock included invasive non-native plants, habitat destruction due to mining and vehicle traffic, specimen collecting, heavy livestock grazing, and insect damage and disease. Although MacFarlane's four-o'clock is afforded some protection on federal lands, there is currently no protection for the species on private and Idaho state lands. Take of MacFarlane's four-o'clock is prohibited under the Oregon Endangered Species Act. Refer to the 1979 and 1996 listing rules for specifics.

2.5.1.3 Species Description

MacFarlane's four-o'clock is a perennial forb with a stout, deep-seated taproot, and freely branched, decumbent (i.e., a plant, which lies on the ground with tips turned upwards) or ascending stems that form small to large clumps. The leaves are opposite, somewhat succulent, green above, and glaucescent (lightly coated with a fine bloom) below. The lower leaves are orbicular or ovate-deltoid in shape, becoming progressively smaller towards the tip of the stem. The inflorescence is comprised of a cluster of four to seven flowers subtended (occurring below) by an involucre (a collection or rosette of bracts occurring below a flower cluster). The striking, 5-merous (having flower parts in 5), bright magenta-colored flowers are up to 25 millimeters (1 inch) long and 25 millimeters (1 inch) wide. They are funnel-form shaped with a widely expanding limb and exserted (projecting beyond the corolla) stamens (modified from Hitchcock et al. 1964, p. 224).

2.5.1.4 Life History

Reproduction by seed in MacFarlane's four-o'clock is demonstrated by the presence of seedlings with cotyledons and the documented survival of some of these seedlings in population monitoring studies (Kaye 1992, p. 32). MacFarlane's four-o'clock is primarily an outcrosser, but is able to produce a small proportion of one-seeded fruits through autogamy (self-pollination). For some populations, sexual reproduction may be more important than vegetative reproduction (Kaye 1992, p. 32). However, the relative contribution of sexual versus vegetative reproduction in MacFarlane's four-o'clock is unknown, and may differ from site to site (Kaye 1992, p. 36).

Inflorescences bagged to exclude pollinators produced fewer fruits than inflorescences open to pollinators (Barnes 1996, p. 19). Several researchers have observed insect visitors to MacFarlane's four-o'clock plants that may act as potential pollinators for this species, including bumblebees *(Bombus* spp.) and solitary bees *(Anthophora* spp. and *Tetralonia* sp.) (Kaye and Meinke 1992, p. 14; Barnes et al. 1995, p. 39). Species of *Anthophora* (solitary bee) and *Bombus* (bumblebees) are apparently the most effective pollinators (Barnes 1996, p. 26). These insects are vital to successful sexual reproduction in this species (Barnes 1996, p. 91). Although MacFarlane's four-o'clock is self-compatible, it apparently requires a vector for pollination (Barnes 1996, p. 40).

Germination of MacFarlane's four-o'clock occurs in the early spring. Established plants generally start growth in early April. Flowering begins in early May and peaks later in the month. It is complete by mid-June with seeds dispersed from mid-June to mid-July. Plants are typically dry by early to middle July. The bloom time and duration appears to be strongly influenced by annual precipitation. Periods of drought cause plants to be stunted and mostly vegetative whereas, during wet years, the plants are larger and flower abundantly (Barnes 1996, p. 16).

In addition to reproducing by seed, plants reproduce clonally from a thick woody tuber that sends out many shoots (collectively called a genet). Daughter plants produced in this manner are known as ramets. Some MacFarlane's four-o'clock populations comprise several clones (genets). However, small populations of MacFarlane's four-o'clock may comprise only one clone (one genet) (Barnes 1996, p. 78). The size of a ramet can vary greatly, from a single stem with no flowers to ramets with over 200 inflorescences present (Barnes 1996, p. 79).

It is difficult to determine the extent of a particular MacFarlane's four-o'clock clone since different clones (genotypes) can overlap in distribution and vary greatly in size (Barnes et al. 1995, p. 29). The root system of some MacFarlane's four-o'clock clones extends beyond the presence of ramets by at least 1 to 3 meters (about 1 to 3 yards) (USFWS 2000, p. 7). Conceivably, an extensive root system could allow populations to expand into adjacent areas. Such areas may contain suitable habitat, or habitat that, under appropriate circumstances, could be suitable for this species in the future.

Most MacFarlane's four-o'clock populations, except perhaps the smallest, contain several genets. The larger populations contain many genets. Vegetative spread has produced some colonies with intermixed lateral roots from different genets growing amongst one another. Other colonies have displayed less interclonal mixing, with more or less separate genet clumps. Barnes (1996, p. 26) hypothesized that the clonal habit of MacFarlane's four-o'clock will increase the amount of inbreeding, but her studies at one population found a high degree of outcrossing; slightly more than half the seeds were cross-pollinated. Because most populations comprise several genotypes, recruitment by seed must be taking place although may be quite slow. This assumption is supported by monitoring (Kaye and Meinke 1992, p.10) that reported seedlings to be rare with poor survivorship – approximately 88 percent of seedlings died by their second year. Seed dispersal has not been studied, but apparently seeds fall to the ground and are transported by gravity and rain (Barnes 1996, p. 90). Seed longevity and viability are unknown.

2.5.1.5 Population Dynamics

MacFarlane's four-o'clock exhibits low genetic diversity among the populations, in part due to the clonal nature of the species, with observed differences increasing as the distance between the populations increases (Barnes et al. 1996, p. 27). Additionally, populations within a given river canyon (e.g., Snake River) are more closely related to one another than to populations in other river canyons (e.g., Salmon or Imnaha). Currently, there appears to be little gene flow between the populations; thus isolation and small population size may be perpetuating low levels of genetic diversity observed in MacFarlane's four-o'clock populations (Yates 2007, p. 3).

In general, monitoring data appear to indicate that MacFarlane's four-o'clock annual ramet abundance, reproductive ramet abundance, and foliar cover has not changed at Idaho occurrences located on Bureau land since 1981 (Mancuso and Shepherd 2008, p. 19). However, a few exceptions were identified. At the Skookumchuck site, the Range Trend Plot monitoring showed a significant decrease in the number of MacFarlane's four-o'clock ramets over time. Upward peaks in ramet abundance were observed in 1983, and again in 1993, followed by a decline in ramet number below the baseline years of 1981 and 1982 for most years after 1996 (Mancuso and Shepherd 2008, p. 19). At Lucile Caves there was a significant decrease in the percentage of reproductive ramets from rhizomes transplanted in 1988. This downward trend followed a two-year increase in the number of reproductive ramets in 1993 and 1995 (Mancuso and Shepherd 2008, p. 19).

2.5.1.6 Status and Distribution

MacFarlane's four-o'clock is narrowly endemic to portions of the Snake, Salmon, and Imnaha river canyons in Wallowa County in northeastern Oregon, and adjacent Idaho County in Idaho. Sites are normally dry and open, or with scattered shrubs. Less than 30.5 centimeters (12 inches) of precipitation occurs mostly as rain during the winter and spring within the Snake, Salmon, and Imnaha river canyons in Oregon and Idaho (Yates 2007, p. 2). Individual plants can be found on all aspects, but most often occur on southeast to western exposures. Habitat and associated species vary among populations. In general, the associated vegetation is usually in early-seral condition, and the grasslands are typically grazing modified versions of *Agropyron spicatum* = *Pseudoroegneria spicata ssp. spicata* (bluebunch wheatgrass) communities. Other common native bunchgrass associates are *Sporobolus cryptandrus* (sand dropseed), *Aristida longiseta* = *Aristida purpurea var. longiseta* (Fendler's threeawn), and *Poa secunda* (Sandberg bluegrass) (Yates 2007, p. 2).

The species global range is approximately 46 kilometers (28.5 miles) by 28.5 kilometers (17.5 miles). Populations in Oregon contain an estimated 3,500 ramets and cover about 36 hectares (90 acres) within four EOs (Kaye 1992, p. 9). An estimated 8,000 to 9,000 ramets occur in Idaho within nine EOs. Two Idaho populations contain more than 1,000 ramets. Most sites throughout the species range are less than an acre in size, but ranges vary in size from a few square meters to 85 hectares (210 acres) for the largest EO. This largest EO consists of several subpopulations that vary in density from a few plants to denser concentrations. In addition, the populations of MacFarlane's four-o'clock in the Snake, Salmon, and Imnaha rivers are disjunct (separated) from each other (Barnes et al. 1995).

There are 13 known EOs of MacFarlane's four-o'clock: nine in Idaho and four in Oregon (USFWS 2008, p. 14). One Hells Canyon EO is quite large, with hundreds of plants growing in eight distinct patches. Of the four EOs in Oregon, three are on Federal lands within the Hells Canyon National Recreation Area (NRA). The fourth EO is privately owned within the NRA. In Idaho, the majority of MacFarlane's four-o'clock occurrences are located at least partly on Bureau administered lands; the remainder occur on private property. Tables 15 and 16 list the EOs currently known for MacFarlane's four-o'clock, area of population, number of plants, land ownership, and river canyon location.

Table 15. MacFarlane's four-o'clock Element Occurrences in Idaho – Adapted from the draft 5-year Status Review (USFWS 2008, p. 14)

Element Occurrence [1]	Area acres (hectare)	Number of Ramets	Land Ownership	River Canyon
Skookumchuck EO #1	144 square yards (120 square meters)	4 ramets	Bureau	Salmon
Long Gulch/John Day EO #2	210 acres (85 ha); 45 acre fenced exclosure on Bureau land*	6,000 ramets in several subpopulations*	Private and Bureau	Salmon
Horseshoe Bend EO #3	1,750 square feet (162 square meters)	300-400 ramets	Bureau	Salmon
Slicker Bar EO #4	5,625 square feet (522 square meters)	244 ramets	Private	Salmon
Giants Nose EO #5	11,250 square feet (1,045 square meters)	380 ramets	Private	Salmon
Lower Pittsburg Landing EO #6	Unknown	250 genets	U.S. Forest Service	Snake
Lucile Caves EO #7	1,500 square yards within a 15 acre fenced area on Bureau land*	~196 genets and ramets (transplants)*	Bureau	Salmon
Rhett Creek EO #8	2 – 3 acres*	640 ramets in 2 subpopulations	Bureau	Salmon
Box Canyon EO #9	1.5 acres*	>800 ramets	Bureau	Salmon

[1] EOs for MacFarlane's four-o'clock are separate if they are > 1 kilometer apart. Separation distances between EO features are measured pairwise and edge-to-edge after accounting for locational uncertainty.

[2] The global distribution of MacFarlane's four-o'clock is Idaho County (Idaho) and Wallowa County (Oregon) in portions of the Snake, Salmon, and Imnaha river canyons. The species range is approximately 46 by 29 kilometers.

*Johnson 2009, pers. comm.

Table 16. MacFarlane's four-o'clock Element Occurrences (Oregon) – Adapted from the draft 5-year Status Review (USFWS 2008, p. 15)

Element Occurrence	Area Occupied	Number of Ramets	Ownership	River Canyon
Tryon Bar / Snake River EO #1	50 acres (20 hectare)	~ 3,000 ramets	U.S. Forest Service	Snake River
Buck Creek EO #2	1.0 acre (0.4 hectare)	~ 200 ramets	Private	Imnaha
Fall Creek EO #3	5.0 acres (2 hectare)	~ 351 ramets	U.S. Forest Service, some private	Imnaha
Pleasant Valley EO #5	0.1 acre (406 square meters)	~ 38 ramets	U.S. Forest Service	Snake River

2.5.1.7 Previous Consultations and Conservation Efforts

2.5.1.7.1 U.S. Forest Service and Bureau

Both the Bureau and U.S. Forest Service have implemented a variety of conservation actions to benefit MacFarlane's four-o'clock. Many of these actions have taken place under Section 7(a)(1) and 7(a)(2) of the Act. 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 threatened and endangered species. Actions and activities have been coordinated and implemented to address recovery tasks outlined in the recovery plans developed for the species. Section 7(a)(2) requires Federal agencies to consult with the Service to ensure that they are not undertaking, funding, permitting, or authorizing actions likely to jeopardize the continued existence of listed species or destroy or adversely modify designated critical habitat. Since the species was first listed in 1979, there have been several conservation actions taken to facilitate recovery of MacFarlane's four-o'clock. These include the following:

- The U.S. Forest Service in Oregon has excluded or discontinued livestock grazing at EOs in the Imnaha River and Snake River canyons. Additionally, the U.S. Forest Service has implemented monitoring efforts at one subpopulation in the Snake River Canyon.
- For weed control, The Oregon Department of Agriculture released a biological control insect at one MacFarlane's four-o'clock location in Hells Canyon (EO#1), and the U.S. Forest Service continues to control weeds in the vicinity of other sites in Hell's Canyon (USFWS 2000, p. 13). Additionally, the Service's La Grande Field Office has funded two seasons of weed treatment near MacFarlane's four-o'clock on U.S. Forest Service lands in Oregon for years 2007 and 2008 (USFWS 2008, p. 35).
- In the Salmon River Canyon, the Bureau has fenced a portion of the Long Gulch/John Day EO previously accessible to livestock. The Bureau has completely fenced the Lucile EO to exclude livestock grazing. The Bureau has also transplanted several hundred MacFarlane's four-o'clock genets and ramets from a large landslide (MP 210 slide) and from another private land ownership to inside the Lucile Caves Exclosure. The Bureau has implemented weed control actions on public lands for the Long Gulch, Rhett Creek, Skookumchuck, and Horseshoe Bend EOs. The Bureau developed Habitat Management Plans in the early 1980s for the Skookumchuck, Long Gulch/John Day, and Lucile Caves EOs, with the intent of providing protection and quality habitat for the species on public lands. All MacFarlane's four-o'clock EOs in the Salmon River drainage (Bureau and private) are monitored. The Bureau monitors EOs that are still within active grazing areas on Bureau lands and applies adaptive management to insure that future grazing does not adversely impact these populations. The Bureau has recently completed planning, environmental analysis, and consultation for the establishment of a new population of MacFarlane's four-o'clock (transplant genets and ramets) at Lower Otto Creek. The Bureau has completed fencing during the winter of 2012 to exclude cattle grazing at the Lower Otto Creek restoration site to provide protection for a new population of MacFarlane's four-o'clock (proposed future transplant effort).
- The Berry Botanic Garden, in coordination with the U.S. Forest Service, Bureau, and Service, has collected thousands of MacFarlane's four-o'clock seeds from throughout its range and placed them into long-term cold storage. The Berry Botanic Garden has also conducted propagation experiments on MacFarlane's four-o'clock and is currently

partnered with the U.S. Forest Service to establish MacFarlane's four-o'clock in suitable habitat in Hells Canyon. The objectives of these experiments were to explore propagation of MacFarlane's four-o'clock using standard germination testing and tissue culture techniques (Raven 2000, p. 2).

2.5.1.7.2 Recovery Plan/Recovery Criteria

In general, only one of the five recovery criteria (20 percent) identified (i.e., MacFarlane's four-o'clock occurring throughout its current range in each of three geographic areas) in the 2000 revised recovery plan has been met (USFWS 2007, p. 4). Other actions such as fencing MacFarlane's four-o'clock populations, weed control efforts, and monitoring extant populations have been on-going by both the U.S. Forest Service and the Bureau. While the U.S. Forest Service and the Bureau have utilized their authorities under the Act to implement conservation actions for the species, there has been little formal coordination between the various agencies for occurrences on adjacent lands. The 2000 revised Recovery Plan did not stipulate a process by which to track and monitor recovery tasks implemented, or how U.S. Forest Service and Bureau conservation actions may complement or achieve recovery objectives; therefore, it is difficult to evaluate the current status of implementation and effectiveness of the tasks identified in the 2000 revised Recovery Plan.

2.5.1.7.3 Recovery Needs Assessment

In August 2007, the Service completed a Recovery Needs Assessment (RNA) for MacFarlane's four-o'clock (USFWS 2007). This RNA summarized all the recovery and conservation actions initiated and/or completed to date, and identified six actions that will be needed for recovery and delisting to occur. These include: (1) establishing a technical working group to provide guidance on identifying and prioritizing remaining recovery actions; (2) developing recovery task implementation agreements with the U.S. Forest Service and Bureau for the control of non-native invasive plant species; (3) developing and implementing a range-wide (population and habitat) monitoring strategy; (4) identifying and implementing site-specific fence construction; (5) developing and implementing studies to assess general life history, ecological needs, and genetic studies; and (6) developing, if possible, a population viability analysis for MacFarlane's four-o'clock. Additionally, the Service's La Grande Field Office is working on a 5-year Action Plan for MacFarlane's four-o'clock in Oregon (with overlap in Idaho), to complete specific recovery tasks within a five year period.

2.5.1.7.4 Population and Habitat Monitoring Data Analysis

Monitoring efforts for MacFarlane's four-o'clock have been conducted on lands managed by the CFO, beginning in 1981, and the U.S. Forest Service (Hells Canyon National Recreation Area, from 1990 to 1995, and 2001 to 2006). These monitoring efforts were intended to provide information on population status and help identify factors affecting MacFarlane's four-o'clock, and to gain insight on the effectiveness of management actions, such as fencing populations, to reduce impacts from livestock use, and effects of fire on populations. Past monitoring efforts for MacFarlane's four-o'clock included most of the species' occurrences in the Salmon River Canyon area and U.S. Forest Service lands along the Snake River.

In 2007, the Service evaluated available Bureau and U.S. Forest Service monitoring data to gain better understanding of MacFarlane's four-o'clock overall population status (Mancuso and Shepherd 2008). Mancuso and Shepherd (2008) evaluated monitoring data collected by the

Bureau from 1981 to 2004, and by the U.S. Forest Service from 2001 to 2006, and provided a summary of long-term monitoring results (Report). This Report included a description of the various monitoring methods used by each agency, a summary of the monitoring results, and recommendations regarding future monitoring needs.

2.5.1.8 Conservation Needs

In 1985, the Service developed a recovery plan for Macfarlane's Four-O'clock (USFWS 1985). In summary, this plan called for the following actions in order to achieve recovery: (1) conduct additional field surveys, (2) protect Macfarlane's Four-O'clock sites and develop management plans, (3) conduct baseline studies to identify limiting factors and determine threats, (4) establish new colonies, and (5) maintain a propagule bank.

In 2000, the Service developed a revised recovery plan (USFWS 2000). In summary, the revised recovery plan called for the following actions: (1) protecting occupied habitat and implementing actions to eliminate or control threats, (2) monitoring population trends, (3) conducting research, (4) conducting surveys in potential habitat areas, (5) establishing propagule banks, (6) if warranted, establishing new populations where Macfarlane's Four-O'clock has been extirpated, and (7) validating and revising recovery objectives as needed.

In August 2007, the Service completed a Recovery Needs Assessment (RNA) for Macfarlane's Four-O'clock (USFWS 2007). This RNA summarized all the recovery and conservation actions initiated and/or completed to date, and identified six actions that will be needed for recovery and delisting to occur. These include: (1) establishing a technical working group to provide guidance on identifying and prioritizing remaining recovery actions; (2) developing recovery task implementation agreements with the U.S. Forest Service and Bureau for the control of non-native invasive plant species; (3) developing and implementing a range-wide (population and habitat) monitoring strategy; (4) identifying and implementing site-specific fence construction; (5) developing and implementing studies to assess general life history and ecological needs, and genetic studies; and (6) developing, if possible, a population viability analysis for Macfarlane's Four-O'clock.

2.5.1.9 Critical Habitat

Critical habitat has not been designated for MacFarlane's four-o'clock; therefore no critical habitat will be affected by this action. We will not address MacFarlane's four-o'clock critical habitat further in this Opinion.

2.5.2 Environmental Baseline of the Action Area

This section assesses the effects of past and ongoing human and natural factors that have led to the current status of the species, its habitat and ecosystem in the action area. Also included in the environmental baseline are the anticipated impacts of all proposed Federal projects in the action area that have already undergone section 7 consultations, and the impacts of state and private actions which are contemporaneous with this consultation.

2.5.2.1 Status of MacFarlane's Four-O'clock in the Action Area

There are six EOs on Federal land managed by the CFO as shown in Table 9. These EOs are Skookumchuck, Long Gulch, Horseshoe Bend, Lucille Caves, Rhett Creek, and Box Canyon.

The Service's Recovery Needs Assessment (USFWS 2007, p. 5) and Johnson (2009, pers. comm.) determined the probability of persistence for each of the EOs: (1) Skookumchuck – overall poor site quality with few MacFarlane's four-o'clock plants present; (2) Long Gulch – large population, ecological conditions described as poor to good; (3) Horseshoe Bend – small population threatened by weed infestations; (4) Lucile Caves – small transplant population protected by fencing; (5) Rhett Creek – vigor appears strong, but poor to fair overall site quality; and (6) Box Canyon – small sized subpopulation with weed infestations.

2.5.2.2 Factors Affecting MacFarlane's Four-O'clock in the Action Area

As shown in Table 17, factors affecting MacFarlane's four-o'clock in the action area include: weeds, insect predation, fire, roads, small population size, private land ownership, trampling, grazing, herbicide use, and mining.

The Bureau has implemented conservation actions to benefit MacFarlane's four-o'clock. These action include monitoring the EOs, installing exclusion fences, developing Habitat Management Plans, using mechanical weed treatments along highway right-of-ways to prevent herbicide drift, and conducting herbicide application to control invasive species in a few EOs (Table 17).

Table 17. MacFarlane's four-o'clock Element Occurrences on CFO managed lands. Adapted from the Appendix A of the draft 5-year Status Review (USFWS 2008, p. 54)

Element Occurrence	Threats Identified	Conservation Actions	Location (River Canyon)
Skookumchuck EO#1	- weedy with *Bromus tectorum* - insect predation - site burned 1990, facilitating non-native weed invasion - new road projects, population is within highway fence boundary - small population size: several genets with 100 ramets	- occurrence monitored by BLM - some fencing to exclude cattle - BLM developed Habitat Management Plan (HMP) for population - BLM conducts mechanical vegetation treatments along Highway 95 right-of-way to prevent herbicide drift.	Salmon
Long Gulch / John Day Creek EO#2	- non-native weeds and likely possibility of more frequent, larger and hotter fires - very weedy: *Bromus tectorum*, *Centaurea solistialis*, and many other non-native plants - portion of population on private[6] land - site partially burned in 1990, facilitating non-native weed invasion - trampling, grazing, - herbicide use; also on private property adjacent to Long Gulch exclosure	- occurrence monitored by BLM - BLM has attempted a land exchange with private landowner for parcels with the species - exclosure fence - BLM developed HMP for population	Salmon
Horseshoe Bend EO#3	- area possibly grazed in the past and currently leased for livestock grazing. - small population size: 8-10 genets - non-native plants are present	- permanent monitoring transect established by BLM	Salmon
Lucile Caves RNA/ACEC EO#7	- small, transplant population: no consensus about long-term success to date - EO burned in 1999 and a fire line was constructed through occupied habitat. No MIMA plants were impacted	- within Lucile Caves RNA/ACEC - protected by fence (15 acres) - population monitoring by BLM annually	Salmon
Rhett Creek EO#8	- site very degraded due to non-native weeds	- monitored by BLM	Salmon

[6] Occurrence of the species on private lands may be considered a threat as listed threatened plants have no take prohibitions under the Endangered Species Act and currently no conservation agreements or easements are in place with landowners to ensure the species protection. Additionally, grazing by domestic livestock and the use of herbicides are known to occur on private lands.

Element Occurrence	Threats Identified	Conservation Actions	Location (River Canyon)
	- native ungulate and livestock use of the area - small population size: 160 genets in 2 subpopulations		
Box Canyon EO#9	- non-native weeds	- monitored by BLM	Salmon

2.5.3 Effects of the Proposed Action

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

2.5.3.1 Direct and Indirect Effects of the Proposed Action on MacFarlane's Four-o'clock

The Program proposes to use herbicides, manual control methods, and biological control methods for controlling weedy vegetation within and adjacent to populations of MacFarlane's four-o'clock. Mechanical noxious weed control (used for site rehabilitation) will not occur within MacFarlane's four-o'clock populations, but may occur in adjacent areas as described below. Total acres treated within the perimeter of MacFarlane's four-o'clock subpopulations is expected to range between 1 to 35 acres; and adjacent areas within 300 feet of a population perimeter are expected to be less than 40 acres annually. Treatments within the perimeter of populations will primarily consist of spot treatments with backpack sprayers. Annually the Bureau may aerially spray herbicides on up to 10 acres within 300 to 600 feet from four-o'clock populations (Johnson 2012, pers. comm.). All herbicide treatments will be in accord with Program BMPs (Appendix A of this Opinion) including the buffers, wind speed, and herbicide restrictions shown in Table 18. Prior to any treatments, surveys will be conducted to mark MacFarlane's four-o'clock plants or population perimeters, and as needed flagging or pin flags may be used in sensitive areas. All noxious weed control activities will be administered and/or supervised by a Bureau ecologist, botanist, biologist, or other qualified personnel. Noxious weed control actions will result in long term benefits to MacFarlane's four-o'clock populations.

Table 18. Buffers, maximum wind speed, application methods, and herbicide restriction associated with listed plant populations.

Listed Plants	Distance from listed plant populations (buffer)	Average Maximum Wind Speed	Herbicide Application Method for Noxious Weed Control
Mirabilis macfarlanei 1/ Silene spaldingii 1/	Within 0 – 2+ feet of a listed plant.	N/A	Hand control measures for control of target species (i.e., pulling weeds, grubbing).
	2 – 25+ feet from a listed plant.	5 mph	Ground based selective spot spraying of target species with non-residual herbicide. Backpack or handpump applicator with stream or narrow cone nozzle setting as well as wicking and wiping applicators.
	< 25 feet from a listed plant.	N/A	No use of picloram authorized.
	>50 feet from a listed plant	8 mph	All ground application methods.
	> 300 feet from outer perimeter of population	5 mph	Aerial based spraying allowed.

2.5.3.1.1 Chemical Treatments

Two of the most serious threats to MacFarlane's four-o'clock includes encroachment on populations by noxious weeds and accidental herbicide spraying. Herbicide spraying of noxious weeds will control and/or curtail additional weed infestations which compete with MacFarlane's four-o'clock.

Effects to MacFarlane's four-o'clock plants

The main adverse effect to MacFarlane's four-o'clock from Program implementation is accidental exposure to herbicides from either direct spraying or herbicide drift. Such exposure may injure or kill MacFarlane's four-o'clock plants. Adhering to the BMPs and buffer, wind speed, and herbicide restrictions shown in Table 18 will reduce but not eliminate the risk of accidental exposure. In addition no herbicide spraying will occur prior to plant surveys being conducted to determine if MacFarlane's four-o'clock is present in the treatment area.

Specific measures to reduce the risk to MacFarlane's four-o'clock from accidental herbicide exposure include the following:

- Within 25 feet of MacFarlane's four-o'clock plants, the use of Tordon (active ingredient picloram), a "long lived" persistent herbicide will not be authorized. Only foliar-contact herbicides will be used. This will reduce risks associated with residual herbicides that persist in the soil and continue to affect newly emerging plants or sprouting perennial shoots (residual pre-emergence herbicide effects).
- Manual weed control will be used in areas less than 2 feet from MacFarlane's four-o'clock plants.
- The only herbicide application method authorized within 2 to 25 feet or more from an individual MacFarlane's four-o'clock plant would be a wick or wipe applicator, backpack sprayer, or hand-pump sprayer. Backpack and hand-pump sprayers must have a stream

or small cone spray nozzle for a smaller application width and a more coarse application droplet size. Using manual weed control (i.e. pulling, grubbing, and cutting) and selective weed spraying with backpack or hand-pump sprayers will reduce weed infestations within populations of MacFarlane's four-o'clock.

- Control of noxious weeds adjacent to MacFarlane's four-o'clock populations will also reduce the risk of weeds encroaching into catchfly populations. Chemical control of weeds on areas which provide potential habitat for MacFarlane's four-o'clock will reduce weeds that compete with native vegetation. Conducting plant surveys prior to applications will reduce the risk for accidental spraying of unknown populations.
- For aerial herbicide applications within 300 to 600 feet of MacFarlane's four-o'clock populations, the Bureau will mark the 300 foot buffer as needed (i.e., if there is not a distinct geographic or topographic feature present delineating a population buffer)..

Effects to Watershed Ecological Condition (Habitat Quality)

Chemical control of noxious weeds will reduce competition and benefit native species and habitat quality. Ground based spraying is more selective than aerial spraying and will have insignificant effects on non-target species, with the exception of the significant effects from accidental spraying of MacFarlane's four-o'clock as identified above. Aerial spraying is not as selective and non-target species that occur with noxious weeds will be adversely affected (e.g., forbs, shrubs). Beneficial effects will result from control of noxious weeds which may encroach on occupied and potential habitat for MacFarlane's four-o'clock. Chemical control of noxious weeds may be used in conjunction with manual and biological control.

Effects to Pollinators

Chemical control of noxious weeds is expected to have insignificant direct effects on pollinators of MacFarlane's four-o'clock (e.g., bumblebees (*Bombus* spp.)) and will indirectly benefit MacFarlane's four-o'clock by reducing competition for a limited number of pollinators. Competition between MacFarlane's four-o'clock and noxious weeds such as yellow starthistle for a limited number of pollinators has the potential to adversely affect both fecundity (i.e., total seed production) and individual plant vigor in some MacFarlane's four-o'clock populations. Control of noxious weeds can reduce this competition for pollinators and at the same time help maintain the diverse high quality habitat critical for both MacFarlane's four-o'clock and its pollinators.

2.5.3.1.2 Manual Control

Effects to MacFarlane's four-o'clock plants

Manual control of noxious weeds within MacFarlane's four-o'clock populations will reduce threats from noxious weeds. Manual control activities will have no or insignificant effects on non-target species such as MacFarlane's four-o'clock. The risk of accidentally trampling MacFarlane's four-o'clock plants and soil/vegetation disturbance during manual control treatments is considered discountable. When used in proximity to listed plants, manual control of noxious weeds will result in beneficial effects to MacFarlane's four-o'clock populations.

Effects to Watershed Ecological Condition (Habitat Quality)

Manual noxious weed control will allow for more species specific weed control when herbicide risks are a concern and will benefit native species and habitat quality. Manual noxious weed control will provide beneficial effects to occupied and potential habitat for MacFarlane's four-o'clock.

Effects to Pollinators

Manual control of noxious weeds is expected to have insignificant to no effect on pollinators (e.g., bumblebees (*Bombus spp.*)). This is primarily because of the small acreage of land treated. Manual control measures will target individual plants, scattered plants in localized areas, or small patches of plants. This will reduce competition between MacFarlane's four-o'clock and noxious weeds for a limited number of pollinators. Maintaining high-quality habitat for MacFarlane's four-o'clock (not just protecting individual plants) consisting of diverse plant communities is critical for attracting pollinators.

2.5.3.1.3 Mechanical Control including Rehabilitation, Seedings, and Plantings

Effects to MacFarlane's four-o'clock Plants

No rehabilitation actions are proposed within MacFarlane's four-o'clock populations. Any actions which reduce noxious weed encroachment into potential habitat for listed plants are beneficial.

Effects to Watershed Ecological Condition (Habitat Quality)

Actions to reduce noxious weed infestations will benefit native species and habitat quality for MacFarlane's four-o'clock. No ground disturbing rehabilitation actions are proposed to occur within any MacFarlane's four-o'clock populations.

Effects to Pollinators

Rehabilitation of small localized areas is expected to have insignificant to no effect on pollinators (e.g., bumblebees - *Bombus* spp.), primarily, because of the small amounts of acreage treated. No ground disturbing rehabilitation actions are proposed to occur within populations of MacFarlane's four-o'clock.

2.5.3.1.4 Biological Control

Effects to MacFarlane's four-o'clock Plants

Biological control of noxious weeds within MacFarlane's four-o'clock populations will reduce threats from noxious weeds. Biological control activities have no or insignificant effects on non-target species. Biological control of noxious weeds has very low risk to non-target plant species. Biological control of noxious weeds will result in beneficial effects for MacFarlane's four-o'clock populations and also benefit potential habitat for the plants.

Effects to Watershed Ecological Condition (Habitat Quality)

Biological control of noxious weeds will allow for improved integrated weed control, which will benefit native species and habitat quality. Biological control will provide for improved noxious weed control for occupied and potential habitat for MacFarlane's four-o'clock. Biological control of noxious weeds is often used in conjunction with chemical and manual control activities except near biological control insect nursery sites.

Effects to Pollinators

Biological control of noxious weeds is expected to have insignificant effects on pollinators for MacFarlane's four-o'clock. This is primarily because it will not result in complete control of host species. Biological control insects are normally released in areas that have large numbers of the host plants (e.g., invasive plants and noxious weeds). However, biological control insects may target individual plants, scattered plants in localized areas, or patches of plants. This will reduce competition with other species for a limited number of pollinators. Maintaining high-quality habitat for MacFarlane's four-o'clock (not just protecting individual plants) which consists of diverse plant communities is critical for attracting pollinators.

2.5.3.2 Effects of Interrelated or Interdependent Actions on MacFarlane's Four-o'clock

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

2.5.4 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.

Future State, Tribal, local, or private actions that are reasonably certain to occur in the action area include livestock grazing, timber harvest, , road construction, road and other facilities maintenance, recreation, prescribed fire, emergency fire rehabilitation, and noxious weed control

Ongoing noxious weed control using herbicide application and other vegetation treatments has the potential to impact MacFarlane's four-o'clock in the action area. Private land owners, State of Idaho, Counties, Idaho Transportation Department, and Nez Perce Tribe have in the past and will continue to conduct active spray programs for controlling noxious weeds. In addition, the Idaho Department of Fish and Game uses herbicides to treat weeds in wildlife management areas. The full scope of noxious weed control programs is not known.

An additional cumulative effect to MacFarlane's four-o'clock is global climate change. Warwell et al. (2010, p. 179) predict that a warming climate will result in the niche for this species rising approximately 466 feet higher in canyons currently supporting the species by the decade of 2060 (i.e., the Snake, Imnaha, and Lower Salmon Rivers). By the end of the century, the climatic niche for the species will disappear in these canyons, but reappear in the Snake River basin in southern Idaho. Suitable areas for the species, based on climate, will increase in other parts of the West through the end of the century.

2.5.5 Conclusion

The Service has reviewed the current status of MacFarlane's four-o'clock, the environmental baseline in the action area, effects of the proposed action, and cumulative effects, and it is our conclusion that the proposed action is not likely to jeopardize the species continued existence.

While the Program may impact some individual plants in the actions area, the proposed action will not significantly reduce reproduction, numbers, or distribution of the species in the action area, and is therefore not likely to cause any reduction in the likelihood of both the survival and recovery of the species rangewide.

2.5.6 Incidental Take Statement

Because the take prohibitions detailed under section 9(a)(1) of the Act do not apply to listed plants, those sections of the Act dealing with incidental take, Sections 7(b)(4) and 7(0)(2), generally do not apply to listed plants either. Therefore we are not including an Incidental Take Statement for MacFarlane's four-o'clock in this Opinion.

However, section 9(a)(2) of the Act prohibits the removal and reduction to possession or the malicious damage of Federally listed endangered plants on areas under federal jurisdiction, or the destruction of endangered plants on non-Federal areas in violation of State law or regulations or in the course of any violation of a State criminal trespass law. Generally, under 50 CFR 17.71, the prohibitions pertaining to endangered plants apply to threatened plants as well.

2.5.7 Conservation Recommendations

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

1. Identify and implement site-specific fence construction for the protection of MacFarlane's four-o'clock populations.
2. Participate in implementing a range-wide (population and habitat) monitoring strategy.
3. Participate in developing and implementing studies to assess general life history, ecological needs, and genetic studies.
4. Participate in surveys within suitable habitats, and map new populations as found.
5. Participate in research essential to species recovery. Cooperate in determining specific limiting factors in terms of habitat needs and characteristics.
6. Work with other agencies to compile a general list of BMPs that would apply to all programs, to the extent that such a list would assist with consultation and species recovery. The intent of implementing BMPs is to avoid/minimize negative effects.
7. Promote restoration of suitable habitat following fire, fire rehabilitation, restoration treatments, or other major disturbances.
8. Ensure that fire suppression efforts will be conducted, as possible, to protect MacFarlane's four-o'clock habitat. Place a high priority on protecting suitable habitat.
9. Utilize available funding resources to plan and implement noxious weed control treatments to benefit MacFarlane's four-o'clock.

2.6 Reinitiation Notice

This concludes formal consultation on the Program. As provided in 50 CFR §402.16, reinitiation of formal consultation is required where discretionary Federal agency involvement or control over the action has been maintained (or is authorized by law) and if:

1. The amount or extent of incidental take is exceeded.
2. New information reveals effects of the agency action that may affect listed species or critical habitat in a manner or to an extent not considered in this Opinion.
3. The agency action is subsequently modified in a manner that causes an effect to the listed species or critical habitat that was not considered in this Opinion.
4. A new species is listed or critical habitat designated that may be affected by the action. In instances where the amount or extent of incidental take is exceeded, any operations causing such take must cease pending reinitiation.

3. LITERATURE CITED

3.1 Published Literature

3.1.1 Background, Informal Consultation, and Proposed Action

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3.1.2 Bull Trout

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3.3 Personal Communications

Johnson, C. 2012, pers. comm. Telephone conversation between Craig Johnson, Fisheries and Wildlife Biologist (U.S. Bureau of Land Management, Cottonwood, Idaho) and Clay Fletcher, Biologist (U.S. Fish and Wildlife Service, Boise, Idaho). Subject: Number of 4th Field HUCs in the Cottonwood Field Office Area with potential noxious weed treatments; and, the number of acres treated annually by aerial herbicide spraying adjacent to Spalding's catchfly and MacFarlane's four-o'clock populations.

4. APPENDICES

4.1 Appendix A
Standards and Project Criteria (BMPS)

A. General

1. The BLM will follow established guidelines and best management practices as stated in: (1) BLM Manual 9011, *Chemical Pest Control*; (2) BLM Manual Handbook H-9011-1; (3) Final EIS Programmatic Environmental Impact Statement, *Vegetation Treatments Using Herbicide on BLM Land in 17 Western States*, June 2007; and (4) and the product label.

2. The BLM will have a certified/licensed pesticide applicator overseeing all spray projects.

3. A spill cleanup kit will be available whenever pesticides (herbicides) are transported or stored.

4. A spill contingency plan will be developed prior to all herbicide applications. Individuals involved in herbicide handling or application will be instructed on the spill contingency plan and spill control, containment, and cleanup procedures.

5. Herbicide applications will only treat the minimum area necessary for the control of noxious weeds.

6. Prior to and during application, weather conditions will be monitored periodically (e.g., every one to two hours) by trained personnel at spray sites (i.e., wind speed, temperature, relative humidity). Additional weather monitoring would occur whenever a weather change may impact safe placement of the herbicide on the target area.

7. All pesticide labels will be followed and other guidance includes the following:

   a. Refer to Tables 1 and 2 for maximum wind speed restrictions by herbicide application method.

   b. Do not spray if precipitation is occurring or is imminent.

   c. Do not spray if air turbulence is sufficient to affect the normal spray pattern.

   d. Do not spray if snow or ice covers the target foliage.

   e. No carrier other than water will be used.

8. Within any 6th field HUC, no more than 500 acres of federal (BLM) herbicide application will occur annually.

9. No use of 2,4-D ester formulations will be authorized.

10. As needed spray dyes will be used to insure that accurate application of herbicides is applied to target weeds while avoiding or minimizing spraying of non-target vegetation. As needed spray dyes will also be used for monitoring of spray application in sensitive areas (e.g., RCAs, water bodies, special status plants, riparian vegetation, etc.).

11. Only selective spot treatment of aquatically approved formulations of glyphosate or imazapyr will be made within 15 feet of live waters. No live water (e.g. flowing ditches, streams, ponds, springs, etc.) will be directly sprayed with herbicides. Although, some limited drift may occur when spot spraying with aquatically approved formulations of herbicides.

B. Aquatic, Riparian, and Wetland Resources

1. Refer to Table 1 below for treatment buffers, maximum wind speed, application methods, and herbicide restrictions associated with aquatic habitats, riparian areas, and wetland areas. These criteria will be implemented when applying herbicides near aquatic resources.

2. Where practical, no helicopter service landings or fuel storage will occur within 300 feet of fish bearing streams and lakes, 150 feet of perennial streams, or 100 feet of intermittent streams, springs, seeps, wetlands, and ponds. In some instances it is not possible to logistically locate a service landing which meets the above criteria, consequently, a location which is the furthest from a water course will be used.

3. Helicopter spray projects will have a fuel transportation, storage, and spill plan developed to reduce risks associated with helicopter fuels.

4. A pre-project evaluation of riparian and livewater buffers will be made by a Fisheries Biologist and District Weed coordinator to determine where special monitoring (i.e., test cards, dye) for helicopter spraying may be needed to ensure that buffers are adequate for protection of riparian areas and live waters. Upon evaluation, buffer distance may be increased if special conditions such as topography, steep slopes, fish habitat, riparian and wetland areas, and risk analysis warrant an increase in buffer width.

5. Sampling of aerial spray projects may be accomplished through the use of spray cards, dye or other type of indicator. The purpose of this monitoring will be to validate buffer effectiveness for riparian areas and water edges. Findings from these indicators will be included with the annual monitoring results.

6. Non-target plant mortality in riparian areas will be monitored to determine if mortality of non-target plants is affecting riparian functions.

7. Helicopter spraying of steep sloped sites will not be authorized if wind direction and/or steep slopes may potentially result in drift of herbicides that could reach non-target riparian areas.

8. Aerial application equipment will be designed to deliver a median droplet diameter of 300 to 800 microns. This droplet size is large enough to avoid excessive drift while providing adequate coverage of target vegetation.

9. Equipment used for transportation, storage, or application of chemicals shall be maintained in a leakproof condition.

10. No herbicide mixing will be authorized within 100 feet of any live waters. Mixing and loading operations must take place in an area where an accidental spill would not contaminate a stream or body of water before it could be contained.

11. No spraying of picloram will be authorized within 100 feet of any live waters or shallow water tables. Avoid application of picloram within dry ephemeral stream channels and dry roadside ditches that drain directly into fish bearing streams.

12. No more than 0.375 pound of ai per acre of picloram will be applied in any given year to reduce the potential for cumulative picloram accumulation in the soil.

13. Only aquatic approved surfactants will be authorized for use within 15 feet of live waters or areas with shallow water tables.

14. Only ground based spot/selective applications of herbicides rated as having a low level of concern for aquatic species will be authorized from 15 to 100 feet from live waters or within riparian areas (which ever is greater). Authorized spray equipment will include pick-up and 4-wheeler mounted spray rigs (hand spot-gun only), backpack sprayer, handpump sprayer, hand-spreading granular formulations, and wicking (e.g., also includes wiping, dipping, painting, or injecting target species).

15. Only the quantity of herbicides needed for the days operation will be transported from the storage area.

16. Manual control (e.g., hand pulling, grubbing, cutting, etc.) is authorized in all areas, and may be used in sensitive areas to avoid adverse effects to non-target species or water quality from herbicides.

Table 19. Buffers, maximum wind speed, application methods, and herbicide restriction associated with aquatic habitats, riparian areas, and wetland resources.

Buffer	Maximum Wind Speed	Herbicide Application Method	Herbicides Authorized (Aquatic Level of Concern)
<15 feet from live water or shallow water tables	5 mph	backpack sprayer, , hand-pump sprayer, wicking, wiping dipping, painting, and injecting selective spraying/treatment of target species only (e.g., spot treatment of individual plants)	aquatic approved herbicides and surfactants only
15-100 feet from live waters or shallow water tables; or within riparian areas	8 mph	ground/spot spraying (no broadcast boom spraying), wicking, wiping, dipping, painting, injecting selective spraying of target species only (e.g., spot treatment of individual plants)	low
0 - 100 feet from live waters or shallow water tables	n/a	No application of picloram will be authorized	n/a
>100 feet from live waters and areas outside riparian areas	n/a	wicking, dipping, painting, and injecting	low and moderate
>100 feet and areas outside riparian areas	8 mph	all ground/broadcast spraying	low and moderate
>150 feet from ponds, lakes, springs, wetlands	5 mph	aerial	low and moderate
>100 feet from intermittent streams – dry channel (non-fish-bearing)	5 mph	aerial	low and moderate
>200 feet from intermittent streams – wet channel (non-fish-bearing)	5 mph	aerial	low and moderate
>200 feet from perennial streams (non-fish bearing)	5 mph	aerial	low and moderate
>300 feet from fish bearing streams	5 mph	aerial	low and moderate

C. Lynx, Northern Idaho Ground Squirrel, Wolverine, and Yellow Billed Cuckoo

Lynx – Threatened

1. No noxious weed control actions will be authorized within one mile of any known occupied critical habitat component (i.e., den). Invasive plant treatment areas primarily occur in low elevation canyon grassland areas which do not provide potential lynx habitat and often do not occur in Lynx Analysis Units (LAUs).

2. No land treatments would be authorized which would adversely affect key prey species for lynx (i.e., snowshoe hares) in the long term.

3. No actions will be authorized which would contribute to a factor affecting mortality for lynx (i.e., "take").

4. No noxious weed control actions will compromise or exceed standards and guidelines identified in the *Canada Lynx Conservation Assessment and Strategy* (LCAS) (Ruediger et al. 2000, entire). All noxious weed control activities will be designed to be consistent with LCAS.

Northern Idaho Ground Squirrel – Threatened

1. Project-level inventories would be completed in suitable habitat during project planning if inventory information is not available or adequate.

2. Avoid activities which would disturb or displace squirrels in areas with known populations during the above-ground activity season (late February to early October).

3. No actions will be authorized which would contribute to a factor affecting mortality for the species (i.e., "take"). Apply appropriate spatial or temporal buffers to avoid species' exposure to harmful chemicals.

Yellow-Billed Cuckoo - Candidate Species

1. Project-level inventories would be completed in suitable habitat during project planning if inventory information is not available or adequate.

2. Avoid implementing activities that have the potential to disturb or displace known populations of cuckoos during the breeding season (May through September).

3. Adhere to Standards and Project Criteria identified above in Section B, <u>Aquatic, Riparian, and Wetland Resources</u>; to avoid or minimize the potential for adverse effects to suitable habitats for yellow-billed cuckoo.

Wolverine – Candidate Species

1. Project-level inventories would be completed in suitable habitat during project planning if inventory information is not available or adequate.

2. Apply appropriate spatial or temporal buffers to avoid disturbing den sites.

3. No actions will be authorized which would contribute to a factor affecting mortality for the species (i.e., "take"). Apply appropriate spatial or temporal buffers to avoid species' exposure to harmful chemicals.

D. <u>Listed Plants</u>

1. No land treatments will be authorized prior to completion of a special status plant survey

which will be conducted during phenology periods which will facilitate identification (i.e., flowering or mature plants). These surveys will only be conducted by qualified personnel.

2. Refer to Table 2 for a summary of herbicide applications that will be used when herbicide application is located in close proximity to listed plant populations.

3. If herbicide applications are proposed to occur within 0.25 mile of listed plants, all individuals involved with spraying activity will be briefed concerning the "no-spray" buffers and given maps of the listed plant populations.

4. When herbicide application is conducted within the perimeter of a listed plant population; the Area Ecologist or Botanist will determine needed training/qualifications for applicators and plant or area marking criteria.

5. If aerial application of herbicides is proposed to occur within 300 - 600 feet of a listed plant population the outer boundary of the 300 foot buffer will be marked as needed. As needed, test spray cards will be placed at the boundary of the plant populations, at a distance of 150 feet from population perimeter, and at 300 feet from perimeters.

6. Cooperators and partners that are involved in the Weed Management Area efforts will be informed about Federally listed or known BLM sensitive plant populations which occur in treatment areas. County Weed Coordinators and private land-owners that have populations of listed plants will be coordinated with to inform them about locations of plant populations and practices that can be used to avoid adverse spraying effects. The USFWS and NMFS will be the responsible agencies for the coordination and development of conservation strategies with non-federal landowners for listed species.

7. All weed control activities occurring within or adjacent to a listed plant population will be supervised by a qualified BLM employee (within 300 feet for ground application; and 600 feet for aerially application).

8. The USFWS will be notified prior to any aerial herbicide applications occurring within 0.5 mile of Federally listed plant populations. USFWS Notification will take place at least two weeks prior to aerial application taking place by BLM ecologist, botanist, or biologist.

Table 20. Buffers, maximum wind speed, application methods, and herbicide restriction associated with listed plant populations.

Listed Plants	Distance from listed plant populations (buffer)	Average Maximum Wind Speed	Herbicide Application Method for Noxious Weed Control
Mirabilis macfarlanei 1/ Silene spaldingii 1/	Within 0 – 2+ feet of a listed plant.	N/A	Hand control measures for control of target species (i.e., pulling weeds, grubbing).
	2 – 25+ feet from a listed plant.	5 mph	Ground based selective spot spraying of target species with non-residual herbicide. Packpack or handpump applicator with stream or narrow cone nozzle setting as well as wicking and wiping applicators.
	< 25 feet from a listed plant.	N/A	No use of picloram authorized.
	>50 feet from a listed plant	8 mph	All ground application methods.
	> 300 feet from outer perimeter of population	5 mph	Aerial based spraying allowed.

1/ Listed plant populations known to occur on public lands within the Cottonwood Field Office area proposed for invasive vegetation control actions.

E. BLM Sensitive and Candidate (Whitebark Pine) Plants

1. No land treatments will be authorized prior to completion of a special status plant survey which will be conducted during key phenology periods which will facilitate identification (i.e. flowering or mature plants). These surveys will only be conducted by qualified personnel.

2. All land treatments and other soil/vegetation disturbing projects will be designed to avoid or minimize adverse effects to candidate and BLM sensitive species.

3. No BLM authorized land treatments will take place that will lead to a trend toward federal listing or cause a loss of viability to the population or species.

II. PROGRAM EVALUATION, MONITORING, AND REPORTING

Project proposals will be prepared and submitted by February 15 for review by BLM Biologists. Project proposals will be reviewed for compliance with the identified standards and project criteria. Special mitigation requirements and sensitive areas will be identified for each project (e.g. riparian areas, special status plants, plant survey needs, etc.).

Noxious weed control activities involving herbicides will include: (1) pesticide use proposal; (2) pesticide application record; and (3) any completed noxious weed post treatment evaluation. Prior to any herbicide use in new treatment areas, a proposal will be prepared which will include a topographic map (1:24,000 scale or larger) of the treatment area. Other noxious weed control actions and land treatments (i.e. manual, mechanical, biological, and rehabilitation actions) will also have a project proposal prepared that will identify: methods, objectives of treatment, location, map of treatment area, acreage, proposed dates for project to be started and completed, sensitive areas, and special mitigation. Post evaluation of treatments will not be conducted on all areas, but will include representative monitoring of treatments and as needed evaluations of sensitive areas.

Annually, a project summary of treatments will be prepared for treatments that took place during the past year. The summary report will primarily consist of a table summarizing treatments that occurred within 6th field HUCs. The table will summarize the following: herbicide treatment acres; application methods; herbicides used; mechanical/manual treatments; herbicide treatments within 100 feet of fish bearing waters, perennial and intermittent non-fish bearing streams, and ponds/wetlands/springs; and biological releases. A final report summarizing past year weed control activities will be submitted to NMFS and USFWS prior to starting next year weed control activities.

4.2 Appendix B

Potential Sulfometuron Methyl use On Bureau of Land Management Lands in the Cottonwood Field Office

Currently sulfometuron methyl is not approved for use on Bureau of Land Management lands in Idaho. Should the product become approved for use in Idaho, such use must be in compliance with the product label. A review of the current label for Oust® XP from DuPont shows the following situations where the herbicide may be a tool used to achieve management objectives for weed control by BLM Cottonwood Field Office in Idaho.

Forestry:

The product may be used to control broadleaf weeds and grasses in forestry sites via ground based application or aerial application by helicopter. The product may be impregnated on fertilizer and applied by ground equipment or by air with either helicopter or fixed-wing aircraft. The use rate for this application is 2 to 4 oz. per acre prior to transplanting conifers.

Non-Crop Sites:

The product is recommended for general weed control on fence rows, along highways, railroad and utility rights-of-ways, fuel storage areas, barrier strips, and industrial sites. Application rates depend on weed to be controlled and range from 0.75 to 3.0 oz. per acre.

Under Asphalt and Concrete Pavement:

The product is recommended to control weeds under asphalt and concrete pavement such as parking lots, highway shoulders, median strips, roadways and other industrial sites. In this case the product would be applied immediately before paving at the rate of 4 to 8 oz. per acre. This may occur during development of recreation facilities and campgrounds.

Industrial Turfgrass:

The product is recommended to control weeds on industrial turfgrass, on roadsides, or other noncrop sites where the turfgrass is well established as a ground cover. The use rate for this application is one ounce for Smooth Brome and Crested Wheatgrass which would likely be the turfgrass treated in the Cottonwood Field Office.

***Prepared by Lynn Danly on 1/26/2012 in response to questions from the US Fish and Wildlife Service in relation to potential use of sulfometuron methyl on public lands.**

4.3 Appendix C

Worksheet for Assessing Levels of Concern Associated with Herbicide Applications for Aquatic Species

Methodology for Determining Level of Concern	Example using 2,4-D
Maximum application rate (known constant based on label rates)	3 lb ai/ac (pounds active ingredient per acre)
EEC - Estimated Environmental Concentration (from Urban and Cook [1986] table based on direct application to a pond 1 acre-foot in volume) measured in ppb (parts per billion), and converted to ppm (parts per million)	at 3 lb ai/ac, in 1 acre-foot water, the EEC = 1103 ppb or 1.103 ppm
Toxicity - the 96 hour LC50 (a standard test) for a specific aquatic species. The LC50 is the concentration of a toxicant that causes mortality in 50% of the test organisms under a specific set of conditions.	LC50 = 250 mg/L (milligrams per liter), or = 250 ppm (testing conducted with rainbow trout)
Safety Factor - A divisor applied to the toxicity value to establish a concentration below which risk is acceptable (as determined by EPA). For endangered aquatic species, EPA uses 1/20 of the LC50 value.	1/20 of the LC50 = 12.5 ppm (250 ppm x 1/20 = 12.5 ppm)
The EPA has determined that there is a presumption of unacceptable risk to endangered aquatic species if the EEC > 1/20 LC50. Conversely, if the EEC < 1/20 LC50, the application rate used to calculate the EEC should not result in an unacceptable risk to endangered aquatic species.	For the 2,4-D amine, where: EEC = 1.103 ppm at 3 lb ai/ac maximum application rate 1/20 the LC50 = 12.5 ppm EEC is < 1/20 of the LC50
Because of some of the concerns associated with this level of concern (risk) analysis (see Table 4 in the text) and because the EPA does not define a magnitude of risk of endangered species, especially when the EEC < 1/20 LC50, a gradual "level of concern" scale was developed based on how close the EEC value is to the 1/20 LC50. The 1/20 LC50 value is divided by the EEC value and the quotient represents the level of concern for a given herbicide. The level of concern scale is as follows: If the 1/20 LC50) EEC is a quotient of >10, the level of concern is low. If the 1/20 LC50) EEC is a quotient of >1 but <10, the level of concern is moderate. If the 1/20 LC50) EEC is a quotient of <1, the level of concern is high.	For 2,4-D amine: 1/20 the LC50 = 12.5 ppm EEC = 1.103 ppm 12.5 ppm)1.103 ppm = 11 Since the quotient is >10, the level of concern is low.

The level of concern (risk) analysis is based on direct application of the active ingredient of a chemical product to a 1 acre-foot pond. This illustrates an extreme case, only remotely likely to occur during implementation of the proposed action. The risk of a direct application is mitigated in the proposed action by selecting appropriate application techniques (hand application vs. aerial spray) and applying buffers adjacent to water, taking into account such factors as chemical volatility, wind speed and direction, temperature, precipitation, and ground slope. While chemical application may occur in association with ponds and lakes, further mitigation of the assessed level of concern (risk) may be realized when treating noxious weeds in association with the numerous rivers and streams within the proposed action area.