BLM

United States Department of the Interior
Bureau of Land Management

Biological Assessment
for the
Twin Falls District Noxious Weed and
Invasive Plant Treatment Environmental Assessment

DOI-BLM-ID-T000-2012-0001-EA

ESA-Listed Fish
Columbia River bull trout (*Salvelinus confluentus*)
Jarbidge River Core Area of the Upper Snake River Recovery Unit

ESA-Listed Aquatic Invertebrates
Bruneau hot springsnail *(Pyrgulopsis bruneauensis*)
Snake River physa (*Physa natricina*)
Bliss Rapids snail (*Taylorconcha serpenticola*)
Banbury Springs lanx (*Lanx* sp.)

ESA-Listed Wildlife
Yellow-billed cuckoo (*Coccyzus americanus occidentalis*)
Canada lynx (*Lynx canadensis*)

ESA-Proposed Wildlife
Wolverine (*Gulo gulo luscus*)

ESA-Listed Plants
Slickspot peppergrass (*Lepidium papilliferum*)

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LIST OF ACRONYMS

ACEC	Area of Critical Environmental Concern
APHIS	Animal and Plant Health Inspection Service
ARMPA	Approved Resource Management Plan Amendment
ATV	All-Terrain Vehicle
AUM	Animal Unit Month
BA	Biological Assessment
BFO	Burley Field Office
BLM	Bureau of Land Management
BOR	Bureau of Reclaimation
CFR	Code of Federal Regulations
CWMA	Cooperative Weed Management Area
DNA	Determination of NEPA Adequacy
DPS	Distinct Population Segment
DR	Decision Record
EA	Environmental Assessment
EIS	Environmental Impact Statement
EOs	Element Occurrences
EPA	Environmental Protection Agency
ERA	Ecological Risk Assessment
ESA	Endangered Species Act
ESR	Emergency Stabilization and Rehabilitation
FIAT	Fire and Invasives Assessment Tool
GA	Geographic Area
GHMA	General Habitat Management Area(s)
GPS	Geographic Positioning System
GRSG	Greater Sage-Grouse
HAF	Habitat Assessment Framework

HIP	Habitat Integrity and Population Monitoring
HMA	Herd Management Area
HUC	Hydrologic Unit Code
IDEQ	Idaho Department of Environmental Quality
IDFG	Idaho Department of Fish and Game
IDL	Idaho Department of Lands
IHMA	Important Habitat Management Area(s)
IM	Instruction Memorandum
INFISH	Inland Native Fish Strategy
ISDA	Idaho State Department of Agriculture
JFO	Jarbidge Field Office
LAU	Lynx Analysis Unit
LCAS	Lynx Conservation Assessment and Strategy
MFP	Management Framework Plan
MP	Management Plan
MRA	Minimum Requirement Analysis
MSDS	Material Safety Data Sheet
NEPA	National Environmental Policy Act of 1969
NHT	National Historic Trail
OHMA	Other Habitat Management Area
OHV	Off-Highway Vehicle
OPLMA	Omnibus Public Land Management Act
PBFs	Physical and Biological Features
PEIS	Programmatic Environmental Impact Statement
PER	Programmatic Environmental Report
PHMA	Priority Habitat Management Area(s)
PIT	Passive Integrated Transponder
POEA	Polyoxyethyleneamine
PUP	Pesticide Use Proposals

RCA	Riparian Conservation Area
RM	River Mile
RMP	Resource Management Plan
ROD	Record of Decision
ROW	Right-of-Way
SFO	Shoshone Field Office
SOP	Standard Operating Procedure
TEP	Threatened, endangered, or proposed
TFD	Twin Falls District
USC	United States Code
USDA	United States Department of Agriculture
USDC	United States Department of Commerce
USDI	United States Department of the Interior
USFS	U.S. Forest Service
USFWS	U.S. Fish and Wildlife Service
USGS	U.S. Geological Survey
UTV	Utility-Terrain Vehicle
VRM	Visual Resource Management
WMA	Weed Management Area
WSA	Wilderness Study Area
WSRs	Wild and Scenic Rivers
WUI	Wildland Urban Interface

Chapter 1 - Introduction

Overview

The Bureau of Land Management (BLM) Twin Falls District (TFD) has prepared an Environmental Assessment (EA) for noxious weed and invasive plant treatment within the TFD boundaries (DOI-BLM-ID-T000-2012-0001-EA). The EA discloses the direct, indirect, and cumulative environmental effects that would result from management and treatment of noxious weeds and invasive plants on BLM lands as required by the National Environmental Policy Act (NEPA) of 1969 (42 United States Code [USC] 4321-4347), the Council on Environmental Quality Regulations for Implementing the Procedural Provisions of NEPA (40 Code of Federal Regulations [CFR] 1500-1508), and the BLM NEPA Handbook (H-1790-1).

The EA tiers to the 2007 *Final Vegetation Treatments Using Herbicides on Bureau of Land Management Lands in 17 Western States Programmatic Environmental Impact Statement* (2007 PEIS) (U.S. Department of the Interior [USDI] BLM, 2007b). The Record of Decision (ROD) was signed September 29, 2007. The 2007 PEIS was developed to guide the BLM's actions through its proposed treatment of vegetation, specifically noxious weeds and invasive plants, in 17 western states in the United States using 18 approved herbicide active ingredients. The EA also incorporates by reference the *Final Vegetation Treatments on Bureau of Land Management Lands in 17 Western States Programmatic Environmental Report* (PER) (USDI BLM, 2007c). The Vegetation Treatments PER describes the effects of other non-chemical vegetation treatments which includes prescribed fire, manual, mechanical, and biological treatment methods to control vegetation (USDI BLM, 2007c).

The EA also tiers to the 2016 *Final Vegetation Treatments Using Aminopyralid, Fluroxypyr, and Rimsulfuron on BLM Lands in 17 Western States PEIS* (2016 PEIS) (USDI BLM, 2016). The ROD for this PEIS was signed August 15, 2016. The 2016 PEIS ROD approves three new herbicides: *aminopyralid*, *fluroxypyr*, and *rimsulfuron*. These three new herbicides are integrated into the herbicide treatment activities that were assessed in the 2007 PEIS. The ROD for the 2016 PEIS increased the number of herbicide active ingredients available to the BLM from 18 to 21. The 2016 PEIS incorporates by reference the analyses completed in the 2007 PEIS for all other vegetation treatment activities.

The active ingredient *sulfometuron methyl* (OUST®) was approved for use in the ROD for the 2007 PEIS. Idaho BLM currently has a moratorium (Instruction Memorandum No. ID-2001-050) that disallows the use of this chemical on public lands. Therefore, use of s*ulfometuron methyl* is not included as part of the proposed action. In addition, herbicides containing *sulfometuron methyl* in combination with other active ingredients would not be used. Therefore, the number of active ingredients included in the proposed action is 20.

Additional information pertaining to the 2007 and 2016 PEISs and the tiering process can be found in the TFD Noxious Weed and Invasive Plant Treatment EA.

Noxious weeds are non-native plants with the potential to displace native vegetation at the watershed and local scale. A noxious weed is any plant designated by a federal, state, or county government to be injurious to public health, agriculture, recreation, wildlife, or any public or private property (Sheley & Petroff, 1999). Idaho currently has 67 different species of weeds that are designated noxious by state law. Appendix A lists noxious weeds currently known from the TFD.

According to Executive Order 13112, invasive plants are defined as non-native plants whose introduction cause or are likely to cause economic or environmental harm or harm to human health. Non-native invasive plants, such as cheatgrass (*Bromus tectorum*) and medusahead wildrye (*Taeniatherum caput-medusae*), have become dominant in portions of the TFD. This dominance has altered fire regimes and, in some cases, resulted in landscape-scale changes in vegetation composition and structure. For example, cheatgrass rapidly invades disturbed areas and acts as a hazardous fuel, increasing the fire frequency and intensity in sagebrush steppe ecosystems and other landscapes characteristic of south-central Idaho. Appendix A contains a list of non-native invasive plants known from the TFD.

Noxious weeds and their continued expansion have been recognized as the single greatest threat to the integrity of native plant communities (Asher, 1998). The rapid expansion of invasive plants across public lands continues to be a primary cause of ecosystem degradation, and control of these species is one of the greatest challenges in land management (USDI BLM, 2007c). Noxious weeds and invasive plants are aggressive and can out-compete native vegetation, especially following a disturbance. Left unchecked, noxious weeds and invasive plants can create monocultures that degrade or reduce soil productivity, water quality and quantity, species diversity and structure of native plant communities, wildlife habitat, wilderness values, recreational opportunities, and livestock forage, and are detrimental to agriculture and commerce of Idaho (USDI BLM, 2007b).

Noxious weeds pose a threat to the entire TFD. In addition, approximately 3.1 million acres, or about 80 percent of the TFD, have high potential to be dominated by invasive plants, particularly cheatgrass and medusahead wildrye. Although these invasive species occur throughout the district, they are most competitive at lower elevations, typically below 5,500 feet elevation (See Figure 1). Historical data show that the highest fire frequencies in the TFD occur below 5,500 feet elevation (See Figure 2).

Specific guidance regarding the BLM's responsibilities to conserve species that are classified as listed, proposed, and candidate species under the Endangered Species Act (ESA) of 1973, as amended, is provided in BLM Manual 6840 – Special Status Species Management. The BLM is required to follow these guidelines from the manual:

- The BLM shall conserve listed species and the ecosystems on which they depend and shall use existing authority in furtherance of the purposes of the ESA;
- Ensure that all actions authorized, funded, or carried out by the BLM are in compliance with the ESA;
- Cooperate with the U.S. Fish and Wildlife Service (USFWS or the Service) in planning and providing for the recovery of ESA-listed and proposed species.

This Biological Assessment (BA) evaluates the effects of noxious weed and invasive plant treatments on animals and plants listed or proposed for listing under the ESA. These effects are determined relative to current conditions for ESA-listed and proposed species. The proposed action contains conservation measures that were adapted from land use plans and the consultations for the the 2007 and 2016 PEISs (USDI BLM, 2007a; USDI BLM, 2015b). Additional conservation measures were developed during Level One Team discussions as part of the ESA Section 7 consultation process. The conservation measures are expected to provide long-term benefits and contribute to the recovery of listed species and conservation of proposed species and habitats. In addition to the conservation measures, the proposed action also includes design features, (see Chapter 2, *Design Features and Conservation Measures*), prevention measures (Appendix B), herbicide application criteria (Appendix D), and standard operating procedures (SOP; Appendix E) to reduce or eliminate potential adverse effects to special status species, including ESA-listed and proposed species. These are consistent with the management direction in BLM Manual 6840.

Relationship of the Proposed Action to Future Federal Actions

The TFD Noxious Weed and Invasive Plant Treatment EA contains a programmatic analysis of vegetation treatments that could occur singly or in combination to treat infestations of noxious weeds and invasive plants to promote land health. The proposed action consists of two planning levels.

1) **On-going Actions**: Manual, biological control, ground-based broadcast herbicide, and spot herbicide treatments of new and existing infestations of noxious weeds where immediate and continued actions are required would be implemented with no further NEPA analysis. Estimated annual acreages are identified for each treatment type (See Table 3 in the proposed action). These acreages are estimates based on past treatments, current noxious weed inventories, and anticipated future needs to control or contain noxious weed populations. Actual treatment acreages could vary from year-to-year.
2) **Larger-scale Treatments**: Planning of larger-scale non-native invasive plant community and noxious weed treatment projects that are not part of the on-going actions listed above would incorporate by reference the EA analysis. Individual project planning could include one or more treatments and would require a Determination of NEPA Adequacy (DNA) and land use plan conformance review, and project-specific Decision Record (DR). Proposals that do not fall within the scope of this analysis would require additional NEPA analysis.

Relationship of Section 7 Consultation for Future Federal Actions of the Proposed Action

The proposed action includes conservation measures, design features, prevention measures, herbicide application criteria, and SOPs that combined, reduce or eliminate potential impacts of on-going or larger-scale noxious weed and invasive plant treatments to ESA-listed and proposed species and/or their designated or proposed critical habitat. This BA analyzes the potential direct, indirect, and cumulative impacts from on-going and larger-scale treatments. Any treatment that falls within the scope of this consultation would not require any further Section 7 consultation. Any treatment that deviates from the proposed action, resulting in potential effects beyond those described in this BA, would require additional Section 7 consultation.

Species Addressed

This BA assesses the impacts from noxious weed and invasive plant treatments on eight ESA-listed species and one species proposed for listing that occur within the TFD. These species and their ESA status are displayed in Table 1. This list of species was derived from the Idaho BLM Special Status Species List Update (USDI BLM, 2015c). Changes in listing status as determined by the Service were used in identifying the species requiring ESA consultation for the proposed action.

Table 1 - ESA-Listed and Proposed Species Addressed in the TFD BA

Species	ESA Status
Jarbidge River bull trout (*Salvelinus* confluentus)[A]	Threatened
Bruneau hot springsnail (*Pyrgulopsis bruneauensis*)	Endangered
Snake River physa (*Physa natricina*)	Endangered
Bliss Rapids snail *(Taylorconcha serpenticola*)	Threatened
Banbury Springs lanx (*Lanx* n sp.)	Endangered
Yellow-billed cuckoo (*Coccyzus americanus*)[B]	Threatened
Canada lynx (*Lynx Canadensis*)	Threatened
Wolverine (*Gulo gulo*)	Proposed
Slickspot peppergrass (*Lepidium papilliferum*)[B]	Threatened

A Includes designated critical habitat
B Includes proposed critical habitat

Figure 1 - TFD High Potential Invasive Plant Communities

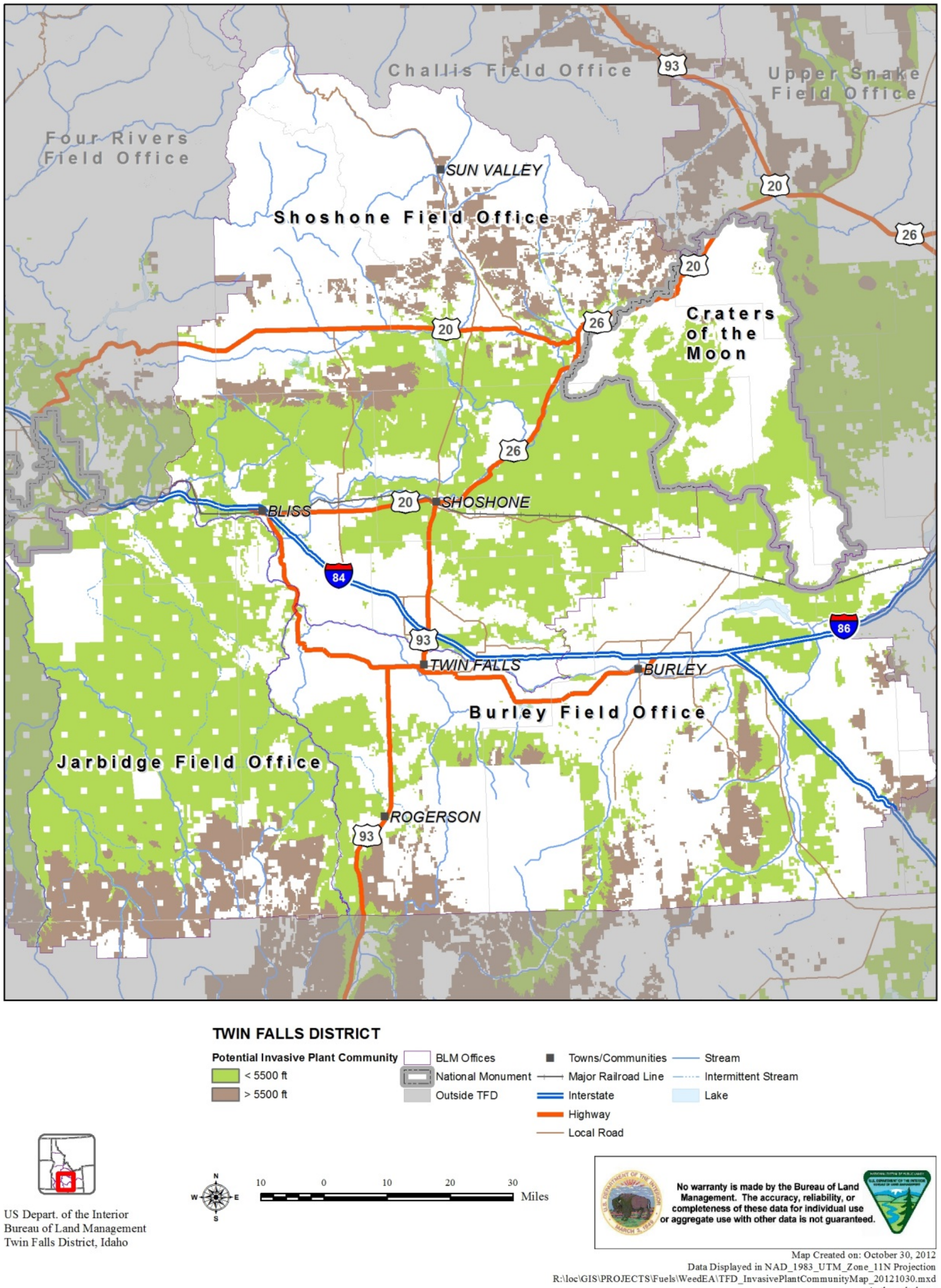
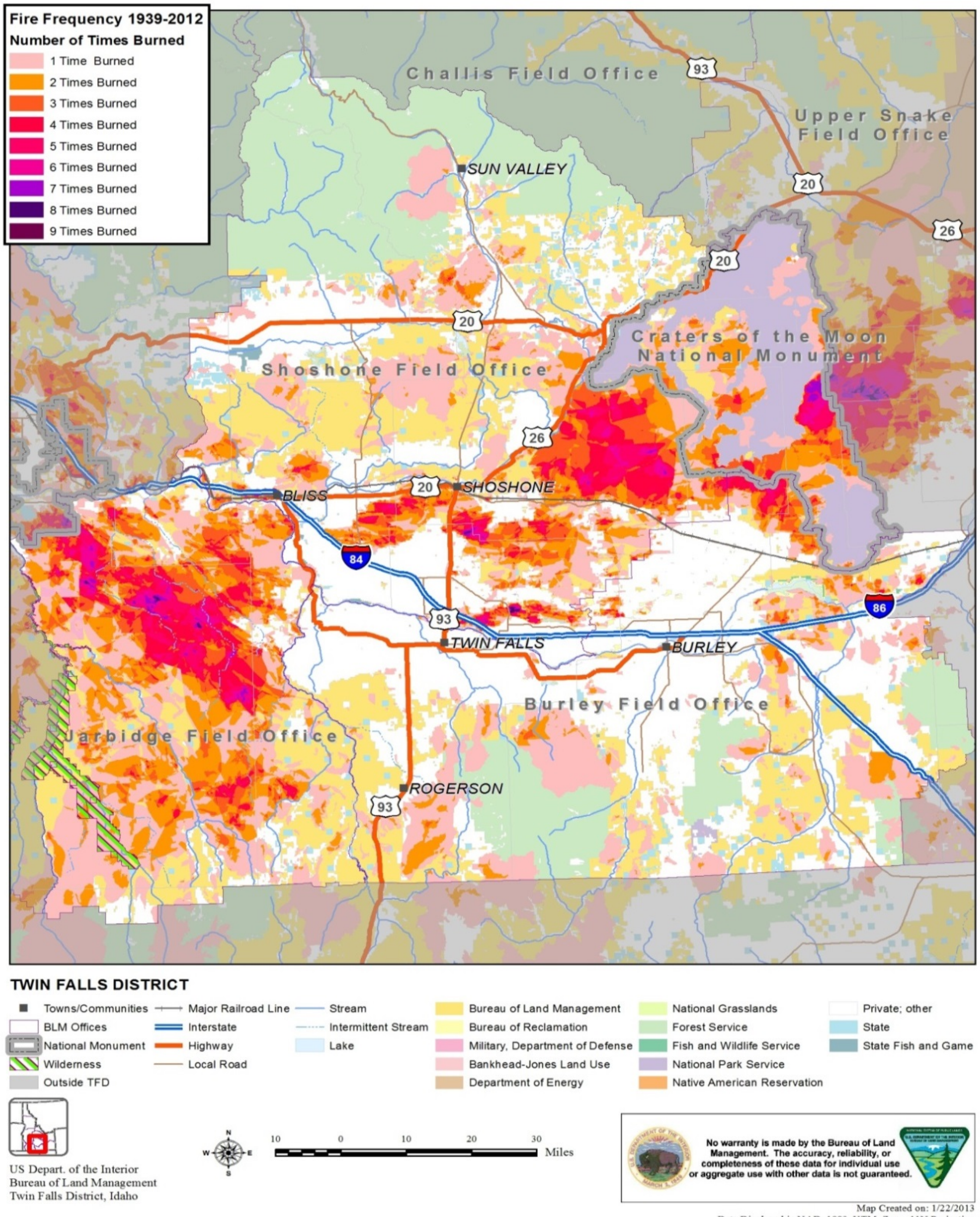


Figure 2 - TFD Fire Frequency, 1939-2012



Chapter 2 – Proposed Action

Targeted Plant Communities

Noxious Weeds

Noxious weeds and invasive plants known to occur and treated in the TFD are included in (Appendix A). Idaho law defines a noxious weed as any plant having potential to cause injury to public health, crops, livestock, land or other property. Nevada law defines a noxious weed as any species of plant which is, or likely to be, detrimental or destructive and difficult to control or eradicate. The BLM defines a noxious weed as a plant species designated by federal or state law as generally possessing one or more of the following characteristics:

- aggressive and difficult to manage;
- parasitic;
- a carrier or host of serious insects or disease;
- non-native, new, or not common to the United States.

The State of Idaho administrative rules put noxious weeds into three categories that can affect how they are managed:

- **Statewide Early Detection and Rapid Response.** Plants in this category must be reported to the Idaho State Department of Agriculture (ISDA) within 10 days after being identified at the University of Idaho or by another qualified authority approved by the ISDA director. Eradication of these weeds must begin in the same season they are found.
- **Statewide Control.** Plants in this list may already exist in some parts of the state. In some areas of the state control or eradication is possible, and a plan must be written that will reduce infestations within 5 years.
- **Statewide Containment.** Plants in this category exist in the state. New or small infestations can be reduced or eliminated, while established populations may be managed as determined by the weed control authority, which usually is the county weed program.

The State of Nevada lists noxious weeds in three categories:

- **Category A** noxious weeds are weeds that are generally not found or that are limited in distribution throughout the State.
- **Category B** listed noxious weeds are weeds that are generally established in scattered populations in some counties of the State.
- **Category C** listed noxious weeds are weeds that are generally established and generally widespread in many counties of the State.

Invasive Plants

In addition to treating noxious weeds, plant communities dominated by invasive species, such as cheatgrass and medusahead wildrye, would be the priority for large-scale treatment utilizing proposed methods to reduce the incidence and dominance of these communities. Other invasive species that have potential to dominate on a smaller scale could also be treated. Appendix A includes a list of invasive plants occurring in the TFD. Specific treatment methods could occur singly or in combination.

According to Executive Order 13112, invasive plants are defined as non-native plants whose introduction cause or are likely to cause economic or environmental harm or harm to human health.

Invasive plants:

- are not part of the original plant community or communities;
- have the potential to become a dominant or co-dominant species on the site if their future establishment and growth is not actively controlled by management interventions; or
- are classified as exotic or noxious plants under state or federal law.

Native species that become dominant for only one to several years (e.g. short-term response to drought or wildfire) are not invasive plants. Douglas-fir and juniper are not targeted species under the proposed action.

Invasive plants compromise the BLM's ability to manage lands for a healthy native ecosystem. They create a host of environmental and other effects, most of which are harmful to native ecosystem processes, including:

- displacement of native plants,
- reduction in functionality of habitat and forage for wildlife and livestock,
- increased potential for soil erosion and reduced water quality,
- alteration of physical and biological properties of soil,
- loss of long-term riparian area function,
- loss of habitat for culturally significant plants,
- high economic cost of controlling invasive plants, and
- increased cost of keeping systems and recreational sites free of invasive species.

Plant communities dominated by non-native annual invasive species across the Snake River Plain and TFD occur primarily below 5,500 feet elevation. It is anticipated that the majority of invasive plant treatment proposals would be implemented within this zone (See Figure 1). These invasive plant communities can be the dominant vegetation cover or be a significant component (≥10% cover) of a native vegetation stand. Treatment of these native plant communities to reduce the incidence of invasive species can be critical to maintaining or improving key wildlife habitats (e.g. sage-grouse habitat, big game winter ranges).

Treatment Planning

The proposed action consists of two planning levels.

1) **On-going Actions:** Manual, biological control, ground-based broadcast herbicide, and spot herbicide treatments of new and existing infestations of noxious weeds where immediate and continued actions are required would be implemented with no further NEPA analysis. Estimated annual acreages are identified for each treatment type (See Table 3). These acreages are estimates based on past treatments, current noxious weed inventories, and anticipated future needs to control or contain noxious weed populations. Actual treatment acreages could vary from year-to-year.
2) **Larger-scale Treatments:** Planning of larger-scale non-native invasive plant community and noxious weed treatment projects that are not part of the on-going actions listed above would incorporate by reference this analysis. Individual project planning would require a Determination of NEPA Adequacy (DNA), land use plan conformance review, and project-specific Decision Record (DR). Proposals that do not fall within the scope of this analysis would require additional NEPA analysis.

On-going Actions

On-going actions would treat noxious weeds that occur primarily in burned areas or locations with frequent disturbance such as roadways, gravel pits, private/public land interfaces, or high-use recreation sites, including OHV areas, camp sites, and trails. Spot herbicide treatments consist of treating individual plants or small patches up to one acre with a hand-held wand attached to a backpack sprayer or vehicle-mounted spray equipment. Ground-based broadcast herbicide treatments are implemented with a boom attached to a vehicle. The ground-based broadcast method allows for treatment of larger patches (greater than one acre), such as roadsides. Manual and biological control treatments would also be implemented as on-going actions.

Areas burned by wildland or prescribed fire would be inventoried for noxious weeds post-fire. Noxious weeds detected during the inventory process would be spot-treated with herbicide using a hand-held wand attached to a backpack sprayer or vehicle-mounted spray equipment. Ground-based broadcast treatments could be used for large patches. In addition, some areas containing known infestations that cannot be completely eradicated require regular (e.g. annual) treatment for containment and to prevent spread to adjacent areas. These areas would be treated at intervals necessary for containment using manual, biological control, ground-based broadcast, or spot herbicide spray methods. Anticipated annual acreages for each of the methods are discussed in the individual treatment methods below. As new invaders are discovered, they would be treated as an on-going action with appropriate methods, as necessary.

Larger-scale Vegetation Treatments

Larger-scale, site-specific vegetation treatment projects utilizing one or more methods for control of noxious weeds and invasive plants would be addressed using the DNA review process. This review process allows the BLM to base site-specific proposed actions on a previous NEPA document. A DR would then be prepared based on the existing NEPA analysis if the DNA review determines that the proposed action has been adequately analyzed in that document and there are no changed circumstances. If a proposed project falls outside the scope of the analysis or if baseline conditions change, a new EA would be prepared to address these circumstances.

Integrating Vegetation Treatments

Per BLM policy and manual direction, including Department of the Interior (DOI) Integrated Pest Management Manual 517, the BLM utilizes an integrated pest management approach to managing and treating vegetation. This approach is inclusive of concepts such as integrated weed management (BLM Manual Section 9015) and more broadly, integrated vegetation management (BLM Handbook 1740-2, 2008).

The integrated weed program on BLM-administered lands is based on weed management objectives and priorities that are influenced by weed infestations and site susceptibility. These criteria provide focus and direction for the weed program and allow for site-specific and adaptive decision making. Integrated weed management strategies may include, but are not limited to, prevention; mechanical and manual methods, biological control, and herbicides; and prescribed fire. For some of the most aggressive invaders, herbicides may be the most effective way to control weed spread.

The BLM would treat noxious weed and invasive plant communities using prescribed fire, mechanical and manual methods, biological control, and herbicides. In an integrated weed management program, each management option is considered, recognizing that no one management option is a stand-alone option and that each has its own strengths and weakness.

General Site Selection and Treatment

Treatment priorities are established and influenced by several factors. These factors include national, state, and local priorities pursuant to current policies, directives, and initiatives. The following local treatment priorities would promote integrated efforts across BLM resource programs that manage vegetation.

- Design Wildland Urban Interface (WUI) community protection treatments that reduce the risk of wildfire to the community and/or its infrastructure and are developed collaboratively with the community.
- Protect, maintain, or restore:
    - special status species habitat;
    - big and upland game crucial habitat, including winter range;
    - special management areas including Craters of the Moon National Monument and Preserve, the Bruneau-Jarbidge Rivers Wilderness, National Historic Trails (NHT), and Areas of Critical Environmental Concern (ACECs);
    - healthy, diverse, resilient, and productive desired plant communities.

Priorities would also be influenced by:

- Treatments that will be planned, implemented, and/or monitored using funding from multiple sources, both internal and external.
- Landscape treatments coordinated across field office or land management boundaries [i.e. Idaho Department of Lands (IDL), U.S. Forest Service (USFS), National Park Service, USFWS, or Military] to improve treatment effectiveness.
- Contracted treatments that support economic opportunities for rural communities and/or high potential to use stewardship contracting authorities.

The extent of noxious weed infestations in the TFD requires prioritization of weed treatment efforts for the most efficient use of limited time and resources. The following management situations would be used to prioritize noxious weed and invasive plant treatments in order to focus efforts towards success (USDI BLM, 2007b):

Priority 1: New aggressive infestations in a previously un-infested area or small infestations in areas of special concern (e.g. special management areas, special status species habitat).

- Management Objective: *Eradicate.* Eliminate all traces of a population (including reproductive propagules) to the point where individuals are no longer detectable. This eliminates the potential for further introduction and spread.

Priority 2: Areas of high traffic or sources of infestation and larger infestations in areas of special concern.

- Management Objective: *Control.* Reduce the extent and density of a target weed to limit the potential for further introduction and spread.

Priority 3: Existing large infestations or roadside infestations where spread can be checked or slowed.

- Management Objective: *Contain.* Prevent weeds from moving beyond the current infestation perimeter.

Applying these priorities would result in the following general strategy:

- Keep weed-free areas weed-free. Keeping weed-free areas weed-free is the most biologically and cost-effective approach. Once an area has been taken over by weeds, restoration may be expensive and may not always return an area to its full native community of plants and animals. Thus it is better to maintain the native vegetation than to have to restore it.
- Use biological controls (if available for the respective weed species) to limit and reduce weeds in areas where they are already well established and beyond control by herbicides, areas difficult to access, or sensitive areas where biological control is the most efficient method.
- Use BLM-approved herbicides or manual methods, such as hand-pulling or grubbing, where weeds are establishing in new areas.
- Use hand-pulling and grubbing near special status plant populations and other areas when it is determined that herbicides cannot be used.

- Use aerial application in areas difficult to access or too large to effectively treat by ground methods.
- Assess current vegetation condition to determine site potential to release and increase desirable perennial vegetation through control of invasive annual species (i.e., herbicide application).
- Revegetate areas where the potential native plant community cannot naturally reestablish following noxious weed and invasive plant control.
- Monitor all types of treatment for effectiveness and adjust control methods accordingly.
- Continue education, prevention, and inventory.

Cooperative Weed Management Areas and Partnerships

A Cooperative Weed Management Area and Partnership (CWMA) is composed of local, private, and Federal interests. CWMAs typically center on a particular watershed or similar geographic area in order to combine resources and management strategies in the prevention and control of weed populations. Much of the BLM's on-the-ground invasive species prevention and management is done directly or indirectly through CWMAs.

The BLM partners with all counties in the TFD as well as Southern Idaho Biocontrol, state, and other Federal agencies to control noxious weeds. The TFD would continue utilizing partnerships to control noxious weeds with allowable methods as funding is made available.

Prevention

As stated in *Partners Against Weeds: An Action Plan for the BLM*, prevention and public education are the highest priority weed management activities. Priorities are as follows:

Priority 1: Take actions to prevent or minimize the need for vegetation control when and where feasible, considering the management objectives of the site.

Priority 2: Use effective non-chemical methods of vegetation control when and where feasible.

Priority 3: Use herbicides after considering the effectiveness of all potential methods or in combination with other methods or controls.

The proposed action adopts prevention measures included in the 2007 PEIS. Appendix B contains the detailed list of these prevention measures. Weed free seed, forage, and straw for permitted activities are required on public lands (USDI BLM, 2011a).

Treatment Methods

Treatment methods would be chosen based on site characteristics. Selection of the most appropriate treatments depends on numerous factors, including specific noxious weeds or invasive plants present on the site, risk of expansion, weed species biology, season, soil type, environmental setting, and objectives. In addition, data regarding past treatment successes or failures would also be considered.

Vegetation treatment methods are selected based on several parameters, which may include the following:

- Management program/objective for the site.
- Historic and current conditions.
- Opportunities to prevent future problems.
- Opportunities to conserve native and desirable vegetation.
- Effectiveness and cost of the treatment methods.
- Success of past restoration treatments or treatments conducted under similar conditions or recommendations by local experts.
- Characteristics of the target plant species, including size, distribution, density, life cycle, and life stage in which the plant is most susceptible to treatment.
- Non-target plant species that could be impacted by the treatment.
- Land use of the target area.
- Proximity to communities and private agricultural land.
- Slope, accessibility, and soil characteristics of the treatment area.
- Weather conditions at the time of treatment, particularly wind speed and direction, precipitation prior to or likely to occur during or after application, and season.
- Proximity of the treatment area to sensitive areas, such as wetlands, streams, or habitat for plant or animal species of concern.
- Potential impacts to humans or terrestrial and aquatic wildlife, including non-game species.
- Need for subsequent re-vegetation and/or restoration.

For most vegetation treatment projects, pre-treatment inventories are conducted before selecting one or more treatment methods. These inventories involve the consideration of all feasible treatments, including their potential effectiveness based on previous experience, and best available science, impacts, and costs. Before vegetation treatment or ground disturbance occurs, the BLM consults specialists or databases for information on sensitive resources within the proposed project area. If no current information exists, the proposed treatment area would have to be inventoried for special status species and evidence of cultural or historic sites.

Detailed descriptions of the methods and equipment used in proposed vegetation treatment actions can be found in Restoring Western Ranges and Wildlands, General Technical Report RMRS-GTR-136, Rocky Mountain Research Station (Monsen, Stevens, & Shaw, 2004).

Manual Methods

Manual methods would typically be used on small isolated infestations, around sensitive plant locations, or in areas where chemical or biological control is not practical or is restricted. Manual treatment involves the use of hand tools and hand-operated power tools to cut, clear, or prune herbaceous and woody species. Treatments include cutting undesired plants above the ground level; pulling, grubbing, or digging out root systems of undesired plants to prevent sprouting and regrowth; cutting at the ground level or removing competing plants around desired species.

Hand tools used in manual treatments include the handsaw, axe, shovel, rake, machete, grubbing hoe, mattock (combination of cutting edge and grubbing hoe), Pulaski (combination of axe and grubbing hoe), brush hook, and hand clippers. Power tools such as chain saws and power brush saws are also used, particularly for thick-stemmed plants.

Manual treatments, such as hand pulling and hoeing, are most effective where the weed infestation is limited and soil types allow for complete removal of the plant material (Rees et al., 1996). Additionally, pulling works well for annual and biennial plants, shallow-rooted plant species that do not re-sprout from residual roots, and plants growing in sandy or gravelly soils. Repeated treatments are often necessary due to soil disturbance and residual weed seeds in the seed bank.

Manual techniques would be used in many areas, particularly where low impact treatments are desirable. Although they have limited value for weed control over a large area, manual techniques can be highly selective. Manual treatment would be used in sensitive habitats such as riparian areas, areas where burning or herbicide application would not be appropriate, and areas that are inaccessible to ground vehicles (USDI BLM, 1991).

Approximately 600 acres of manual treatment could occur annually under the proposed action (See Table 3).

Mechanical Methods

Mechanical treatments would be used on larger infestations where manual noxious weed and invasive plant treatments would be impractical or too expensive or where seedbed preparation is required for re-vegetation. Mechanical treatment involves the use of vehicles such as wheeled tractors, crawler-type tractors, or specially designed vehicles with attached implements designed to cut, uproot, mulch, or chop existing vegetation. The selection of a particular mechanical method is based on the characteristics of the vegetation, seedbed preparation and re-vegetation needs, topography and terrain, soil characteristics, and climatic conditions. Mechanical methods that would be used by the BLM include tilling (disk plowing), drill seeding, broadcast seeding followed by harrowing or chaining, mowing, and mastication.

Disk plowing would be implemented where herbicide or prescribed fire is not a feasible treatment or to create fuel breaks when implementing a prescribed fire treatment. Mechanical disk plowing would be used to reduce competition from invasive plants. Application of herbicides such as *Glyphosate* following disk plowing may occur to eliminate any later germination of invasive plants. To be effective, disk plowing would need to be completed prior to seed production of invasive plants.

Drill or broadcast seeding in the fall would be utilized to establish desirable perennial vegetation. Rangeland drills or no-till drills would be utilized to seed grass, forb, and shrub mixtures after seedbed treatments (prescribed fire, herbicide, disk plowing, etc.). The rangeland drill was developed to seed rough rangeland sites and is typically used in open, relatively flat topography, which is fairly absent of larger rocks [8-10" inch (in) diameter]. This method works well in most soil types and is the primary seeding method that would be used. A no-till drill is best utilized in areas with low surface rock present. The advantage of using a no-till drill is less soil disturbance; however, no-till drills are not readily available and can only be used in non-rocky soils. The drill seed method has the greatest probability of seeding success among various seeding tools and methods. Broadcast seeding would be utilized on small tracts or when the terrain is not conducive to drill seeding. Broadcast seeding is normally followed with a cover treatment using a harrow or aerator implement.

A harrow/aerator implement, such as a Dixie harrow or Lawson aerator, would be utilized to prepare a seedbed or cover seed broadcast over an area that is not conducive to drill seeding due to impeding standing live or dead vegetation.

The Dixie harrow consists of metal tubes attached to a 1,500 pound drawbar. Each tube has four sets of steel fins which protrude 12 inches from either side of the tube. When the Dixie harrow is dragged along the ground the design of these fins allow for the tubes to twist and turn which reduces woody cover and covers seed that has already been broadcast on the soil surface. A rubber–tired tractor of 150 horsepower or greater is required to pull the Dixie harrow effectively. A tined harrow could be used to cover broadcast seed where no live or dead woody cover is present. The Lawson aerator is a large drum aerator pulled behind a large tractor and is designed to crush shrubs and reduce canopy cover while not killing plants. It causes minimal impact to the soil.

Chaining would be utilized for seed coverage where brittle brush or tree skeletons preclude the use of drills. Chaining consists of pulling heavy (40 to 90 pounds per link) chains in a “U” or “J” shaped pattern behind two crawler-type tractors. The chain is usually 250 to 300 feet long and may weigh as much as 32,000 pounds. The width of each swath varies from 75 feet to 120 feet. Chaining can be done on irregular, moderately rocky terrain, with slopes of up to 20%.

Mowing tools, such as rotary mowers or straight-edged cutter bar mowers, would be used to cut herbaceous and woody vegetation above the ground surface. Generally mowing treatments would be followed-up with herbicide treatments. Mowing treatments alone have limited use for noxious weed control, as the machinery tends to spread seeds and not kill roots. Mowing is most effective on annual and biennial plants (Rees et al., 1996). Weeds are rarely killed by mowing, and an area may have to be mowed repeatedly for the treatment to be effective (Colorado Natural Areas Program, 2000). However, the use of a “wet blade,” in which an herbicide flows along the mower blade and is applied directly to the cut surface of the treated plant, can greatly improve the control of some species.

Mastication would be utilized to remove live or dead shrubs or trees with less soil surface disturbance than chaining. Mastication treatment may be followed by spot herbicide application for species that resprout (e.g. Russian olive, saltcedar, [*Tamarix* sp.]). Mastication is achieved utilizing an implement such as a Fecon® head attached to a crawler-tractor. The head grinds the woody plant from the top down, creating debris that acts as mulch on the soil surface. Mastication can be used in combination with broadcast seeding; the woody debris resulting from mastication provides cover for seed.

Prescribed Fire

Prescribed fire would be used in combination with other treatment methods to combat non-native annual invasive plants and restore native plant communities. Prescribed fire would be used as a treatment to remove plant cover and litter accumulations to improve success of herbicide and seeding treatments. This would occur in degraded upland plant communities, including adjacent ephemeral drainages, but would not occur in perennial or intermittent drainages supporting woody riparian vegetation. Project area boundaries, sagebrush islands or other important habitat features would be protected from the burn by one or more of the following actions: wet line, foam line, hand line, location of ignition, dozer or disk line or other mechanical methods as described in the Mechanical Methods section above. Prescribed fire would also be used to remove accumulations of noxious weeds or invasive plants from fence lines, drainages, or ravines where the integrity of BLM projects or wildlife migration corridors is compromised.

A project-level prescribed burn plan would be developed to describe burning parameters and address safety and smoke management. Burning prescriptions would minimize soil erosion and mortality of desirable perennial plants. All prescribed burning will be coordinated with state and local air quality agencies to ensure compliance with local air quality standards.

Prescribed fire in sage-grouse habitat would be subject to the following criteria and would be addressed in the site-specific project and burn plans per the Idaho and Southwestern Montana and Nevada and Northeastern California Greater Sage-Grouse ARMPA/Final EISs (2015):

- why alternative techniques were not selected as a viable options;
- how sage-grouse goals and objectives would be met by its use;
- how the Conservation Objectives Team Report objectives would be addressed and met;
- a risk assessment to address how potential threats to sage-grouse habitat would be minimized.

Prescribed fire could be used to meet management objectives to protect and/or enhance greater sage-grouse habitat in Priority Habitat Management Areas (PHMA) and Important Habitat Management Areas (IHMA). In PHMA or IHMA, use of prescribed fire would be determined on a project-by-project basis and would be dependent on existing vegetation, including shrub cover and patch size, understory composition, and distance to sage-grouse seasonal habitats. Limited prescribed fire may be utilized for initial seedbed preparation in Wyoming big sagebrush patches with greater than 10% shrub foliar cover and a degraded understory dominated by non-native annual invasive vegetation. Prescribed fire would be followed by additional treatments to control noxious weeds and invasive plants and re-establish desirable perennial vegetation, including shrubs. Projects would be reviewed to ensure that they meet requirements for adaptive management thresholds under the ARMPAs.

Any prescribed fire in sage-grouse winter habitat would need to be designed to strategically reduce wildfire risk around and/or in the winter range and designed to protect and/or restore winter range habitat quality (Idaho and Southwestern Montana and Nevada and Northeastern California Greater Sage-Grouse ARMPA/Final EISs, 2015).

Biological Control

Biological control involves the intentional use of insects, nematodes, mites, or pathogens (agents such as bacteria or fungi that can cause diseases in plants), or domestic animals that weaken, consume, or destroy vegetation (USDI BLM, 1991). The concept of biological control is to introduce natural enemies that are specific to particular weeds and which would not attack other plants. The use of biological agents other than domestic animals is strictly controlled and permitted by the U.S. Department of Agriculture (USDA) Animal and Plant Health Inspection Service (APHIS) following rigorous testing to ensure that agents are host-specific. The goal of biological control is to reduce the weed to a minor part of the vegetation community instead of the dominant member of the community. Biological control will not eradicate a weed species and is not appropriate to be used when eradication of a weed is the management goal.

Biological control agents have been utilized in the TFD weed control program for approximately 20 years. Biological controls used to date include insects and domestic animals. Under the proposed action, currently approved biological control agents would be released as necessary. As new agents are approved for release, they would also be considered as a control method. If additional weeds become established in the TFD for which approved agents are available, those agents will also be considered as a treatment tool if their use would help to achieve treatment goals. Table 2 details the biological control agents currently approved for use in Idaho. Based on past treatments, an estimated 60 releases of biological control agents could be made per year under this proposal (See Table 3).

Table 2- Approved Biological Control Agents for Idaho

Target Weed	**Biological Control Agent(s)**
Canada thistle	Canada thistle stem weevil (*Hadroplontus* [*Ceutorhynchus*] *litura*) Canada thistle gall fly (*Urophora cardui*)
Dalmatian toadflax Yellow toadflax	Toadflax flower-feeding beetle (*Brachypterolus pulicarius*) Toadflax moth (*Calophasia lunula*) Toadflax root boring moth (*Eteobalea intermediella*) Toadflax root boring moth (*Eteobalea serratella*) Dalmatian toadflax stem weevil (*Mecinus janthiniformis*) Yellow toadflax stem weevil (*Mecinus janthinus*) Toadflax seed capsule weevil (*Rhinusa* [*Gymnetron*] *antirrhini*) Toadflax root galling weevil (*Rhinusa* [*Gymnetron*] *linariae*)

Target Weed	Biological Control Agent(s)
Diffuse knapweed Russian knapweed Spotted knapweed	Knapweed root boring moth (*Agapeta zoegana*) Russian knapweed gall wasp (*Aulacidea acroptilonica*) Knapweed seed head weevil (*Bangasternus fausti*) Knapweed seed head fly (*Chaetorellia acrolophi*) Knapweed root boring weevil (*Cyphocleonus achates*) Russian knapweed gall midge (*Jaapiella ivannikovi*) Knapweed seed head weevil (*Larinus minutus*) Knapweed seed head weevil (*Larinus obtusus*) Knapweed seed head moth (*Metzneria paucipunctella*) Knapweed root boring moth (*Pelochrista medullana*) Knapweed root boring moth (*Pterolonche inspersa*) Knapweed root boring beetle (*Sphenoptera jugoslavica*) Russian knapweed nematode (*Subanguina picridis*) Knapweed seed head fly (*Terellia virens*) Knapweed seed head gall fly (*Urophora affinis*) Knapweed seed head gall fly (*Urophora quadrifasciata*)
Field bindweed	Bindweed gall mite (*Aceria malherbae*) Bindweed defoliating moth (*Tyta luctuosa*)
Hydrilla	Indian hydrilla tuber weevil (*Bagous affinis*) Australian hydrilla stem boring weevil (*Bagous hydrillae*) Australian hydrilla leaf mining fly (*Hydrellia balciunasi*) Indian hydrilla leaf mining fly (*Hydrellia pakistance*)

Target Weed	Biological Control Agent(s)
Leafy spurge	Minute spurge flea beetle (*Aphthona abdominalis*) Brown dot spurge flea beetle (*Aphthona cyparissiae*) Black spurge flea beetle (*Aphthona czwalinae*) Copper spurge flea beetle (*Aphthona flava*) Brown-legged spurge flea beetle (*Aphthona lacertosa*) Black dot spurge flea beetle (*Aphthona nigriscutis*) Spurge root/defoliating beetle (*Aphthona spp.*) Spurge clearwing moth (*Chamaesphecia crassicornis*) Spurge clearwing moth (*Chamaesphecia hungarica*) Spurge gall midge (*Dasineura capsulae*) Spurge hawk moth (*Hyles euphorbiae*) Red-headed spurge stem borer (*Oberea erythrocephala*) Spurge tip gall midge (*Spurgia esulae*)
Mediterranean sage	Mediterranean sage root weevil (*Phrydiuchus tau*)
Musk thistle	Musk thistle seed head fly (*Urophora solstitialis*)
Puncturevine	Puncturevine seed weevil (*Microlarinus lareynii*) Puncturevine stem weevil (*Microlarinus lypriformis*)
Purple loosestrife	Black-margined loosestrife beetle (*Galerucella calmariensis*) Golden loosestrife beetle (*Galerucella pusilla*) Loosestrife root weevil (*Hylobius transversovittatus*) Loosestrife seed weevil (*Nanophyes marmoratus*)
Rush skeletonweed	Rush skeletonweed root boring moth (*Bradyrrhoa gilveolella*) Rush skeletonweed gall midge (*Cystiphora schmidti*) Rush skeletonweed gall mite (*Eriophyes chondrillae*) Rush skeletonweed rust(*Puccinia chondrillina*)
Russian thistle	Russian thistle gall mite (*Aceria salsolae*) Russian thistle casebearer (*Coleophora klimeschiella*) Russian thistle stem mining moth (*Coleophora parthenica*)
Saltcedar	Saltcedar defoliating beetle (*Diorhabda carinulata*) Saltcedar defoliating beetle (*Diorhabda elongate*) Saltcedar defoliating beetle (*Diorhabda sublineata*)

Target Weed	Biological Control Agent(s)
Scotch broom	Broom seed beetle (Bruchidius villosus) Scotch broom seed weevil (*Exapion fuscirostre*) Scotch broom twig miner (*Leucoptera spartifoliella*)
Yellow starthistle	Yellow starthistle bud weevil (*Bangasternus orientalis*) Yellow starthistle peacock fly (*Chaetorellia australis*) Yellow starthistle hairy weevil (*Eustenopus villosus*) Yellow starthistle flower weevil (*Larinus curtus*) Yellow starthistle rust (*Puccinia jacea soltitialis*) Yellow starthistle gall fly (*Urophora sirunaseva*)
Accessed 5/9/2013 from the ISDA website and modified by known availability by BLM specialists http://www.agri.state.id.us/Categories/PlantsInsects/NoxiousWeeds/Bio_Control.php	

Domestic goats or sheep would be the only classes of livestock used to control specific noxious weed populations. This method would be used as a small scale application in areas where herbicide use is not desirable due to high human use or sensitive resources, or where manual treatment is impractical due to difficult access. This could include but is not limited to recreation sites including campsites, trailheads, and trails; near public/private land boundaries; and in areas with steep terrain. Goats or sheep would not be used as a weed control treatment within Riparian Conservation Areas (RCAs) in undeveloped sites. Goats or sheep would not be used in developed sites in RCAs with ESA-listed aquatic species habitat. Approximately 500 acres could be treated annually using this method under the proposed action (See Table 3). Treatments using domestic goats or sheep would not occur within nine miles of the Jarbidge/Bruneau river canyons bighorn sheep population. Separation between domestic goats or sheep used for biocontrol and bighorn sheep in other areas would require an effective separation plan coordinated with Idaho Department of Fish and Game (IDFG) that provides sufficient separation to minimize the risk of contact and disease transmission. Goats or sheep would need to be quarantined before and after moving to a new location to ensure no transfer of undesirable plant materials.

Herbicides

The TFD is proposing to use 20 herbicides that are approved for use on public lands by the RODs for the 2007 and 2016 PEISs. Herbicides would be used to control and eliminate areas of noxious weeds and invasive plants spread and to contain existing infestations. The 20 active ingredients in these herbicides are:

- 2,4-D
- Aminopyralid
- Bromacil
- Chlorsulfuron
- Clopyralid

- Dicamba
- Diflufenzopyr (in formulation with dicamba and known as Overdrive® and Distinct®)
- Diquat
- Diuron
- Fluridone
- Fluroxypyr
- Glyphosate
- Hexazinone
- Imazapic
- Imazapyr
- Metsulfuron methyl
- Picloram
- Rimsulfuron
- Tebuthiuron
- Triclopyr

A list of these approved BLM herbicides, available formulations, registered trade names, and general effects can be found in Appendix C. The registered trade names are the most current as of January 12, 2016. Other formulations of the active ingredient may be used and include less common trade named products. Additional information concerning the herbicides available for use under the proposed action is included in the 2007 and 2016 PEISs.

The active ingredient *sulfometuron methyl* (OUST®) was approved for use in the ROD for the 2007 PEIS. Idaho BLM currently has a moratorium (Instruction Memorandum No. ID-2001-050) that disallows the use of this chemical on public lands. Therefore, use of s*ulfometuron methyl* is not included as part of the proposed action. In addition, herbicides containing *sulfometuron methyl* in combination with other active ingredients would not be used.

Chemical treatment involves the application of herbicides (chemical compounds), by a variety of application methods, at certain plant growth stages to kill noxious weeds and invasive plants. Depending on the type of herbicide selected, they can be used for control or complete eradication and may be used in combination with other control treatments. Selection of an herbicide and timing of application would depend on its chemical effectiveness on a particular weed species, habitat types present, proximity to water, and presence or absence of sensitive plant, wildlife, fish or other aquatic species.

Herbicide applications also utilize adjuvants to enhance or prolong the activity of an active ingredient (USDI BLM, 2007a; USDI BLM, 2015a). For terrestrial herbicides, adjuvants aid in proper wetting of foliage and absorption of the active ingredient into plant tissue. Adjuvant is a broad term that includes surfactants, selected oils, anti-foaming agents, buffering compounds, drift control agents, compatibility agents, stickers, and spreaders. Adjuvants are not under the same registration guidelines as pesticides; the Environmental Protection Agency (EPA) does not register or approve the labeling of spray adjuvants. Individual herbicide labels contain lists with "label-approved" adjuvants for use with a particular herbicide under specific conditions. Currently more than 200 adjuvants are approved for use on BLM lands (USDI BLM, 2015a).

Under the proposed action, only approved adjuvants would be used and all label restrictions would apply.

Ecological risk assessments (ERAs) for herbicides analyzed in the 2007 and 2016 PEISs included the use of adjuvants; results of the ERAs were incorporated into the biological assessments (BAs) for the PEISs. Conservation measures resulting from consultations on the 2007 and 2016 PEISs address the use of adjuvants for sensitive aquatic resources (USDI BLM, 2007a; USDI BLM, 2015a). These conservation measures are incorporated into the *Design Features and Conservation Measures* section below.

Application methods that would be used include spraying from all-terrain vehicle (ATV), utility-terrain vehicle (UTV), truck, tractor, backpack, horse, helicopter or fixed wing aircraft. Ground-based broadcast applications would utilize ATVs, UTVs, trucks, and tractors with a boom attachment. Low boom [20 in (0.51 meters) and below] ground-based broadcast applications would utilize ATVs and UTVs; high boom [50 in (1.27 meters) and above] ground-based broadcast applications would utilize trucks or tractors (AECOM, 2014). Spot treatments would utilize a hand-held wand attached to a backpack sprayer or vehicle mounted spray equipment. Aerial herbicide application would be considered for larger-scale use on a project-by-project basis and is restricted for some herbicides. Twin Falls District application criteria developed from label specifications and the 2007 and 2016 RODs are listed for each herbicide in Appendix D. All application rates, procedures, and restrictions would be within label specifications.

Approximately 8,000 spot herbicide applications for noxious weed control would occur annually as an on-going action (See Table 3). Based on past application records, these spot applications could range in size from a single plant to one acre.

On-going noxious weed treatments would also include ground-based broadcast roadside spraying along travel routes to reduce weed spread due to road use and maintenance. Treatments would be implemented using broadcast spray equipment mounted to a pickup, trailer, tractor, UTV, or ATV. Approximately 30 feet on either side of roads could be treated. Approximately 500 miles of road (about 3,600 acres or <1% of the District) could be treated annually (See Table 3).

Herbicide Treatment Standard Operating Procedures

The BLM will adopt Standard Operating Procedures (SOP) from the RODs for the 2007 and 2016 PEISs to ensure that risks to human health and the environment from herbicide treatment actions are minimized. The SOP are the management controls and performance standards intended to protect and enhance natural resources that could be affected by vegetation treatments involving the use of herbicides. These SOP are listed in Appendix E.

Herbicide Application Criteria

The current list of BLM approved herbicides and local site-specific herbicide use criteria can be found in Appendix D. These criteria along with design features described below would be utilized to formulate site-specific vegetation treatment plans and Pesticide Use Proposals (PUP) across the TFD. The 2007 and 2016 PEIS decisions concerning specific use of certain chemicals approved for BLM use were included in the development of local use criteria. These decisions are addressed below.

Consistent with decisions made in the RODs for the 2007 and 2016 PEISs, the BLM will not utilize aerial application of:

- Bromacil, chlorsulfuron, diuron, and metsulfuron methyl.
- In addition, diquat will not be aerially applied in riparian areas and wetlands.

The use of *tebuthiuron* will be avoided in Native American traditional use areas. To address potential risks associated with the adjuvant R-11® and polyoxyethyleneamine (POEA), the BLM will not use R-11® in aquatic environments, and either avoid using *glyphosate* formulations containing POEA, or seek to use formulations with the least amount of POEA, to reduce risks to amphibians and other aquatic organisms. In addition to the SOP that are protective of resources and values in the planning area, design features and conservation measures listed below would be incorporated into project-level planning.

Herbicides used for pre-emergent control of noxious weeds or invasive plants would not be applied to bare soil where there is potential for off-site soil movement that may negatively impact sensitive resources or private agricultural crop land. Site factors to consider in this determination are topography, soil type and erosion potential, treatment location relative to sensitive resources or private agricultural crop land, project size, wildfire or prescribed fire intensity, and residual vegetation and litter cover. Appropriate SOP would also be applied in the determination (See Appendix E).

Re-vegetation

When natural recovery of the native plant community will not occur following treatment for noxious weeds and invasive plants, re-vegetation would be used to stabilize the site, restore desirable vegetation, and eliminate or reduce the conditions that favor noxious weeds and invasive plants. This would be accomplished by seeding or planting desirable perennial vegetation that will re-establish plant community structure and diversity.

<u>Seed Treatments</u>

Based upon site-specific conditions, re-vegetation may include seed-bed preparation (e.g. prescribed fire, disk plowing, and/or herbicide treatments) and seed or seedling plantings. Rangeland drill and broadcast seeding (with or without a following cover treatment) would be the primary methods used for re-vegetation of desirable plant species, especially on larger areas. Seeding would be metered and distributed either by placing seed into the soil at a predetermined depth using a drill or broadcasting seed on the soil surface.

<u>Seed Selection</u>

Plant materials for vegetation treatment would be selected and seed mixtures designed to best meet land use plan resource management objectives and may include native and/or introduced species. Species selected for use would be taken from the seed list in Appendix F, although other plant materials may be added as they become available. Species planted on vegetation treatment areas must provide for attainment of resource management objectives and be in compliance with Executive Order 13112, Invasive Species (February 3, 1999).

The use of native species or cultivars is emphasized over the use of non-natives for vegetation treatments based on availability, adaptation (ecological site potential) and probability of success. In some land use plan areas of the TFD, use of native species may be required. Non-native species may be selected for use that would exhibit the ability to effectively compete with non-native annual vegetation, mimic natives both structurally and functionally and support sage-grouse objectives. A mixture of native and non-native species would be proposed if all the desired native species are not available in sufficient quantities to meet resource objectives or the existing plant community has crossed an ecological threshold and non-native annual vegetation is dominant. Non-native species could be used if they are the best plant material available to meet the objectives of a project. Seed mixtures proposed for use could contain a variety of grasses, forbs, and shrubs and would be consistent with species normally adapted to soils and precipitation of the site.

The National Seed Strategy for Rehabilitation and Restoration, 2015-2020 (Plant Conservation Alliance (PCA), 2015) promotes the development and use of locally adapted, genetically appropriate native seed. The use of local seed sources for native plants would be emphasized, especially for ecotypes of plants like big sagebrush (*Artemisia tridentata*). Important elements that would be considered in creating seed mixtures with native plants include the following:

- availability at a reasonable cost per acre,
- adaptation to the area proposed for treatment (i.e. select the seed mixture based on ecological site potential),
- impacts of competition (noxious weeds, invasive plants, other plants in the seed mixture, and existing land uses) on native plant establishment and persistence, and
- select the warmer component of a species' current range when selecting native species (other than sagebrush) for restoration when available and appropriate (Kramer & Havens, 2009).

The TFD Emergency Stabilization and Rehabilitation (ESR) Seed Mixture Development Instruction Memorandum (IM #ID200-2008-003) provides additional guidance on development and use of seed mixtures. The recommendations contained in this IM are in Appendix F.

Shrub Seeding and Planting

Following completion of a drill or broadcast seeding treatment, shrub seed (primarily sagebrush) could be applied using aerial or ground methods on the drill seed treatment area. Ground application would be done with a tractor/truck and broadcast seeder. The seed could be lightly covered by a rubber-tired packer or drag chains. Large-scale aerial applications of sagebrush and other small seed species typically are not covered post-application.

Sagebrush appropriate to site potential would be seeded and/or planted in PHMA and IHMA. Planting would occur after establishment of desirable perennial understory vegetation. Shrub seedlings may be planted following a drill seed treatment. In some cases, the only habitat improvement needed is to re-establish shrubs and only shrub planting would occur in such areas. The following upland native shrubs are the primary species that would be utilized for planting: Wyoming and basin big sagebrush (*Artemisia tridenata* ssp. w*yomingensis* and *Artemisia tridentata* ssp. *tridentata*), silver sagebrush (*Artemisia cana*), and antelope bitterbrush (*Purshia tridentata*). Other native shrubs or trees would be used as appropriate to re-vegetate treated sites (e.g. replanting riparian shrubs where noxious weeds or invasive plants have been treated). Planting would occur during the early spring or late fall when precipitation and temperatures are more favorable for shrub establishment.

Planting of shrub seedlings would be done when it is desirable to establish species quickly, create a seed source, stabilize soils, and/or restore wildlife habitat. This method is usually limited to bare root or containerized shrub or tree seedlings. The disturbance associated with hand planting consists of the area within a two to three-inch radius of the plant. Planting tools include planting bars, hoedads, and augers. If hand planting is done the second growing season after a re-vegetation treatment, a two by two-foot clearing of vegetation for each seedling planted may be required. Areas immediately around the hole may be cleared of competitive vegetation (scalped) using a tool such as a shovel, Pulaski or McLeod.

Mechanical planting can cover larger areas in shorter time periods. Use of a tree planter would create a linear scalp in which a narrow furrow is cut and the shrub planted, and then pressed into the ground.

Summary of Proposed Actions

Table 3 describes the anticipated yearly treatment acreages for on-going actions. These estimates are based on past records, current noxious weed inventory, and expected future needs for manual, biological control, and spot or ground-based roadside herbicide applications. These actions, if approved, would be authorized under the DR for this document and no further decision would be required.

Table 3 - Estimated Annual Treatment for On-going Actions

Treatment Method	Estimated Treatment Per Year
Manual	600 acres
Biological Control Agents	60 releases
Biological Control (goats/sheep)	500 acres
Spot Herbicide Application	8,000 acres
Ground-based Roadside Herbicide Application	3,600 acres

Larger-scale vegetation treatments would be planned using the DNA review process. A separate DR would be issued following that review process.

Livestock and Wild Horse Management

Coordination with permittees would occur for large–scale noxious weed and invasive plant treatments where permitted livestock grazing occurs. New seedings would not be grazed until treatment objectives have been met or the treatment is determined to be a failure, as documented by monitoring. This time frame is typically two growing seasons. In sage grouse habitat, ARMPA management decisions concerning rest and monitoring of new seedings would be implemented (Appendix L- MD Fire 34, MD LG 20, and MD LG 22). The length of rest necessary to allow plants to mature and develop robust root systems may vary, dependent on growing conditions and seeded species. Resumption of livestock grazing would ultimately depend on monitoring and meeting of resource management objectives. Monitoring needs and criteria for resumption of grazing would be developed as part of the site-specific treatment plan. Design features for livestock grazing would be considered and included as appropriate during project planning (see Design Features for livestock below).

Livestock permittees would be informed of proposed temporary closures early in the project planning process. Temporary livestock closures or adjustments would be implemented by decision or agreement. Grazing decisions or agreements will specify the terms and conditions of closures including the temporary loss of animal unit months (AUMs) and monitoring objectives and criteria for re-authorizing livestock grazing on the treated area. If it is determined through monitoring that treatment objectives have not been met, a new proposed decision or agreement would be issued addressing additional rest and/or other livestock management direction needed to help meet treatment objectives, if necessary.

Treatments for noxious weed and invasive plants within the Saylor Creek Wild Horse Herd Management Area (HMA) would be focused on improving rangeland health and reducing fire frequency. Proposed treatments would be implemented in a manner to prevent the need for removal of horses from the HMA. Design features for wild horses would be considered and included as appropriate during project planning (see Design Features for wild horses below).

Livestock and wild horses may be temporarily excluded from a treatment area by using existing management fences or constructing temporary fences. Temporary fences would be placed around the perimeter of a treated area to the minimum amount required. When constructing fences, such factors as topography, rocky outcrops, soils, and existing fences would be considered. Temporary fence construction would be strategically located to avoid concentration of livestock and/or wild horses in riparian habitats. If necessary, cattleguards, gates, and caution signs may also be installed on county, agency, or state roads, highways, and areas of high recreation use where new fences are built. Fence construction will conform to BLM Manual Handbook H-1741-1 (1989). In general, all fence posts, braces, and gates would be constructed of steel or wood.

The size of the treated area to be fenced, difficulty in fence construction (e.g. topography), special status species habitat protection, the temporary loss of AUMs, and the economic impact to livestock permittees would be considered prior to determining if a protective fence is required. Cost effectiveness is also an important consideration when determining if a fence is needed, especially if the tangible benefits produced by the cost to construct a fence are minimal.

Permanent exclosures could be constructed within vegetation treatments to evaluate exclusion of land uses and the long-term establishment of plant materials. Exclosures could contain both treated and untreated vegetation and should be established in areas that are representative of larger scale projects.

Cultural Resources

Inventories for cultural resources would be performed during project planning. Consultation with the State Historic Preservation Officer was completed (Section 106 of the National Historic Preservation Act) according to the National Programmatic Agreement. The TFD-specific cultural resource programmatic agreement was signed on October 29, 2015. Important cultural resource sites identified during the inventory will be recorded, marked, and avoided during treatment implementation if the proposed treatment would cause adverse effects to the resource. Law enforcement patrols may be used to protect cultural resources from unauthorized human activities.

Paleontological Resources

The potential for the presence of paleontological resources would be assessed during project planning. Field inventories would be conducted as needed for sites where there is potential for paleontological resources to occur. Important paleontological resource sites identified during the inventory will be recorded, marked, and avoided during treatment implementation.

Design Features and Conservation Measures

The purpose of design features and conservation measures is to reduce or eliminate potential impacts that may be caused by vegetation treatment actions. Design features and conservation measures were derived from land use plans, conservation plans and agreements, existing NEPA documents, and current ESA Section 7 consultations. In addition, mitigation and conservation measures contained within the RODs and BAs for the 2007 and 2016 PEISs are included, as appropriate. Where multiple design features or conservation measures in different documents addressed the same resource, the most conservative option was chosen for incorporation into this plan. Project-specific design features and conservation measures in addition to those listed below could be included in individual project plans if needed to reduce or eliminate potential adverse impacts.

Soils

Where practical, minimum tillage or no tillage would be used on soils with high to very high wind erosion susceptibility.

Wet soils at field capacity would be minimally disturbed.

Drill rows and all seed covering projects would run along the contours of the land, where possible, to reduce erosion.

Water Resources and Riparian Conservation Areas (RCAs)

The TFD uses the Inland Native Fish Strategy (INFISH) for the Intermountain, Northern, and Pacific Northwest Regions (USDA FS, 1995) to identify areas where management actions may affect aquatic resources, including water quality. The INFISH RCAs are:

- 300 feet for fish bearing streams;
- 150 feet for perennial non-fish bearing streams;
- 150 feet for ponds, lakes, reservoirs, and wetlands greater than one acre;
- 50 feet for seasonally flowing or intermittent streams, wetlands less than one acre, landslides and landslide-prone areas.

Figure 3 displays the relationship between the stream channel, riparian vegetation, and upland vegetation within the RCA. The RCA consists of the stream channel and the area on either side of the stream extending from the edges of the active channel (i.e., where high water scours perennial vegetation or deposits debris within the active floodplain) beyond the outer limits of hydric vegetation for a linear distance appropriate for the RCA (i.e., fish-bearing, non-fish bearing, or wetlands). The term hydric vegetation refers to vegetation types that are influenced by surface or subsurface water and include woody (e.g., aspen, dogwood, willow) and herbaceous (e.g., carex, rush, sedge) plant species. Management actions within RCAs, such as noxious weed and invasive plant treatments, are often necessary to meet riparian management objectives for special status aquatic species. The following conservation measures were developed to reduce the potential for noxious weed and invasive plant treatments to have negative effects to RCAs. Additional design features and conservation measures to protect special status aquatic species are listed below.

Conservation Measures for Site Access and Fueling/Equipment Maintenance

- Where feasible, access work sites only on existing roads and limit all travel on roads when damage to the road surface will result or is occurring.
- *Within RCAs*, do not use full-sized vehicles for transport or fueling off of established roads.
- *Outside of RCAs,* allow driving off of established roads only on slopes of 20% or less.
- Helicopter service landings, fuel trucks, and fueling or storage of fuel would not occur within 300 feet of live water.
- Except in emergencies, land helicopters outside of RCAs.
- Prior to helicopter fueling operations prepare a transportation, storage, and emergency spill plan and obtain the appropriate approvals; for other heavy equipment fueling operations use a slip-tank not greater than 250 gallons; prepare spill containment and cleanup provisions for maintenance operations.

Conservation Measures Related to Mechanical Treatments

Outside RCAs:

- Conduct soil-disturbing treatments only on slopes of 20% or less, where feasible.

Within RCAs:

- Do not use vehicles or heavy equipment in perennial channels or in intermittent channels with water, except at crossings that already exist.
- Do not conduct ground disturbing activities (e.g., disking, drilling, chaining, and plowing) or mowing within riparian areas. Within upland vegetation areas in RCAs, utilize seed cover methods that minimize ground disturbance and sediment production.
- Do not remove large woody debris or snags during mechanical treatment activities.
- Leave suitable quantities (to be determined at the local level) of excess vegetation and slash on site. Do not completely remove invasive hydric trees and shrubs (e.g. saltcedar, Russian olive) from riparian areas if removal would result in bank destabilization. Phase removal with planting of native riparian shrubs to maintain bank stability.

Conservation Measures Related to Prescribed Fire

- Prescribed fire would not be used in RCAs associated with perennial or intermittent drainages.

Conservation Measures Related to Biological Control

- Goats or sheep would not be used as a weed control treatment within RCAs in undeveloped sites.

Conservation Measures Related to Herbicide Treatments

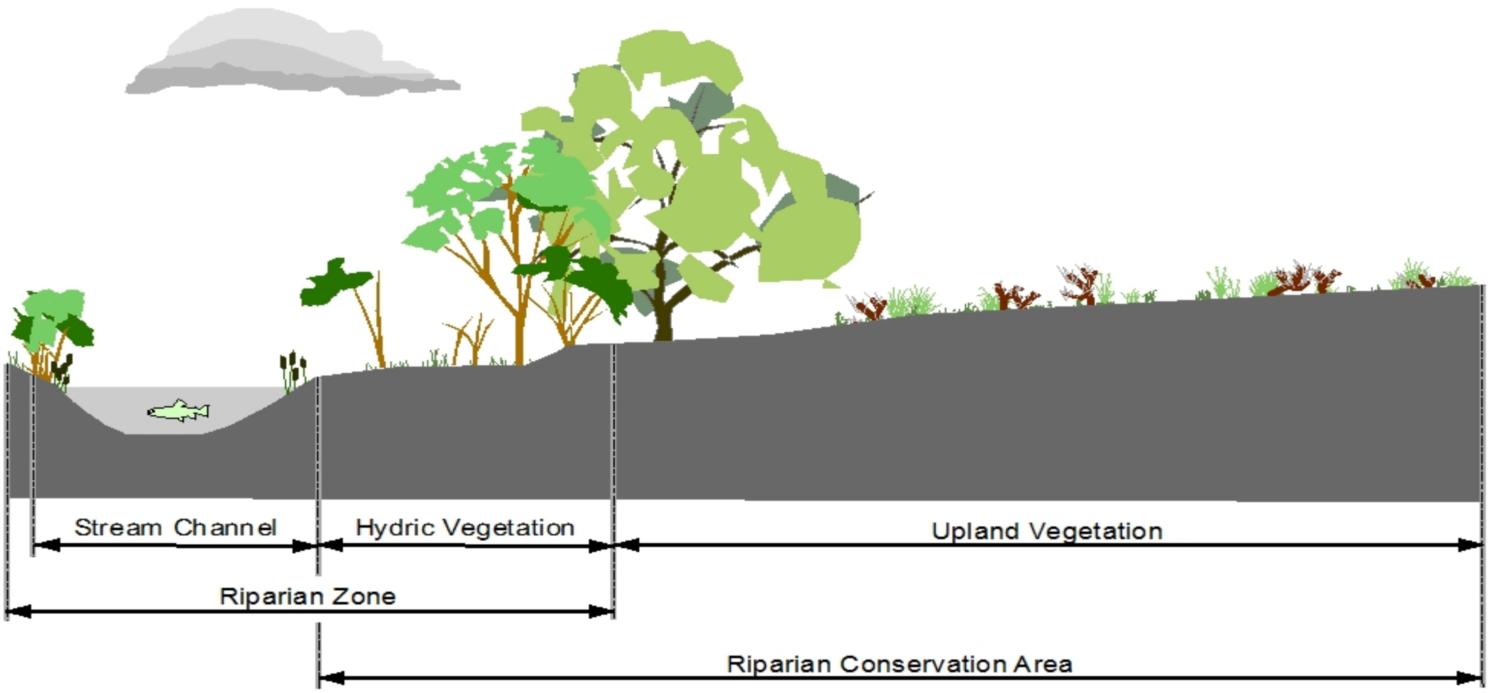
- The following herbicides **would not** be broadcast sprayed in RCAs: aminopyralid, bromacil, chlorsulfuron, clopyralid, dicamba, diflufenzopyr+dicamba (Overdrive®), diuron, fluroxypyr, hexazinone, imazapic, metsulfuron methyl, picloram, rimsulfuron, tebuthiuron. These herbicides can be used for spot treatments in upland vegetation within RCAs, but cannot be used within 15 feet of hydric vegetation. Additional restrictions for diuron application adjacent to ESA TEP (threatened, endangered, or proposed) aquatic species habitats are listed in the Special Status Aquatic Animal Species (TEP and BLM sensitive) conservation measures.
- The following herbicides **could** be used in RCAs: 2,4-D, diquat, fluridone, glyphosate, imazapyr, triclopyr. The following restrictions apply to use of these herbicides in all RCAs:
    - Only ground-based broadcast or spot herbicide treatments would be used within RCAs.
    - Do not broadcast spray within 100 feet of open water when wind velocity exceeds 5 mph.
    - Do not broadcast spray when wind velocity exceeds 10 mph.
    - Do not use a high boom for broadcast spray within 100 feet of hydric vegetation. A low boom may be used from 50-100 feet of hydric vegetation.

- Do not broadcast spray within 0-50 feet of hydric vegetation. Spot application may occur using a backpack sprayer or ATV/UTV mounted spray equipment. Vehicles used for spraying would be appropriate for site conditions and local travel restrictions. Application methods may also include wicking, wiping, dipping, painting, or injecting.
- Use only herbicides approved for aquatic use within 15 feet of hydric vegetation.
- Avoid using glyphosate formulations that include R-11 and either avoid using any formulations with POEA, or seek to use the formulation with the lowest amount of POEA available, to reduce risks to aquatic organisms.
- Do not spray if precipitation is occurring or is imminent (within 24 hours).
- Do not spray if air turbulence is sufficient to affect the normal spray pattern.
- Maintain equipment used for transportation, storage or application of chemicals in a leak proof condition.
- Do not store or mix herbicides, or conduct post-application cleaning within riparian areas.
- Ensure that trained personnel monitor weather conditions at spray times during application.
- Strictly enforce all herbicide labels.
- Follow all instructions and SOPs to avoid spill and direct spray scenarios into aquatic habitats. Special care should be followed when transporting and applying 2,4-D, bromacil, clopyralid, diruon, glyphosate, hexazinone, imazapyr, metsulfuron methyl, picloram, tebuthiuron, and triclopyr.
  Additional restrictions are listed below for treatments in and adjacent to ESA TEP aquatic species habitats.

Aquatic herbicides such as *diquat* and *fluridone* may be used to treat infestations of aquatic invasive plants on BLM lands within the TFD. Treatments would focus on reservoirs (e.g. Salmon Falls, Magic, Wilson Lake, or Lower Goose Creek Reservoirs) that are not occupied by special status aquatic species. Aquatic herbicides would only be used on a case-by-case basis after alternative aquatic vegetation treatments (i.e. mechanical or biological) have been demonstrated as ineffective.

Areas with potential for groundwater for domestic or municipal water use shall be evaluated through the appropriate, validated EPA model(s) to estimate vulnerability to potential groundwater contamination, and appropriate mitigation measures shall be developed if such an area requires the application of herbicides and cannot otherwise be treated with non-chemical methods.

Figure 3 - Relationship Between the Stream Channel, Upland, and Riparian Vegetation Within the RCA



Special Status Aquatic Animal Species (TEP and BLM sensitive)

Applicable conservation measures specific to TEP aquatic species listed below are from the BAs for the 2007 and 2016 PEISs and should be used to develop site-specific treatment plans. These would be applied in addition to the design features and conservation measures listed above for RCAs. These conservation measures would apply to treatments occurring in watersheds with TEP aquatic species, as well as designated and proposed critical habitats. Conservation measures for TEP aquatic species listed below, including protective buffers, should be reviewed and applied as needed to protect BLM sensitive aquatic species.

Additional conservation measures apply to all special status aquatic species (TEP and BLM sensitive), as noted.

Conservation Measures for Site Access and Fueling/Equipment Maintenance

- Where TEP aquatic species occur, consider ground-disturbing activities on a case by case basis, and implement SOPs to ensure minimal erosion or impact to the aquatic habitat.

Conservation Measures Related to Mechanical Treatments

- Ground-disturbing activities other than tree and shrub planting or minimum-disturbance seeding methods would not occur within 300 feet of all water bodies and springs containing special status aquatic species or their habitats. Minimum-disturbance seeding methods would include broadcast seeding with a lightweight smooth or tined harrow, smooth chain, or no-till drill.

Conservation Measures Related to Prescribed Fire

For prescribed fire treatments adjacent to RCAs:

- Within RCAs:
  - Do not camp, unless allowed by local consultation.
  - Have a fisheries biologist determine whether pumping activity can occur in streams with TEP aquatic species.
  - During water drafting/pumping, maintain a continuous surface flow of the stream that does not alter original wetted stream width.
  - Do not alter dams or channels in order to pump in streams occupied by TEP aquatic species.
  - Consult with a local fisheries biologist prior to helicopter dipping in order to avoid entrainment and harassment of TEP aquatic species.

Conservation Measures Related to Biological Control

- Goats or sheep would not be used in developed sites within RCAs containing TEP aquatic species habitat.

Conservation Measures Related to Herbicide Treatments

- Buffers for *diuron* would be as follows for TEP aquatic species:
    - If using a high boom at typical application rate or low boom at maximum application rate, do not spray within 300 feet of habitats where TEP aquatic species occur.
    - If using a high boom at maximum application rate, do not spray within 900 feet of habitats where TEP aquatic species occur.
- Do not use *diquat, fluridone*, terrestrial formulations of *glyphosate*, or *triclopyr BEE,* to treat aquatic vegetation in habitats where TEP aquatic species occur or may potentially occur.
- Do not broadcast spray *diuron, glyphosate, picloram*, or *triclopyr BEE* in upland habitats adjacent to aquatic habitats that support or may potentially support TEP aquatic species under conditions that would likely result in off-site drift.
- In watersheds that support TEP aquatic species or their habitat, do not apply *bromacil, diuron, tebuthiuron*, or *triclopyr BEE* in upland habitats within 0.5 mile upslope of aquatic habitats that support TEP aquatic species under conditions that would likely result in surface runoff.
- No surfactants would be used within 15 feet of streams containing TEP and BLM sensitive aquatic species.

The following conservation measures would apply to protect habitats for ESA-listed snails:

- Aerial herbicide treatments would not occur within 0.5 miles of the Snake River or lower Bruneau River downstream of the wilderness boundary (Bruneau hot springsnail Recovery Area) to protect listed Snake River snails, Banbury Springs lanx, and the Bruneau hot springsnail.
- No spraying of herbicides would occur within 15 feet of geothermal springs within the Bruneau hot springsnail Recovery Area or within 15 feet of the water in Box Canyon and Briggs Creek to protect Banbury Springs lanx. Manual treatments and aquatic-approved herbicide applications using wicking, wiping, dipping, painting, or injection are the only treatment methods allowed in these habitats.

The following conservation measure would apply to bull trout critical habitat:

- No aerial herbicide treatment would occur within 300 feet of the canyon rim for the Bruneau River or Jarbidge River (including the East Fork and West Fork Jarbidge River).

Additional conservation measures, including protective buffers, could be included in site-specific treatment plans to address conditions such as soil type, rainfall, vegetation type, and herbicide treatment method for protection of TEP aquatic species.

Conservation Measures Related to Re-vegetation Treatments

- Aerial seeding within or upstream of habitats occupied by special status aquatic species will be limited to seed mixtures with no added chemicals such as fertilizer.

- Ground-disturbing activities other than tree and shrub planting would not occur within 300 feet of all water bodies and springs containing special status aquatic species or their habitat.
- Hydro-mulch will not be used within 300 feet of occupied special status aquatic species habitat to avoid impacts associated with decreased water quality resulting from sediment and nutrient inputs and increased turbidity.

Wildlife (General)

To minimize risks to terrestrial wildlife and limit contamination of off-site vegetation, which may serve as forage for wildlife, do not exceed the typical application rate for applications of *dicamba, 2,4-D, bromacil, diuron,* Overdrive®, *glyphosate, hexazinone, tebuthiuron,* or *triclopyr* where feasible. Where practical, limit *glyphosate* and *hexazinone* to spot applications in rangeland and wildlife habitat areas to avoid contamination of wildlife food items. See Appendix D for specific herbicide application criteria.

Larger-scale treatments in big game habitat would be restricted during the following periods unless a short-term exemption is granted by the appropriate line officer. These dates, as specified, are general in nature and may be adjusted as needed based on local conditions. Treatments in big game winter range or breeding habitat would be coordinated with Idaho and Nevada state wildlife agencies.

- Big game winter range: November 15–April 30
- Calving/fawning/lambing habitat
  - Elk (*Cervus canadensis*)/mule deer (*Odocoileus hemionus*): May 1–June 30
  - Pronghorn (*Antilocapra americana*): May 15–June 30
  - Bighorn sheep (*Ovis canadensis*) lambing: April 15–June 30

See Appendix H additional information regarding seasonal wildlife restrictions.

Special Status Plants and Wildlife

If special status plant and/or animal populations and their habitats occur in a proposed treatment area, the area would be assessed for habitat quality and options for treatment. The current BLM list of special status species and their presence in each field office is found in Appendix I.

Proposed treatments near or adjacent to special status species habitat would be designed to occur outside the sensitive periods of a species life cycle or habitat (e.g. breeding/spawning season, winter habitat). There may be situations where completing the project during the sensitive period may be more beneficial to the species over time than if the project was not done at all. Such treatments would be designed to minimize potential impacts to special status species and their habitats. Refer to SOP for herbicide use (Appendix E) in addition to design features listed below when planning projects using herbicides.

<u>Special Status Plants</u>

Potential project areas would be assessed to determine presence or absence of populations or habitats for plants that are designated by the BLM State Director as sensitive, plants that are listed as threatened, endangered, or proposed for listing under the ESA, or candidates for listing.

Surveys of proposed project areas within potential habitat would be performed by botanically qualified staff to determine the presence/absence of the species.

The following general design features would apply to areas containing BLM sensitive plants or their habitats. These design features were derived from land use plans and amendments.

General design features for BLM sensitive plants

- Requirements of individual BLM sensitive plants would be considered when designing seed mixtures and ground-disturbing activities in their habitats.
- Use seeding methods that minimize impacts to special status species populations.
- Seeding within occupied habitat would not be done, unless it is clearly beneficial for the BLM sensitive plants occupying the site.
- Highly competitive non-native plant materials would not be used in BLM sensitive plant habitats unless native plant materials are unavailable or they are needed to stabilize a site.
- The biology and ecology of BLM sensitive plants would be considered when selecting a method of noxious weed control, including herbicides and associated application methods and biological controls. Treatments would be designed to avoid adverse impacts to sensitive plant populations and their habitats.
- Apply protective buffers for broadcast herbicide treatments as needed to protect BLM sensitive plants and their pollinators. General guidelines for herbicide-specific buffers are located on pp. 4-130 to 4-134 of the BA for the 2007 PEIS and Appendix C of the ROD for the 2016 PEIS.

Slickspot peppergrass, Threatened

Planning and implementation of vegetation treatment activities will comply with the Biological and Conference Opinion for the 2015 Jarbidge Resource Management Plan (RMP) (USFWS, 2015a). Applicable conservation measures and implementation actions from the Biological Opinion are presented below. Conservation measures from the BAs for the 2007 and 2016 PEISs, including buffers for broadcast herbicide treatments, were added as appropriate. Additional conservation measures, implementation actions, and design features from future plans and agreements would be incorporated to site-specific treatment plans as necessary.

BLM will promote diversity, richness, and health of native plant communities to support pollinators and habitat for slickspot peppergrass.

- BLM will focus slickspot peppergrass habitat conservation and restoration efforts in or adjacent to occupied habitat to encourage connectivity among populations through the following measures:
    - Utilize current inventory standards (USDI BLM, 2010, or more current) for evaluation of potential habitat.
    - Where habitat categories for slickspot peppergrass exist, BLM will conserve remaining stands of sagebrush and native vegetation in making activity plan and project level decisions.
    - Vegetation treatment projects undertaken in habitat categories for slickspot peppergrass will be compatible with species habitat restoration objectives, as described below.

- BLM will select and implement specific projects to restore habitat categories for slickspot peppergrass in degraded areas as funding allows, such as planting shrubs and forbs and controlling noxious weeds, within and adjacent to occupied habitat. Apply methods described below.
- Current element occurrence (EO) ranks would be used to prioritize the need for and scope of restoration treatments in occupied habitat. Habitat supporting A- or B-ranked EOs would have little need for restoration treatments except for spot noxious weed and invasive plant treatments using manual, biological control, or herbicide methods. C-ranked and lower EOs typically occur in habitats that contain or are dominated by noxious weeds and invasive plants, and may be lacking key native community components such as sagebrush, grasses, and forbs. These habitats would require larger-scale treatments using multiple methods to control noxious weeds and invasive plants and restore diverse plant communities that support slickspot peppergrass.
- When conducting vegetation treatment projects, BLM will use seeding techniques that minimize soil disturbance such as minimum-till drills and rangeland drills equipped with depth bands, use native plant materials and seed during restoration activities, and select native forbs that benefit slickspot peppergrass insect pollinators.
- Large-scale habitat restoration treatments that could result in short-term adverse effects, including broadcast herbicide application, would not be applied to more than 10 percent of occupied habitat until treatment effectiveness and impacts to slickspot peppergrass habitat have been determined through monitoring.
- Limit use of full-size vehicles for treatment site access and equipment staging to existing roads in slickspot peppergrass habitats.

Although non-chemical methods will be the preferred approach in occupied habitat, when appropriate, projects involving the application of pesticides (including herbicides, fungicides, and other related chemicals) in slickspot peppergrass habitat and potential habitat that may affect the species will be analyzed at the project level and designed such that pesticide applications will support conservation and minimize risks of exposure

- Site-specific stipulations will be developed locally using these criteria:
  - Evaluate the benefits and risks of vegetation treatment including the following: application methods; pesticides, carriers, and surfactants used; needed treatment buffers; and use of non-chemical noxious weed control (e.g., biological controls and hand pulling).
  - Apply appropriate spatial and temporal buffers to avoid species' exposure to harmful chemicals, including from off-site drift. Refer to Table 4 for buffer distances for ground and aerial broadcast application.
  - Explore opportunities to eradicate competing non-native invasive plants in occupied habitat where slickspots are being invaded by such plants.
  - Implement re-vegetation and noxious weed control measures to reduce the risks of non-native invasive plant infestations following ground/soil disturbing actions in slickspot peppergrass habitat.

- Do not use goats or sheep to control noxious weeds or invasive plants in slickspot peppergrass occupied habitat.
- Determine risks to slickspot peppergrass prior to use of biological control agents that affect target plants in the mustard family (Brassicaceae).

Suggested buffers for broadcast herbicide treatments are presented in Table 4. Herbicides would not be broadcast sprayed within buffers unless treatments would maintain or improve slickspot peppergrass habitat and would result in long-term benefits for the species.

Buffers could be altered at the local level based on site-specific conditions. Additional analysis may be necessary at the local level that considers site conditions such as soil type, annual precipitation, vegetation type, site topography, and treatment method. Where formulas are used that contain multiple active ingredients, the buffers for the formulated product will be based on the active ingredient that requires the greatest distance. If a tank mix of one or more chemicals is desired, an additional assessment of potential effects to slickspot peppergrass must be made with the assumption that effects of the herbicides are at a minimum additive. Larger buffers may be warranted.

On-going spot treatment of target species can occur within buffers if the herbicide application method would not result in drift to slickspot peppergrass. Accepted methods would include direct spray, painting, wicking, dipping, or injection. BLM will educate weed treatment staff annually, including weed management cooperators, regarding slickspot peppergrass identification and conservation measures for weed control.

Table 4 - Herbicide-specific spatial buffers for broadcast spray application in the vicinity of slickspot peppergrass occupied and unsurveyed potential habitat

Herbicide	Spatial Buffer
2,4-D	• Do not spray within ½ mile of slickspot peppergrass occupied or unsurveyed potential habitat.
Aminopyralid	<u>Ground Application</u> • If using a low boom at the typical application rate, do not apply within 100 feet of slickspot peppergrass occupied or unsurveyed potential habitat. • If using a low boom at the maximum application rate or a high boom at the typical application rate, do not apply within 400 feet of slickspot peppergrass occupied or unsurveyed potential habitat. • If using a high boom at the maximum application rate, do not apply within 600 feet of slickspot peppergrass occupied or unsurveyed potential habitat. <u>Aerial Application</u> • Do not apply by airplane at the typical application rate within 1,800 feet of slickspot peppergrass occupied or unsurveyed potential habitat. • Do not apply by airplane at the maximum application rate within 2,000 feet of slickspot peppergrass occupied or unsurveyed potential habitat. • Do not apply by helicopter at the typical application rate within 1,600 feet of slickspot peppergrass occupied or unsurveyed potential habitat. • Do not apply by helicopter at the maximum application rate within 1,700 feet of slickspot peppergrass occupied or unsurveyed potential habitat. <u>General</u> • In areas with severe or very severe potential for wind erosion, do not apply within 1.2 miles of slickspot peppergrass occupied or unsurveyed potential habitat.
Bromacil	• No aerial application. • Do not apply within 1,200 feet of slickspot peppergrass occupied or unsurveyed potential habitat. • In areas with severe or very severe potential for wind erosion, do not apply within ½ mile of slickspot peppergrass occupied or unsurveyed potential habitat.
Chlorsulfuron	• No aerial application. • Do not apply by ground methods within 1,200 feet of slickspot peppergrass occupied or unsurveyed potential habitat. • In areas with severe or very severe potential for wind erosion, do not apply within ½ mile of slickspot peppergrass occupied or unsurveyed potential habitat.
Clopyralid	• Use only a low boom during ground applications of this herbicide within ½ mile of slickspot peppergrass occupied or unsurveyed potential habitat. • Do not apply by ground methods at the typical application rate within 900 feet of slickspot peppergrass occupied or unsurveyed potential habitat. • Do not apply by aerial methods within ½ mile of slickspot peppergrass occupied or unsurveyed potential habitat • In areas with severe or very severe potential for wind erosion, do not apply within ½ mile of slickspot peppergrass occupied or unsurveyed potential habitat.
Dicamba	• If using a low boom at the typical or maximum application rate or high boom at typical application rate, do not apply within 1,050 feet of slickspot peppergrass occupied or unsurveyed potential habitat. • In areas with severe or very severe potential for wind erosion, do not apply within ½ mile of slickspot peppergrass occupied or unsurveyed potential habitat.

Herbicide	Spatial Buffer
Diquat	• This herbicide is used for aquatic treatments only and would not be used in or near slickspot peppergrass habitats.
Diuron	• No aerial application. • Do not apply within 1,100 feet of terrestrial TEP species. • If using a low boom at the typical application rate, do not apply within 900 feet of aquatic habitats where TEP aquatic plant species occur. • If using a high boom, or a low boom at the maximum application rate, do not apply within 1,100 feet of aquatic habitats where TEP aquatic plant species occur. • In areas where wind erosion is likely, do not apply within ½ mile of TEP plant species.
Fluridone	• This herbicide is used for aquatic treatments only and would not be used in or near slickspot peppergrass habitats.
Fluroxypyr	<u>Ground Application</u> • If using a low boom at the typical application rate, do not apply within 100 feet of slickspot peppergrass occupied or unsurveyed potential habitat. • If using a low boom at the maximum application rate, do not apply within 600 feet of slickspot peppergrass occupied or unsurveyed potential habitat. • If using a high boom at the typical application rate, do not apply within 400 feet of slickspot peppergrass occupied or unsurveyed potential habitat. • If using a high boom at the maximum application rate, do not apply within 700 feet of slickspot peppergrass occupied or unsurveyed potential habitat. <u>Aerial Application</u> • Do not apply by airplane at the typical application rate within 1,100 feet of slickspot peppergrass occupied or unsurveyed potential habitat. • Do not apply by helicopter at the typical application rate within 900 feet of slickspot peppergrass occupied or unsurveyed potential habitat. • Do not apply by airplane or helicopter at the maximum application rate within 1,500 feet of slickspot peppergrass occupied or unsurveyed potential habitat. <u>General</u> • In areas with severe or very severe potential for wind erosion, do not apply within 1.2 miles of slickspot peppergrass occupied or unsurveyed potential habitat.
Glyphosate	• Use only a low boom during ground applications of this herbicide within ½ mile of slickspot peppergrass occupied or unsurveyed potential habitat. • Do not apply by ground methods at the typical application rate within 50 feet of terrestrial slickspot peppergrass occupied or unsurveyed potential habitat. • Do not apply by ground methods at the maximum application rate within 300 feet of terrestrial slickspot peppergrass occupied or unsurveyed potential habitat. • Do not apply by aerial methods within 300 feet of slickspot peppergrass occupied or unsurveyed potential habitat.
Hexazinone	• Only apply this herbicide by ground methods using a low boom within ½ mile of slickspot peppergrass occupied or unsurveyed potential habitat. • Do not apply by ground methods at the typical application rate within 300 feet of slickspot peppergrass occupied or unsurveyed potential habitat. • Do not apply by ground methods at the maximum application rate within 900 feet of slickspot peppergrass occupied or unsurveyed potential habitat. • In areas with severe or very severe potential for wind erosion, do not apply within ½ mile of slickspot peppergrass occupied or unsurveyed potential habitat.

Herbicide	Spatial Buffer
Imazapic	• Do not apply by ground methods within 25 feet of slickspot peppergrass occupied or unsurveyed potential habitat. • Do not apply by helicopter at the typical application rate within 25 feet of slickspot peppergrass occupied or unsurveyed potential habitat. • Do not apply by helicopter at the maximum application rate, or by plane at the typical application rate, within 300 feet of slickspot peppergrass occupied or unsurveyed potential habitat. • Do not apply by plane at the maximum application rate within 900 feet of slickspot peppergrass occupied or unsurveyed potential habitat. • In areas where wind erosion is likely, do not apply within ½ mile of slickspot peppergrass occupied or unsurveyed potential habitat.
Imazapyr	• Use only a low boom for ground applications of this herbicide within ½ mile of slickspot peppergrass occupied or unsurveyed potential habitat. • Do not apply at the typical application rate, by ground or aerial methods, within 900 feet of slickspot peppergrass occupied or unsurveyed potential habitat. • Do not apply at the maximum application rate, by ground or aerial methods, within ½ mile of slickspot peppergrass occupied or unsurveyed potential habitat. • In areas with severe or very severe potential for wind erosion, do not apply within ½ mile of slickspot peppergrass occupied or unsurveyed potential habitat.
Metsulfuron Methyl	• No aerial application. • Use only a low boom for ground applications of this herbicide within ½ mile of slickspot peppergrass occupied or unsurveyed potential habitat. • Do not apply at the typical application rate by ground methods within 900 feet of slickspot peppergrass occupied or unsurveyed potential habitat. • Do not apply at the maximum application rate, by ground methods within ½ mile of slickspot peppergrass occupied or unsurveyed potential habitat. • In areas with severe or very severe potential for wind erosion, do not apply within ½ mile of slickspot peppergrass occupied or unsurveyed potential habitat.
Overdrive® ***(Diflufenzopyr + Dicamba)***	• No aerial application. • If using a low boom at the typical application rate, do not apply within 100 feet of slickspot peppergrass occupied or unsurveyed potential habitat. • If using a low boom at the maximum application rate, do not apply within 900 feet of slickspot peppergrass occupied or unsurveyed potential habitat. • If using a high boom, do not apply within 900 feet of slickspot peppergrass occupied or unsurveyed potential habitat. • In areas with severe or very severe potential for wind erosion, do not apply within ½ mile of slickspot peppergrass occupied or unsurveyed potential habitat.
Picloram	• Do not apply by ground or aerial methods, at any application rate, within ½ mile of slickspot peppergrass occupied or unsurveyed potential habitat. • In areas with severe or very severe potential for wind erosion, do not apply within ½ mile of TEP plant species.

Herbicide	Spatial Buffer
Rimsulfuron	Ground Application • If using a low boom at the typical application rate, do not apply within 200 feet of TEP terrestrial plants. • If using a low boom at the maximum application rate or a high boom at the typical application rate, do not apply within 400 feet of TEP terrestrial plants. • If using a high boom at the maximum application rate, do not apply within 700 feet of slickspot peppergrass occupied or unsurveyed potential habitat. Aerial Application • Do not apply by airplane at the typical application rate within 1,600 feet of slickspot peppergrass occupied or unsurveyed potential habitat. • Do not apply by airplane at the maximum application rate within 1,900 feet of slickspot peppergrass occupied or unsurveyed potential habitat. • Do not apply by helicopter at the typical application rate within 1,400 feet of slickspot peppergrass occupied or unsurveyed potential habitat. • Do not apply by airplane or helicopter at the maximum application rate within 1,600 feet of slickspot peppergrass occupied or unsurveyed potential habitat. General • In areas with severe or very severe potential for wind erosion, do not apply within 1.2 miles of slickspot peppergrass occupied or unsurveyed potential habitat.
Tebuthiuron	• If using a low boom at the typical application rate, do not apply within 25 feet of terrestrial slickspot peppergrass occupied or unsurveyed potential habitat. • If using a low boom at the maximum application rate or a high boom at the typical application rate, do not apply within 50 feet of slickspot peppergrass occupied or unsurveyed potential habitat. • If using a high boom at the maximum application rate, do not apply within 900 feet of slickspot peppergrass occupied or unsurveyed potential habitat. • In areas with severe or very severe potential for wind erosion, do not apply within ½ mile of slickspot peppergrass occupied or unsurveyed potential habitat.
Triclopyr Acid	• Use only a low boom during ground applications of this herbicide within ½ mile of slickspot peppergrass occupied or unsurveyed potential habitat. • Do not apply by ground methods at the typical application rate within 300 feet of slickspot peppergrass occupied or unsurveyed potential habitat. • Do not apply by aerial methods at the typical application rate within 500 feet of slickspot peppergrass occupied or unsurveyed potential habitat. • Do not apply by ground or aerial methods at the maximum application rate within ½ mile of slickspot peppergrass occupied or unsurveyed potential habitat. • In areas with severe or very severe potential for wind erosion, do not apply within ½ mile of slickspot peppergrass occupied or unsurveyed potential habitat.
Triclopyr BEE	• Use only a low boom for ground applications of this herbicide within ½ mile of slickspot peppergrass occupied or unsurveyed potential habitat. • Do not apply by ground methods at the typical application rate within 300 feet of slickspot peppergrass occupied or unsurveyed potential habitat. • Do not apply by aerial methods at the typical application rate within 500 feet of slickspot peppergrass occupied or unsurveyed potential habitat. • Do not apply by ground or aerial methods at the maximum application rate within ½ mile of slickspot peppergrass occupied or unsurveyed potential habitat. • In areas with severe to very severe potential for wind erosion, do not apply within ½ mile of slickspot peppergrass occupied or unsurveyed potential habitat.

Where needed and feasible, coordinate with adjacent land owners and local governments regarding control of invasive plants in upland areas through cooperative weed management programs.

- Take advantage of cooperative weed management opportunities as they arise.
- Restore wildlife habitat while promoting slickspot peppergrass conservation.
- Any restoration efforts for wildlife within habitat categories for slickspot peppergrass will be compatible with slickspot peppergrass habitat requirements.

Prescribed fire projects will be designed to conserve and enhance slickspot peppergrass habitat.

- Prescribed fire in slickspot peppergrass habitat will only be used as a tool for assisting with species conservation (e.g., a burn in preparation to decrease cheatgrass litter before herbicide application, or to clear fence lines of accumulated windblown weeds).

Fuels management projects conducted in habitat categories for slickspot peppergrass should have long-term benefits to slickspot peppergrass.

- Avoid fuels management projects in occupied habitat, unless such projects would enhance species conservation or are necessary for hazardous fuels reduction near the urban interface. Implement protection measures to avoid or minimize negative impacts to the species. In habitat categories for slickspot peppergrass, design native seed mixtures that emphasize local stock and will promote species conservation.
    - Because of potential negative impacts to habitat categories for slickspot peppergrass from linear fuel breaks, which can act as weed dispersal corridors, the following measures will be applied in or adjacent to habitat categories for slickspot peppergrass:
        - BLM will evaluate the effectiveness of existing fuel breaks (location, dry fuel load, and noxious weed and invasive plant composition) in protecting habitat categories for slickspot peppergrass.
        - BLM may create and maintain fuel breaks where frequent fires can threaten habitat categories for slickspot peppergrass. New fuel breaks in habitat categories for slickspot peppergrass will be designed to conserve and enhance its habitat. Where appropriate and where objectives will be met, native vegetation should be emphasized in the creation of new fuel breaks. If native vegetation or seed is not available or if objectives would be met through their use, fuel breaks may include non-native, non-invasive, species that will not invade slickspots. In areas adjacent to habitat categories for slickspot peppergrass, fuel breaks may include potentially invasive non-native species such as intermediate wheatgrass (*Thinopyrum intermedium*) and forage kochia (*Kochia* or *Bassia prostrata*) as a last resort if the benefits of their use are demonstrated to outweigh the risks to slickspot peppergrass and its habitat. If potentially invasive non-native species are used, monitoring for spread will occur. If spread is found to occur outside the original treatment area, control measures will be applied to eliminate further spread.

        - Consider actions to repair or restore existing fuel breaks so they function as desired.
    - BLM may create fuel breaks using techniques such as mowing to strategically reduce fuel loads where frequent fires can threaten habitat categories for slickspot peppergrass if the benefit of these actions can be demonstrated to outweigh the risks to slickspot peppergrass and its habitat.

Provide adequate rest from livestock use for areas treated after major disturbances in habitat categories for slickspot peppergrass. Major disturbances include fire, fire rehabilitation, or other soil-disturbing occurrences.

- Protect treated areas by using temporary livestock closures or other measures. The length of rest will be determined by achieving certain goals associated with plant establishment outlined in the restoration, fire rehabilitation, or other plan.

Site-specific larger-scale vegetation treatment plans will use *A Framework to Assist in Making Endangered Species Act Determinations of Effect for Slickspot Peppergrass* or current analysis methods to analyze potential effects of proposed treatments on slickspot peppergrass and/or proposed critical habitat. If proposed vegetation treatments would result in long-term adverse effects to slickspot peppergrass or adverse modification or destruction of proposed critical habitat, additional consultation with the Service may be required.

Goose Creek Milkvetch (Astragalus anserinus), Type 2 BLM Sensitive Species

Goose Creek milkvetch is a narrowly endemic plant known from the Goose Creek drainage near the Idaho/Utah/Nevada border. The BLM and the Service signed a Conservation Agreement and Strategy (agreement) for protection of the species and its habitat in July 2015 (USDI BLM & USFWS, 2015). Applicable conservation actions contained in the agreement are listed below:

<u>Fire Prevention</u>

BLM fire prevention activities will be conducted to reduce the threat of fire within Goose Creek milkvetch occupied habitat and throughout the range of the species. A high priority will be placed on protecting Goose Creek milkvetch occupied habitat from fire.

- Fuel breaks may be beneficial to reduce the spread of wildfire to Goose Creek milkvetch occupied habitat; however, there may be potential negative impacts to Goose Creek milkvetch because fuel breaks may facilitate weed dispersal. Use of existing roads as fire breaks is encouraged. BLM proposed fuel breaks within the Goose Creek milkvetch pollinator buffer [500 m (1,640 ft.)] will be discussed with the conservation team prior to implementation.
- New fuel breaks will be prohibited within Goose Creek milkvetch habitat.
    - If new fuel breaks are planned within the pollinator buffer of Goose Creek milkvetch occupied habitat, targeted surveys to detect and control invasive species will be performed on a regular basis.
    - The seeding or use of highly competitive, non-native species, such as crested wheatgrass (*Agropyron cristatum*), intermediate wheatgrass, and kochia species will not be used in fuel breaks within the pollinator buffer of Goose Creek milkvetch occupied habitat.

- Where site-specific modifications or conditions warrant changes to this conservation action, changes will occur in coordination with the conservation team. Any modification will include a documented rationale or justification.

- Cheatgrass control by herbicide application or other methods will be considered within Goose Creek milkvetch occupied habitat and the pollinator buffer if and when the level of cheatgrass significantly increases the risk of wildfire or habitat alteration. Control methods and monitoring will be developed by the BLM in coordination with the conservation team.

Re-vegetation

The use of native forbs in seed mixtures, with a variety of blooming times, and preferably found within the range of Goose Creek milkvetch occupied habitat, is encouraged in order to benefit Goose Creek milkvetch insect pollinators and pollinator enhancement in restoration projects. Seeding should only be used when there is a documented high mortality of native grasses and forbs, or a documented need to improve diversity within Goose Creek milkvetch occupied habitat or the pollinator buffer.

- Within Goose Creek milkvetch occupied habitat, the BLM will use native forbs and grasses in seed mixtures as needed. Native plants and seeds that originate from local sources and/or from existing provisional seed zones for target native species are preferred. If native plants are not available, non-highly competitive, non-native or native cultivar plant species will be used.
- Within Goose Creek milkvetch occupied habitat, the BLM will exclude the seeding of highly competitive, non-native plant species including crested wheatgrass, intermediate wheatgrass, and kochia species. The seeding density of non-native grasses should be calibrated based upon the native grass survival so as not to exceed the target or pre-disturbance grass canopy cover of the site.
- Within the Goose Creek milkvetch pollinator buffer, the conservation actions for re-vegetation above will generally apply. Exceptions to the exclusion of seeding highly competitive, non-native plant species including crested wheatgrass, intermediate wheatgrass, and kochia species within the pollinator buffer will be considered where site-specific modifications or conditions warrant their use. The BLM will notify the conservation team if an exception is necessary. Additional monitoring and control measures may be incorporated into the project design, as recommended by the conservation team. Control measures will be informed by monitoring and based upon thresholds or triggers that are exceeded.
- Within Goose Creek milkvetch occupied habitat, the use of aerial seeding only (without accompanying soil surface disturbance activities), back-pack seeders, and hand planting will be utilized to reduce surface disturbance from seeding activities.
- Within Goose Creek milkvetch occupied habitat, drill seeding is prohibited. Exceptions will be considered if drill seeding may be beneficial to reduce another threat to Goose Creek milkvetch. Where site-specific modifications or conditions warrant drill seeding within Goose Creek milkvetch occupied habitat, the BLM will notify the conservation team. Drill seeding within Goose Creek milkvetch occupied habitat will require a rationale for the benefits of drill seeding as well as a monitoring and adaptive

management plan that is developed by the BLM in coordination with the conservation team.

- Within the Goose Creek milkvetch pollinator buffer, drill seeding is permitted. Goose Creek milkvetch occupied habitat will be flagged and clearly visible prior to drill seeding activities so drill seeding activities do not occur within Goose Creek milkvetch occupied habitat. Equipment operators will have GPS polygons delineating Goose Creek milkvetch occupied habitat to avoid them. A biological monitor (which includes trained personnel familiar with Goose Creek milkvetch) is required to be on-site during drill-seeding activities within the pollinator buffer to ensure compliance.
- BLM Field Office staff, in coordination with and agreement from the conservation team, will examine and modify the actions identified here in order to accommodate changes necessary to improve the effectiveness of re-vegetation treatments within Goose Creek milkvetch occupied habitat.

Leafy Spurge Management

Leafy spurge control will be conducted throughout the range of Goose Creek milkvetch through integrated pest management (chemical, biological, mechanical, and manual control methods). A high priority will be placed on controlling leafy spurge within Goose Creek milkvetch occupied habitat.

- The BLM will include Goose Creek milkvetch populations and Goose Creek milkvetch occupied habitat on leafy spurge weed control planning maps and regularly inform weed crews and new staff regarding current conservation actions.
- Annual funding of leafy spurge control will be prioritized and actively pursued by the BLM at each respective field office. Leafy spurge within Goose Creek milkvetch occupied habitat will be a high priority for treatment.
- Effective BLM approved chemical and biological methods will be used to control leafy spurge within Goose Creek milkvetch occupied habitat as identified in the 2007 PEIS or other BLM District specific vegetation treatments plans.
- The BLM in Idaho and Utah will closely coordinate with Cassia County and Box Elder County in the treatment and monitoring of leafy spurge in the Goose Creek drainage. The BLM will remain an active partner in established weed management areas (WMAs): Goose Creek, Raft River, Elko County, and Tri State WMAs.
- On BLM lands, leafy spurge control will occur on an annual basis at known locations within Goose Creek milkvetch occupied habitat and adjacent areas in Idaho, Nevada, and Utah, as funding allows.
- Within Goose Creek milkvetch occupied habitat, leafy spurge treatment 2 times per year is recommended for post-fire years 1, 2, and 3.
- In accordance with the Conservation Agreement and Strategy, BLM staff in coordination with the conservation team will develop a schedule of repeated surveys in Goose Creek milkvetch occupied habitat to detect new invasions of leafy spurge or other invasive species, as well as monitor leafy spurge treatment effectiveness within Goose Creek milkvetch occupied habitat. Leafy spurge surveys and monitoring within Goose Creek milkvetch occupied habitat can be incorporated as part of the range-wide monitoring plan.

- The schedule of repeated surveys for new leafy spurge infestations will ensure that surveys will be performed within Goose Creek milkvetch occupied habitat on an annual or biennial basis within each BLM field office.
- Until additional monitoring protocols are developed in coordination with the conservation team, the BLM will implement the existing leafy spurge monitoring protocols from the Idaho BLM which include: a) installation of monitoring plots around leafy spurge plants in Goose Creek milkvetch occupied habitat; b) counting the number of leafy spurge stems within the plot on a regular basis.

- BLM Field Office staff, in coordination with and agreement from the conservation team, will use an adaptive management process to examine and modify the actions identified here in order to accommodate changes necessary to improve the effectiveness of weed control activities within Goose Creek milkvetch occupied habitat.

General Noxious Weed Management

Weed control will be conducted within Goose Creek milkvetch occupied habitat through integrated pest management (chemical, biological, mechanical, and manual control methods). A high priority will be placed on controlling weeds within Goose Creek milkvetch occupied habitat. A proactive approach is recommended to monitor invasions in nearby areas and to select the appropriate treatment methods that conserve Goose Creek milkvetch.

- The BLM will include Goose Creek milkvetch populations and sites on weed control planning maps and regularly inform weed crews and new staff on current conservation actions and treatment protocols for Goose Creek milkvetch occupied habitat.
- In accordance with the Conservation Agreement and Strategy, BLM staff and the conservation team will develop a schedule of repeated surveys in Goose Creek milkvetch occupied habitat to detect new invasions of weeds in addition to leafy spurge. Weed surveys and monitoring within Goose Creek milkvetch occupied habitat can be incorporated as part of the range-wide monitoring plan.
- As invasions of noxious weeds occur within Goose Creek milkvetch occupied habitat and the presence and or density of such weeds is determined to be a risk to Goose Creek milkvetch habitat, BLM staff will develop treatment protocols that identify treatment options as appropriate for each known weed species and the most appropriate control methods within Goose Creek milkvetch occupied habitat, in coordination with the conservation team.
- The BLM and the conservation team will develop a monitoring protocol to evaluate the effectiveness of control methods within Goose Creek milkvetch occupied habitat. This will occur on an as needed basis. The BLM will provide weed control and weed invasion updates to the conservation team on an annual basis.
- Until additional treatment protocols are developed in coordination with the conservation team, the BLM will implement the following measures within Goose Creek milkvetch occupied habitat: a) herbicide treatments are limited to back-pack sprayers, animal-pack sprayers or ATV/UTV sprayers; and b) ATV/UTV use on steep slopes or Salt Lake Formation “ashy” outcrops within Goose Creek milkvetch occupied habitat will be prohibited.

- The BLM Field Offices, in coordination with the conservation team, will use an adaptive management process to examine and modify the treatment methods to accommodate changes necessary to improve the effectiveness of weed control activities within Goose Creek milkvetch occupied habitat.
- When and where feasible, the BLM will cooperate to control noxious weeds in established cooperative weed management programs.

Special Status Wildlife Species

Yellow-billed Cuckoo (Coccycus americanus), Threatened

- Conduct surveys of suitable habitat prior to vegetation inventory or treatments that may impact yellow-billed cuckoo during the nesting season (May 1 through August 31). Surveys would be performed by a qualified biologist holding a current survey permit.
- Conduct inventory and spot treatments for noxious weeds or invasive plants, including manual, biological, and herbicide treatments, prior to May 1 or after August 31 in occupied, proposed critical, or unsurveyed suitable habitats.
- If manual, biological control, or spot herbicide treatments of noxious weeds or invasive plants prior to May 1 or after August 31 would not result in desired outcomes for containment or control, coordinate with the local biologist to determine measures that would minimize disturbance to potentially nesting birds. This could include limiting the number of people implementing treatments and the amount of time present in the habitat. Use only non-motorized access and spot herbicide application with backpack sprayers, manual, or biological control methods in occupied, proposed critical, or unsurveyed suitable habitat. Spot application methods include direct spray, painting, wicking, wiping, or injecting herbicide on or into individual plants. Refer to design features and conservation measures for water quality and RCAs for herbicide application restrictions in riparian areas.
- Mechanical treatments, ground-based broadcast application of herbicides, or cutting of noxious or invasive woody species would not occur from May 1 to August 31 within 200 feet of occupied, proposed critical, or unsurveyed suitable yellow-billed cuckoo habitat.
- Aerial application of chemicals would not occur from May 1 to August 31 within 0.5 miles of occupied, proposed critical, or unsurveyed suitable yellow-billed cuckoo habitat.
- Prescribed fire would not be used within 0.5 miles of occupied, proposed critical, or suitable yellow-billed cuckoo habitats.
- Following noxious weed or invasive plant control treatments, replant or reseed treated areas with native species, if natural recovery is not meeting management and/or habitat objectives. Planting of shrubs or trees within the area of fluvial influence would not occur from May 1 to August 31 in occupied, proposed critical, or unsurveyed suitable habitat.

Canada Lynx (Lynx Canadensis), Threatened

In order to minimize or avoid impacts to lynx, the BLM must follow, at a minimum, the conservation measures listed below:

- Prior to vegetation treatments, map lynx habitat within areas in which treatments are proposed to occur. Identify potential denning and foraging habitat, and topographic features that may be important for lynx movement (major ridge systems, prominent saddles, and riparian corridors).
- Design vegetation treatments in lynx habitat to approximate historical landscape patterns and disturbance processes.
- Ensure that no more than 30% of lynx habitat within a Lynx Analysis Unit (as defined in Ruediger et al., 2000) would be in an unsuitable condition at any time.
- If deemed necessary, defer livestock grazing following vegetation treatments to ensure the re-establishment of key plant species. BLM personnel should use resource goals and objectives to determine the need for this restriction and the length of deferment on a case by case basis.
- Give particular consideration to amounts of denning habitat, condition of summer and winter foraging habitat, as well as habitat linkages, to ensure that treatments do not negatively impact lynx. If there is less than 10% lynx habitat in a Lynx Analysis Unit, defer vegetation treatments that would delay development of denning habitat structure. Protect habitat connectivity within and between Lynx Analysis Units.
- Do not use *2,4-D* in Canada lynx habitat; do not broadcast spray *2,4-D* within ¼ mile of Canada lynx habitat.
- Where feasible, avoid use of the following herbicides in Canada lynx habitat: *bromacil, clopyralid, diquat, diuron, glyphosate, hexazinone, imazapyr, metsulfuron methyl, picloram*, and *triclopyr*.
- Do not broadcast spray *clopyralid, diuron, glyphosate, hexazinone, picloram*, or triclopyr in Canada lynx habitat; do not broadcast spray these herbicides in areas adjacent to Canada lynx habitat under conditions when spray drift onto the habitat is likely.
- If broadcast spraying *bromacil, diquat, imazapyr*, or *metsulfuron methyl* in or near Canada lynx habitat, apply at the typical, rather than the maximum, application rate.
- If conducting manual spot applications of *glyphosate, hexazinone*, or *triclopyr* to vegetation in Canada lynx habitat, utilize the typical, rather than the maximum, application rate.

Greater Sage-grouse (Centrocercus urophasianus), Type 2 BLM

The ROD for the Idaho and Southwestern Montana, Nevada and Northwestern California, Oregon, and Utah Greater Sage-Grouse ARMPAs/Final EISs provided greater sage-grouse management decisions that are applicable to individual projects occurring in sage-grouse habitat management areas (see Appendix L). Greater sage-grouse habitat within proposed project areas would be assessed during project-level planning within the management area designations including PHMA, IHMA, General Habitat Management Area (GHMA), and Other Habitat Management Area (OHMA). Project proposals and their effects would be evaluated based on the existing habitat and values affected. Required Design Features found in both applicable

ARMPAs/Final EISs are incorporated below. Seasonal dates may be modified due to documented local variations (e.g. higher/lower elevations) or annual climatic fluctuations (e.g. early/late spring, long/heavy winter) in coordination with state wildlife agencies in order to better protect sage-grouse and their habitats.

- Sage-grouse would be used as an umbrella species when planning vegetation treatments in sagebrush steppe (Noss, 1990; Rich & Altman, 2001; Rowland, Wisdom, Suring, & Meinke, 2006). The assumption is habitat needs for other sagebrush-obligate sensitive species would benefit from protection, improvement, and restoration of sage-grouse habitat. Other sagebrush obligates include pygmy rabbit (*Brachylagus idahoensis*), sage thrasher (*Oreoscoptes montanus*), sage sparrow (*Amphispiza belli*), and Brewer's sparrow (*Spizella breweri*). In some cases, some species may have habitat needs in addition to what is outlined for sage-grouse. Where identified, the interdisciplinary team would address unique habitat needs of other sagebrush obligates. The following design features would apply to sagebrush steppe habitats. Adjustments to dates may occur based on land use plan guidance and local conditions.
- Avoid constructing fences (temporary or permanent) within two kilometers of occupied sage-grouse leks. If fencing cannot be avoided, fences should be marked or flagged.
- Temporary protection fences would not be constructed within 400 yards of an active sage-grouse lek.
- No repeated or sustained behavioral disturbance (e.g., visual, noise over 10 dbA at lek, etc.) to lekking birds from 6:00 pm to 9:00 am within 2 miles (3.2 kilometers) of leks during the lekking season.
- Vegetation treatments within 0.6 miles of occupied sage-grouse leks that results in or could likely result in disturbance to lekking birds would be avoided from approximately 6:00 pm to 9:00 am. This guideline would apply from mid-February through mid-May.
- Treatments in areas supporting sage-grouse nesting habitat would be limited from March 1 through June 30.
- Treatments in brood-rearing habitat would be limited from May 15 to September 15 (early brood-rearing – May 15 to June 15; late brood-rearing June 15 to September 15).
- Treatments in close proximity to sage-grouse wintering habitats would be limited from November 1 through March 15.
- Within vegetation treatment areas, standing dead juniper trees that are potential raptor perches may be felled as needed to protect pygmy rabbits and sage-grouse from excessive predation.
- Solicit and consider expertise and ideas from local landowners, working groups, and other federal, state, county, and private organizations during development of projects.
- Avoid mechanized anthropogenic disturbance, in nesting habitat during the nesting season when implementing: 1) fuels/vegetation/habitat restoration management projects, 2) infrastructure construction or maintenance, 3) geophysical exploration activities; 4) organized motorized recreational events.
- Where applicable, design fuels treatment objectives to protect existing sagebrush ecosystems, modify fire behavior, restore native plants, and create landscape patterns which most benefit sage-grouse habitat.

- Use burning prescriptions which minimize undesirable effects on vegetation or soils (e.g., minimize mortality of desirable perennial plant species and reduce risk of annual grass invasion).
- Where appropriate, ensure that treatments are configured in a manner that promotes use by sage-grouse.
- Power-wash all vehicles and equipment involved in fuels management activities, prior to entering the area, to minimize the introduction of undesirable and/or invasive plant species.
- Load and unload all equipment on existing roads to minimize disturbance to vegetation and soils.
- Design vegetation treatments in areas of high fire frequency which facilitate firefighter safety, reduce the potential acres burned, and reduce the fire risk to sage-grouse habitat.
- Reduce the risk of vehicle or human-caused wildfires and the spread of invasive species by planting perennial vegetation (e.g. green-strips) paralleling road rights-of-way.
- Give higher priority to vegetation rehabilitation or manipulation projects that include:
    - Sites where environmental variables contribute to improved chances for project success (Meinke, Knick, & Pyke, 2009).
    - Areas where seasonal habitat is limiting sage-grouse distribution and/or abundance (wintering areas, wet meadows and riparian areas, nesting areas, leks, etc.).
    - Cooperative efforts that may improve sage-grouse habitat quality over multiple ownerships.
    - Projects that may provide connectivity between suitable habitats or expand existing good quality habitats.
    - Where desirable perennial bunchgrasses and/or forbs are deficient in existing sagebrush stands, use appropriate mechanical, aerial or other techniques to re-establish them. Examples include but are not limited to, use of a Lawson aerator with seeding, harrow or chain with seeding, drill seeding, hand planting plugs, aerial seeding or other appropriate technique.
    - Replace stands of annual grasses within otherwise good quality habitats with desirable perennial species. Other factors that contribute to the importance of the restoration project in maintaining or improving sage-grouse habitat.
    - Sage-grouse preferred forbs would be seeded in projects occurring in IHMA and PHMA when appropriate and available.
    - Re-establish sagebrush cover in otherwise suitable sage-grouse habitat with consideration to local needs and conditions using the general priorities in the following order:
        - Recently burned native areas
        - Native grassland with suitable forb component
        - Non-native grassland with suitable forb component
        - Recently converted annual grass areas
        - Native grassland
        - Non-native grassland

Sage Grouse Habitat Project Prioritization

The Fire and Invasives Assessment Tool (FIAT) provides the BLM and other land management agencies with a framework for prioritizing wildfire management and greater habitat conservation (Appendix H, ARMPA, 2015). Supported by USFS General Technical Report 326 (Chambers et al., 2014), FIAT provides the BLM with a mechanism to identify and prioritize areas within sage-grouse habitat for potential treatment based on their resistance and resilience characteristics. Areas will likely respond differently to fuels management, wildfire, and subsequent rehabilitation dependent on a variety of factors identified in Chambers et al. (2014).

FIAT will be used at the field level as one of multiple factors to help prioritize projects in sage-grouse habitat. Policy and annual directives also influence project priorities related to sage-grouse habitat. Local priorities may be influenced by past wildfire disturbance, proximity to intact habitat, and past restoration and rehabilitation projects. Projects would be prioritized that would link intact or recovering habitats. For additional prioritization guidance, see Appendix L.

Idaho Dunes Tiger Beetles (Cicindela arenicola), (Cicindela waynei waynei), Type 2 BLM

Stabilization projects would not occur in Idaho Dunes Tiger beetle habitats (i.e. sand dunes). Vegetation treatments to control noxious weeds and invasive plants would preserve the natural integrity and character of sand dune habitats to the greatest extent possible.

Columbian sharp-tail grouse (Tympanuchus phasianellus columbianus), Type 2 BLM

- Treatments within 0.6 miles of occupied Columbian sharp-tail grouse leks that results in or could likely result in disturbance to displaying birds would be avoided from approximately 6:00 pm to 9:00 am. This guideline would be applied from mid-March through June.
- Treatments in nesting habitat would be limited in May through mid-July. Adjustments to these dates may occur based on land use plan guidance and local conditions.

Migratory Bird Species of Conservation Concern

Proposed vegetation treatment areas would be assessed for presence or absence of birds protected by the Migratory Bird Treaty Act. Some of the birds classified as Migratory Bird Species of Conservation Concern (Appendix J) are also designated as BLM sensitive species.

If migratory birds are known or suspected to occur within a proposed project area, life-cycle and habitat requirements of these birds would be considered when designing vegetation treatments. This would include all treatment types including but not limited to prescribed fire, ground-disturbing activities, chemical herbicide use and seed mixtures. Treatments would be designed to minimize potential impacts to migratory birds and their habitats.

Specific design features such as avoidance of occupied areas by timing or distance would be outlined in the project plan. In general, treatments in areas with known breeding populations of migratory birds would be avoided during the nesting season, generally February 1 – July 31. Specific avoidance dates and distances would be determined based on location and species present.

Raptors

Seasonal restrictions for potentially disruptive construction or other human activities will generally apply for raptors from February 1 through July 31 unless an exception is granted by the BLM field office manager or designated line officer. Spatial buffers are listed in Table 5.

Temporary exceptions can be granted in situations where the raptor nest has been destroyed, such as by wind, wildfire, or lightning. Exceptions can also be granted if the nest is inactive due to young having fledged or the nest being unused in the current nesting season. Exceptions or temporal deviations from the established February 1 - July 31 timeframe may also be granted based on species, variations in nesting chronology of particular species locally, topographic considerations (e.g., an intervening ridge between treatment activities and a nest) or other factors that are biologically reasonable.

Table 5 - Spatial Buffers for Nesting Raptors

Species	Spatial Buffer in Non-Urban Areas (Miles)
Ferruginous hawk	1.0
Northern goshawk	0.5
Peregrine falcon	1.0
Prairie falcon	0.5
Red-tailed hawk	0.33
Swainson’s hawk	0.25
Burrowing owl	0.25

Bald and Golden Eagles

- Aerial seeding treatments (e.g. sagebrush) within 1,000 feet of active American bald (*Haliaeetus leucocephalus)* and golden eagle (*Aquila hrysaetos*) nests would be avoided between January 1 and January 31.
- Aerial seeding treatments and aerial application of herbicides would be avoided within 0.5 miles to one mile of active American bald and golden eagle nests between February 1 and July 31. Avoidance distances would be determined by the amount of screening provided by vegetation or topographic features.
- On-the-ground vegetation treatments would be avoided within 0.5 mile of direct line of sight or within 0.25 miles of bald eagle winter concentration sites during the winter roosting season from November 1 through March 1.
- Aerial treatment applications will be avoided within 0.5 mile of bald eagle winter concentration sites during November 1 through March 1.
- If treatments are necessary to meet vegetation treatment objectives outside of the temporal and spatial restrictions for bald or golden eagles, the BLM may apply for a Non-

Purposeful Take Permit from the Service. The BLM would not conduct such treatments until a permit is acquired.

Livestock

See Wildlife (General) section for Design Features to minimize potential risks for forage contamination.

Wild Horses

Do not apply *bromacil* or *diuron* in grazing lands within the HMA, and use appropriate buffer zones identified in Appendix D to limit contamination of vegetation in off-site foraging areas.

Minimize potential risks to wild horses by applying *glyphosate*, *hexazinone, tebuthiuron*, and *triclopyr* at the typical application rate, where feasible, in areas associated with wild horse use.

Limit the size of larger-scale broadcast applications of *2,4-D*, *dicamba*, Overdrive®, *picloram*, and *triclopyr* in order to reduce potential impacts to wild horses.

Apply herbicide label grazing restrictions for livestock to herbicide treatment areas that support populations of wild horses.

Do not apply *2,4-D* in the HMA during the peak foaling season (March through June, and especially in May and June), and do not exceed the typical application rate of Overdrive® or *hexazinone* in the HMA during the peak foaling season in areas where foaling is known to take place.

Native American Traditional Use Areas

Do not exceed the typical application rate when applying *2,4-D, bromacil, diquat, diuron*, *fluridone*, *hexazinone, tebuthiuron*, and *triclopyr* in known traditional use areas.

Avoid applying *bromacil* or *tebuthiuron* aerially in known traditional use areas.

Limit *diquat* applications to areas away from high residential and traditional use areas to reduce risks to Native Americans.

Human Health and Safety

Use the typical application rate, where feasible, when applying *2,4-D, bromacil, diquat, diuron, fluridone, hexazinone, tebuthiuron*, and *triclopyr* to reduce risk to occupational and public receptors. Occupational receptors include workers that mix, load, and apply herbicides and operate transport vehicles as well as operating equipment used for vegetation treatments or prescribed fire. Public receptors include those members of the public most likely to come into contact with applied herbicides or smoke from prescribed fire.

Bromacil and *diuron* would not be applied aerially.

Limit application of *chlorsulfuron* via ground broadcast applications at the maximum application rate.

Limit *diquat* application to ATV/UTV, truck spraying, and boat applications to reduce risks to occupational receptors; limit *diquat* applications to areas away from high residential and subsistence use to reduce risks to public receptors.

Evaluate *diuron* applications on a site-by-site basis to avoid risks to humans. There appear to be few scenarios where *diuron* can be applied without risk to occupational receptors.

Do not apply *hexazinone* with an over-the-shoulder broadcast applicator.

Special Management Areas

National Conservation Lands

The National Conservation Lands include Wilderness, Wild and Scenic Rivers, Wilderness Study Areas, National Scenic and Historic Trails, National Monuments, and National Conservation Areas. The TFD contains a Wilderness, three designated Wild and Scenic Rivers, several Wilderness Study Areas, two National Historic Trails, and one National Monument and Preserve.

Wilderness and Wild and Scenic Rivers

Sections 1503 and 1504 of the Omnibus Public Land Management Act (OPLMA) of 2009 (123 Stat. 1032-1040) established the Bruneau-Jarbidge Rivers Wilderness and Bruneau, Jarbidge, and West Fork of the Bruneau Wild and Scenic Rivers (WSRs). Vegetation treatment activities within the Bruneau-Jarbidge Rivers Wilderness and WSR corridors would be applied following the management considerations and vegetation treatment guidelines approved in the final DR of the Owyhee Canyonlands Wilderness and Wild and Scenic Rivers Management Plan and Environmental Assessment (DOI-BLM-ID-B000-2011-0001-EA), signed April 10, 2015. Specifically:

- All proposals involving potential soil or vegetation disturbance will be developed in accordance with the Owyhee Canyonlands Wilderness and Wild and Scenic Rivers Management Plan, the Wilderness Act, andother applicable laws and regulations.
- BLM will preserve wilderness character by managing noxious weeds and non-native invasive plants, with an emphasis on treating small (<0.1 acre) infestations that have the potential to spread and displace native plants. Larger infestations will be managed separately, since they could involve several treatment applications or associated tactics.
- All proposed treatments will be evaluated through a Minimum Requirements Analysis (MRA) for the purpose of protecting and preserving wilderness character. The MRA will determine whether the proposal is consistent and compatible with requirements of the Wilderness Act, the OPLMA, and House Report 101-405.

Wilderness Study Areas

Vegetation treatments and design features in wilderness study areas (WSAs) would be designed consistent with BLM Manual 6330–Management of Wilderness Study Areas.

National Historic Trails

Portions of the Oregon and California NHT pass through the TFD. New or revised design features would be incorporated in the event of new NHT management plans.

- Historic trails adjacent to proposed treatment areas would be marked and monitored by a cultural resource specialist to ensure intact ruts are not disturbed.
- Vegetation treatments should focus on maintaining or improving the visual setting of the Oregon and California NHT to the extent practicable. Surface-disturbing activities should be kept to the minimum necessary within a 330-foot distance from the trail. Utilize broadcast seeding, chains, or harrows as a feasible alternative to rangeland drills, or a combination of methods with drills that reduce the appearance of drill rows.
- Mechanized equipment for seeding (both wheeled and tracked) would not be used on the Oregon or California NHT.
- Seeding treatments along the Oregon and California NHT would use native plant species or cultivars and aerial or ground broadcast application methods. Seed cover methods that do not result in the appearance of rows (e.g. harrow) can be used.
- Visual Resource Management guidelines and specifications of the NHTs and other scenic values would be protected within the NHTs protective zone, a 0.25 mile corridor on either side of the NHTs.

Craters of the Moon National Monument and Preserve

Design features relevant to specific resources are identified in those sections of the Craters Management Plan. The following features are identified in the Management Plan and only apply to vegetation treatment actions within the Craters of the Moon National Monument and Preserve.

- Use of native plants would be emphasized in rehabilitation and restoration projects, and only native plants would be used for rehabilitation or restoration projects within the Pristine Zone.
- Integrated noxious weed management principles would be used to: 1) detect and eradicate all new infestations of noxious weeds; 2) control existing infestations; and 3) prevent the establishment and spread of noxious weeds within and adjacent to the planning area.
- Plant materials used in vegetation treatments would be predominately native. However, non-native species may be used in vegetation treatments in the BLM portion of the Monument on harsh or degraded sites where they are needed to structurally mimic the natural plant community and prevent soil loss and invasion by noxious weeds and invasive plants. The species used would be those that have the highest probability of establishment on these sites without invading surrounding areas. These “placeholders” would maintain the area for future native restoration. Native seed would be used more frequently and at larger scales as species adapted to the local area become available.

Areas of Critical Environmental Concern

Areas of Critical Environmental Concern (ACEC) are a designation that highlights areas where special management attention is needed to protect and prevent irreparable damage to important historic, cultural and scenic values, fish, wildlife, or other natural systems or processes, or to protect human life and safety from natural hazards. Vegetation treatments in ACECs would protect the values for which the area was established and would be in conformance with applicable management direction contained in the land use plans and activity plans.

Travel Management

Motorized off-highway vehicle travel is limited to existing roads, primitive roads, and trails except areas designated as open or closed through a land use plan decision (Appendix L - MD TTM 1). Exceptions are:

- Any vehicle whose use is expressly authorized by the authorized officer or otherwise officially approved.
- Vehicles in official use where official use is by an employee, agent, or designated representative of the federal government or one of its contractors, in the course of employment, agency, or representation.

For vegetation treatment implementation:

- Apply appropriate seasonal restrictions for sage-grouse and other wildlife.
- Avoid travel through known special status plant habitats during conditions (e.g. saturated soils) that would result in damage to the special status plants or their habitat.
- Use different ingress and egress routes when using off-road vehicles for treatment application (e.g. spraying noxious weeds) or transporting supplies (e.g. shrub seedlings for large planting projects) to avoid route creation.
- Utilize hardened or previously disturbed areas for staging equipment.

Monitoring

For herbicide use, implementation monitoring is accomplished through the use of PUPs and Pesticide Application Records. Both documents are required by the BLM in order to track pesticide use annually. The PUP requires reporting of the pesticide proposed for use and the maximum application rate. It also requires reporting of the number and timing of applications. Targeted and non-targeted species at the treatment site are described, as well as the other site characteristics. A description of sensitive resources and mitigation measures to protect these resources is also required. Most importantly, a description of the integrated weed management treatment or combination of treatments employed is required. Pertinent NEPA documents and decisions must also be referenced. The PUP must be signed by a certified weed applicator, the field office manager, state coordinator, and deputy state director before the treatment can go forward. The Pesticide Application Record, which must be completed within 24 hours after completion of the application, documents the actual rate of application and that all the above factors have been taken into account. Pesticide Application Records are used to develop annual state summaries of herbicide use for BLM.

Invasive plant implementation monitoring for non-herbicide treatments is accomplished through pre- and post-treatment site visits. Monitoring would determine if treatments were effective and if additional treatments are necessary.

Monitoring should address the following questions:

- What changes in the distribution, amount, and proportion of invasive plant infestations have resulted due to treatments?
- Has infestation size been reduced at the project level or larger scale (such as a watershed)?
- Which treatment methods, separate or in combination, are most successful for a particular species? (USDA FS, 2005).

Monitoring of noxious weed, non-native invasive plant, or other vegetation treatment effectiveness can be qualitative or quantitative and should include comparisons of pre- and post-treatment information. Baseline vegetation inventories would be conducted to determine pre-treatment conditions and to determine needed treatments. Post-treatment monitoring would occur to evaluate treatment effects and success. Methods used to monitor treatments could include field observations, photo plots, and quantitative methods such as vegetation cover, density, or belt transects. Short-term post-treatment monitoring would occur annually for three years. Long-term monitoring for successful treatments would occur at five years post-treatment, then at five year intervals, dependent on available funding.

Monitoring activities will be conducted according to the Twin Falls District Land Treatment Monitoring Guidelines outlined in Instruction Memorandum IDIMT000-2012-001 (Appendix K).

Chapter 3 – Species Life History Summaries

Jarbidge River Bull Trout

Listing Status and Recovery Plan

On June 10, 1998, the Service issued a final rule listing the Columbia River and Klamath River populations of bull trout (*Salvelinus confluentus*) as a threatened species (63 FR 31647-31674) under the ESA. The effective date of the listing was July 10, 1998. The Jarbidge River population of bull trout were emergency listed as endangered on August 11, 1998 (63 FR 42757-42762); listing status was changed to threatened on April 8, 1999 (64 FR 17110-17125). The coterminous United States population of the bull trout was listed as threatened on November 1, 1999 (64 FR 58910-58933). The Service completed a 5-year review in 2008 and concluded that bull trout should remain listed as a threatened species (USDI USFWS, 2008a).

In 2014, the Service renewed its efforts to complete recovery planning for the coterminous United States population of bull trout. The recovery strategy used a geographic classification that lists bull trout as a single Distinct Population Segment (DPS) within the five-state area of the coterminous United States. This single DPS is subdivided into six biologically-based recovery units which include: (1) Coastal Recovery Unit; (2) Klamath Recovery Unit; (3) Mid-Columbia Recovery Unit; (4) Upper Snake Recovery Unit; (5) Columbia Headwaters Recovery Unit; and (6) Saint Mary Recovery Unit (USDI USFWS, 2015b). Recovery units are population units that have been "…documented as necessary to both the survival and recovery of the species in a final recovery plan" (USDC NMFS & USDI USFWS, 2010). The Jarbidge population of bull trout is included in the Upper Snake Recovery Unit. Major drainages within the recovery unit include: the Salmon River, Malheur River, Jarbidge River, Little Lost River, Boise River, Payette River, and Weiser River.

The Upper Snake Recovery Unit contains 22 bull trout core areas, one of which is the Jarbidge Core Area (Figure 4). Core areas represent a combination of suitable habitat and one or more local populations that function as one demographic unit due to occasional gene flow between them (USDI USFWS, 2004). There are six local populations of bull trout within the Jarbidge Core Area. These local populations include: the East Fork Jarbidge River (including the East Fork headwaters, Cougar Creek, and Fall Creek), the West Fork Jarbidge River (including Sawmill Creek), Dave Creek, Jack Creek, Pine Creek, and Slide Creek.

Species Description

Bull trout, 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). 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 (Bond, 1992; Cavender, 1978). To the west, the bull trout's current range includes Puget Sound, coastal rivers of British Columbia, Canada, and southeast Alaska (Bond, 1992). 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 (Brewin & Brewin, 1997; Cavender, 1978). Bull trout are wide spread throughout the Columbia River basin, including its headwaters in Montana and Canada.

Life History and Habitat Characteristics

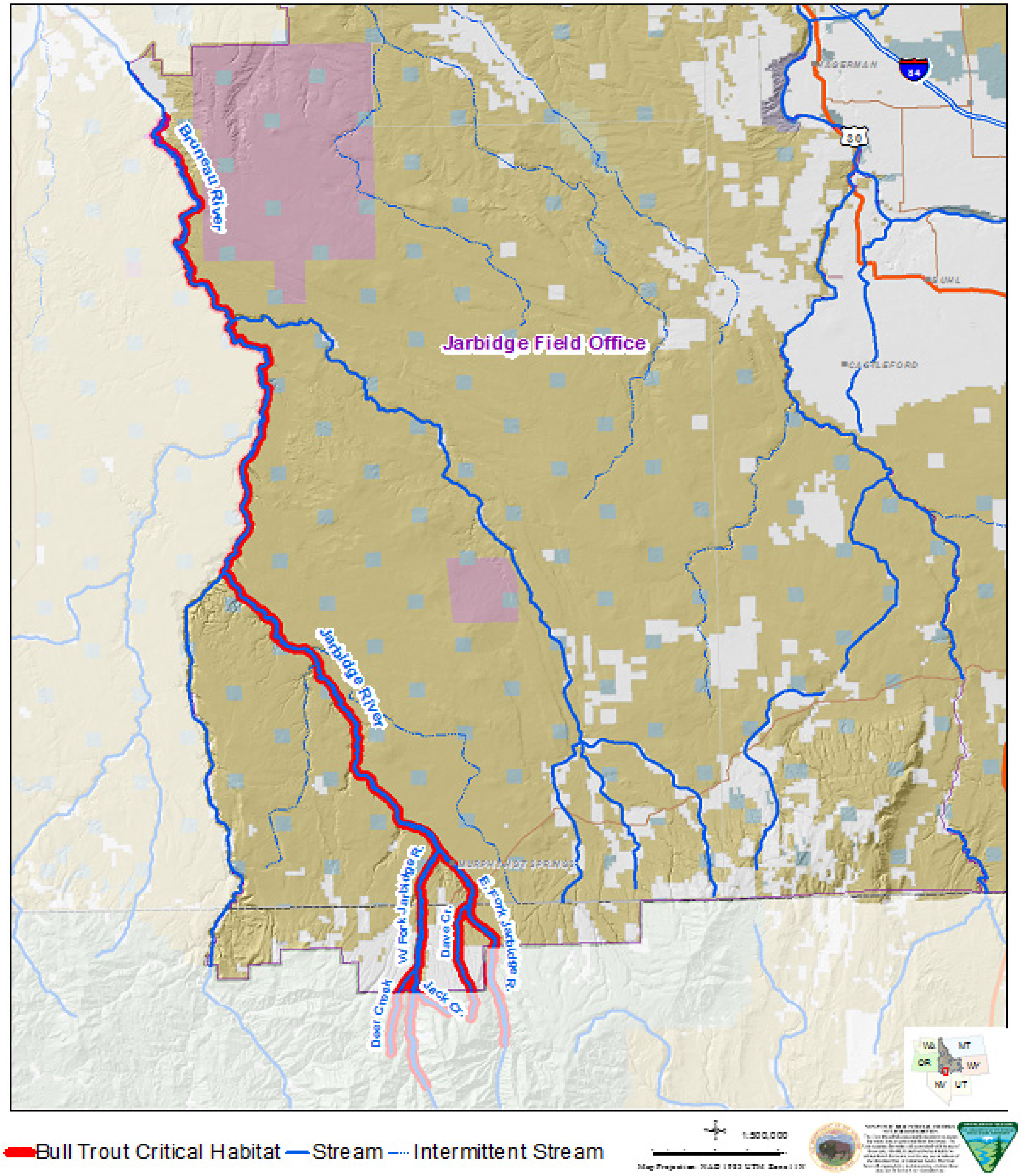
Bull trout exhibit resident and migratory life history strategies throughout much of the current range (Rieman & McIntyre, 1993). Resident bull trout complete their entire life cycle in the streams where they spawn and rear. Migratory bull trout spawn and rear in streams for one to four years before migrating to either a lake (adfluvial), river (fluvial), or, in certain coastal areas, to saltwater (anadromous) where they reach maturity (Fraley & Shepard, 1989; Goetz, 1989). 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 & McIntyre, 1993).

The reproductive strategies for bull trout have 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 salmonids, which spawn once and then die, and therefore require only one-way passage upstream. Therefore, even dams or other barriers with fish passage facilities may be a factor in isolating bull trout populations if they do not provide a downstream passage route.

The draft bull trout Recovery Plan (USDI USFWS, 2002a) 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 & Carroll, 1994). In theory, bull trout metapopulations (core areas) can be composed of two or more local populations. However, Rieman & Allendorf (2001) suggested that for a bull trout metapopulation to function effectively, a minimum of ten local populations are required. Bull trout core areas with fewer than five local populations are at increased risk of local extirpation, core areas with between five and ten local populations are at intermediate risk, and core areas with more than ten interconnected local populations are at diminished risk (USDI USFWS, 2002a). There are nine local populations within the core area for bull trout.

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. Rieman & Allendorf (2001) estimated 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.

Figure 4 – BLM TFD Bull Trout Critical Habitat



Survival of bull trout populations is 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 & McIntyre, 1993). Increased habitat fragmentation reduces the amount of available habitat and increases isolation from other populations of the same species (Saunders, Hobbs, & Margules, 1991). Burkey (1989) 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. Migrations also facilitate gene flow among local populations because individuals from different local populations interbreed when some stray and return to non-natal streams. Local populations that are extirpated by catastrophic events may also become reestablished in this manner.

Bull trout are found primarily in colder streams, although individual fish are migratory in larger, warmer river systems throughout the range (Buchanan & Gregory, 1997; Fraley & Shepard, 1989; Rieman, Lee, & Thurow, 1997; Rieman & McIntyre, 1993). 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 & Shepard, 1989; Rieman & McIntyre, 1995). Spawning areas are often associated with cold water springs, groundwater infiltration, and the coldest streams in a given watershed (Pratt, 1992; Rieman et al., 1997; Rieman & McIntyre, 1993). Goetz, (1989) 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).

Bull trout typically spawn from August to November during periods of decreasing water temperatures. Depending on water temperature, incubation is normally 100 to 145 days (Pratt, 1992) and, after hatching, juveniles remain in the substrate. Time from egg deposition to emergence may exceed 200 days. Fry normally emerge from early April through May, depending upon water temperatures and increasing stream flows (Pratt, 1992).

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; Pratt, 1992; Rich, 1996; Sexauer & James, 1997; Thomas, 1992; Watson & Hillman, 1997). Jakober (1995) 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 & McIntyre, 1993). Juvenile and adult bull trout frequently inhabit side channels, stream margins, and pools with suitable cover (Sexauer & James, 1997).

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). Bull trout normally reach sexual maturity in four to seven years and live as long as 12 years. Bull trout can 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 (Fraley & Shepard, 1989; Leathe & Graham, 1982; Pratt, 1992; Rieman & McIntyre, 1996).

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; Donald & Alger, 1993; Goetz, 1989). Adult migratory bull trout are primarily piscivores, known to feed on various fish species (Donald & Alger, 1993; Fraley & Shepard, 1989).

Status and Species Distribution

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 (Bond, 1992; Brewin & Brewin, 1997; Cavender, 1978; Leary & Allendorf, 1997). Although 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 & Arbelbide, 1997; Rieman et al., 1997).

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 non-native species (e.g., brook trout, *Salvelinus fontinalis)* have resulted in declines in range-wide bull trout distribution and abundance (Bond, 1992; Newton & Pribyl, 1994; Rieman & McIntyre, 1993; Schill, 1992; Thomas, 1992; USDI USFWS, 2002a; Ziller, 1992). Several local extirpations have been reported, beginning in the 1950s (Berg & Priest, 1995; Buchanan & Gregory, 1997; Donald & Alger, 1993; Goetz, 1994; Light, Herger, & Robinson, 1996; Newton & Pribyl, 1994; Ratliff & Howell, 1992; Rode, 1990). 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 (USDI USFWS, 2002a).

The most recent study of the distribution and movement of bull trout in the Jarbidge Core Area was conducted by the U.S. Geological Survey (USGS) in 2006 and 2007. This study captured 349 bull trout in 24.8 miles of habitat in the East and West Forks of the Jarbidge River, and in Fall, Slide, Dave, Jack, and Pine creeks. In 2007, 1,353 bull trout were captured in 15.5 miles of habitat in the West Fork Jarbidge River and its tributaries and 11.2 miles of habitat in the East Fork Jarbidge River and its tributaries (Allen, Connolly, Mesa, Charrier, & Dixon, 2010). The study results indicated that almost four times the number of bull trout inhabit the Jarbidge Core Area than was estimated in the 2004 Draft Recovery Plan, there are substantial movements between tributaries, increased abundance with increasing altitude, and growth rates indicative of a high-quality habitat (Allen et al., 2010).

Fluvial bull trout have been documented to use the mainstem Jarbidge River; therefore, bull trout may also use the Bruneau River for foraging, migration, and overwintering habitat. Bull trout use of the Bruneau River has not been documented (USDI USFWS, 2004). However, there are no known physical barriers preventing fish movement between the Jarbidge and Bruneau Rivers. Once in the Bruneau River, fish passage is physically unrestricted for approximately 40 miles downstream to Buckaroo Ditch Dam at Hot Springs, Idaho.

In 2005, BLM completed stream habitat surveys on Dave Creek, the Jarbidge River and its East Fork, Buck Creek, and Deer Creek (USDI BLM, 2006a; unpublished data). These surveys were completed on sections of stream that had not been previously surveyed and were representative of larger stream reaches with similar habitat characteristics such as stream gradient, width, and depth. These data are summarized in the Biological Assessment for the Jarbidge Record of Decision and Approved Resource Management Plan (USDI BLM, 2015a).

The BLM began monitoring water temperatures in the Jarbidge watershed with continuous water temperature recorders in 2002. Water temperature data for Dave Creek, the Jarbidge River and its East Fork, and Buck Creek indicate water temperatures in July and August exceed the 55°F mean weekly maximum temperature considered to be functioning properly for bull trout rearing and migration by 1°F to 12°F. The water temperature requirements for bull trout include temperatures ranging from 39°F to 48°F for spawning and 39°F to 53°F for summertime rearing. Generally, bull trout spawning occurs from mid-September through late October as water temperatures decline to 48°F and colder. Adult bull trout have not been found in the lower Jarbidge River when water temperatures exceed 57°F. Streams within the Jarbidge watershed that do not meet bull trout water temperature standards in July and August typically begin meeting the standards by early to mid-September.

In 2006, the USGS Columbia River Research Laboratory formed a cooperative agreement with the Service to collect information on the life history, movements, abundance, and distribution of bull trout in the upper Jarbidge River basin (Allen et al., 2010). The USGS used Passive Integrated Transponder (PIT) tags and strategically placed tag detectors to monitor the connectivity between bull trout streams. Robust bull trout populations were found in the upper portions of the East Fork Jarbidge River, the West Fork Jarbidge River, and in Pine, Jack, Dave, and Fall Creeks. The study found bull trout to be dominant in the upper portions of the East Fork Jarbidge River, and in Fall, Dave, Jack, and Pine Creeks. The relative abundance of bull trout was notably higher at elevations above 6,890 feet. During two years of sampling in the upper Jarbidge River watershed, USGS captured 1,702 bull trout (80 percent of which were captured in 2007). Eighty-seven percent of the bull trout sampled were found above 6,890 feet.

The USGS PIT tag detections were used to determine the overall mean annual growth rate of 1.4 inches for bull trout in the East Fork and West Fork Jarbidge Rivers. The annual growth rates of bull trout across the upper Jarbidge River watershed ranged from 0.8 inches to 2.4 inches. These growth rates are indicative of good habitat conditions. Bull trout sampling in Deer Creek and Buck Creek found both streams to be very shallow (2.0 inches and 2.8 inches, respectively) and to have limited pool habitats. There are no historical records of bull trout being present in either of these streams.

Conservation Needs

The maintenance of viable core areas is essential to the survival and recovery of the bull trout (USDI USFWS, 2002a). 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. One hundred twenty-one core areas are recognized across the United States range of the bull trout (USDI USFWS, 2005b). A core area assessment conducted by the Service for the five 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, four are at low risk and two are of unknown status (USDI USFWS, 2008a). A summary of the current status and conservation successes of the bull trout within bull trout recovery units is provided in the 2015 Recovery Plan for the Conterminous United States Population of Bull Trout (USDI USFWS, 2015b).

Threats to the Species

Bull trout are vulnerable to many of the same threats that have reduced salmon populations in the Columbia River Basin. They are more sensitive to increased water temperatures, poor water quality, and low flow conditions than many other salmonids. Past and continuing land management activities such as timber harvest, livestock grazing, road construction, and mining have degraded stream habitat, especially those along larger river systems and stream areas located in valley bottoms, to the point where bull trout can no longer survive or successfully reproduce. Cumulative impacts of these activities are increased stream temperatures, more fine sediment in spawning gravels, loss of stream channel stability, and the creation of migration barriers. Road construction and maintenance account for a majority of man-induced sediment loads to streams in forested areas (Cederholm & Reid, 1987; Furniss, Roelofs, & Yee, 1991; Shepard, Leathe, Weaver, & Enk, 1984). Sedimentation affects streams by reducing pool depth, altering substrate composition, reducing interstitial space, and causing braiding of channels (Rieman & McIntyre, 1993), which reduce carrying capacity. Sedimentation negatively affects bull trout embryo survival and juvenile bull trout rearing densities (Pratt, 1992; Shepard et al., 1984).

Large dams built for flood control and power production have eliminated riverine habitat and restricted bull trout movement. Culverts installed at road crossings may also act as barriers to bull trout movement. Additionally, irrigation withdrawals, including diversions, can dewater spawning and rearing streams, impede fish passage and migration, and cause entrainment. Discharging pollutants such as nutrients, agricultural chemicals, animal waste, and sediment into spawning and rearing waters is also detrimental. The loss and degradation of habitat has isolated many populations, increasing the risk of extinction due to demographic, genetic, and environmental stochasticity, and other natural catastrophic events. In many watersheds, remaining bull trout are small, resident fish isolated in headwater streams.

Historically, both intentional reductions and liberal harvest regulations posed a threat to some bull trout populations. Bull trout can no longer be legally harvested in Idaho, but misidentification of bull trout as brook trout or lake trout is resulting in some fish being killed accidentally. Illegal poaching of spawning adults is a problem in some areas.

Hybridization, competition, and predation from non-native species has also been detrimental to bull trout. Brook trout readily spawn with bull trout creating a hybrid that is often sterile. Lake trout have out-competed and replaced adfluvial populations of bull trout in some lakes. Overall, interspecific interactions, including predation, with non-native species may exacerbate stresses on bull trout from habitat degradation, fragmentation, isolation, and species interactions (Rieman & McIntyre, 1993).

Warmer temperature regimes associated with global climate change represent another risk factor for bull trout. Increased stream temperature is a recognized effect of a warming climate (ISAB, 2007). Species at the southern margin of their range that are associated with colder water temperatures, such as the bull trout, are likely to become restricted to smaller more disjunct habitat patches or become extirpated as the climate warms (Rieman et al., 2007).

Climate warming is projected to result in the loss of 22 to 92 percent of suitable bull trout habitat in the Columbia River basin (ISAB, 2007). Habitat conservation and restoration will be needed to mitigate these habitat losses.

Bull Trout Critical Habitat

Status of Bull Trout Critical Habitat

On-going 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 2270-2431) and a final rule on October 18, 2010 (75 FR 63898-64070). The rule became effective on November 17, 2010. The designation of critical habitat encompasses 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).

Distribution of Bull Trout Critical Habitat

Rangewide, the Service designated reservoirs/lakes and stream/shoreline miles in 32 critical habitat units throughout occupied watersheds within Washington, Oregon, Idaho, Nevada, and Montana. Designated bull trout critical habitat is of two primary use types: (1) spawning and rearing; and (2) foraging, migrating, and overwintering. Compared to the 2005 designation, the final rule increased 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. The rule also identified and designates as critical habitat approximately 1,323.7 kilometers (822.5 miles) of streams/shorelines and 6,758.8 hectares (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 re-establishing bull trout in currently unoccupied habitat areas to achieve recovery.

Designated critical habitat for the Jarbidge Core Area of the Upper Snake Recovery Unit included the Bruneau River from the confluence with the Jarbidge River downstream to the slackwater area for C.J. Strike Reservoir and several of the streams in the upper Jarbidge River Watershed (Figure 4). The tributaries on BLM-managed lands that are designated critical habitat include the Bruneau River, Jarbidge River (canyon), portions of the East Fork Jarbidge River and its tributary Dave Creek, and the West Fork Jarbidge River and its tributary Deer Creek. Designated critical habitat for bull trout also includes several streams on the Humboldt-Toiyabe

National Forest such as the East Fork Jarbidge River and its tributaries Dave Creek, Slide Creek (including God's Pocket and two unnamed tributaries), Cougar Creek, Fall Creek (and two unnamed tributaries) and the West Fork Jarbidge River and its tributaries Deer Creek, Pine Creek (and two unnamed tributaries), Fox Creek, Sawmill Creek, Jack Creek, and Jenny Creek.

There are 152 miles of bull trout critical habitat for the Jarbidge core area (USDI USFWS, 2015b). A total of 99 miles (65 percent) occur within the TFD, Jarbidge FO. Of these 99 miles, 87 miles are on BLM-managed land, three miles are on State land, and nine miles are on private land. There also are 52 miles of bull trout critical habitat managed by the Humboldt-Toiyabe National Forest in Nevada. Overall, the BLM Jarbidge FO manages 87 miles (57 percent) of the bull trout critical habitat for the Jarbidge core area.

For the 87 miles of bull trout critical habitat on BLM-managed land within the TFD, 66 miles (76 percent) are within the Bruneau-Jarbidge Rivers Wilderness. These same miles, which include the Jarbidge and Brueau rivers, are also designated as a WSR segment. There also are 19 miles (22 percent) of BLM lands within an eligible WSR segment (i.e., East Fork Jarbidge River, West Fork Jarbidge River, and Dave Creek). In effect, a total of 85 miles (98 percent) of the 87 miles of bull trout critical habitat on BLM-managed lands are either in Wilderness or a designated or eligible WSR segment. The three miles of bull trout critical habitat on BLM-managed land not encompassed by Wilderness or a WSR segment are along two short sections of Deer Creek (tributary to West Fork Jarbidge River) and the lower Bruneau River below the Wilderness boundary. A portion of these miles (0.3 mile) are encompassed by the Lower Bruneau Canyon Area of Critical Environmental Concern (ACEC) and are within the Bruneau hot springsnail Recovery Area (USDI USFWS, 2007). State and private land encompass 0.1 percent of the bull trout critical habitat within the TFD.

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 71240-71438). This population status reflects the condition of bull trout habitat.

The primary land and water management activities impacting the physical and biological features (PBFs) 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 non-native 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. The factors which appear to be particularly significant are:

- 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 (Rieman & McIntyre, 1993; Dunham & Rieman, 1999).
- 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 & Shepard, 1989; MBTSG, 1998).

- The introduction and spread of non-native 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, Allendorf, & Forbes, 1993; Rieman, Peterson, and Meyers, 2006).
- In the Coastal-Puget Sound region where amphidromous bull trout occur, degradation of mainstem river foraging, migrating, and overwintering habitat, and the degradation and loss of marine nearshore foraging and migration habitat due to urban and residential development.
- Degradation of foraging, migrating, and overwintering habitat resulting from reduced prey base, roads, agriculture, development, and dams.

One objective of the final rule was to identify and protect those habitats that provide resiliency for bull trout use in the face of climate change. Over a period of decades, climate change may directly threaten the integrity of the essential physical or biological features of bull trout critical habitat. Protecting bull trout strongholds and cold water refugia from disturbance and ensuring connectivity among populations are important considerations in addressing this potential impact. Additionally, climate change may exacerbate habitat degradation impacts both physically (e.g., decreased base flows, increased water temperatures) and biologically (e.g., increased competition with non-native fishes).

Condition of Bull Trout Critical Habitat - Jarbidge Core Area (Upper Snake River Recovery Unit)

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 71239-71438). The primary land and water management activities impacting the PBFs 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 non-native species presence or introduction (75 FR 2282). Except for the impacts from non-native species and timber harvest, all of these activities have impacted critical habitat for Jarbidge River bull trout. Additional information for the condition of critical habitat in the Jarbidge River recovery unit can be found in the on-going actions consultation for bull trout critical habitat (USDI USFWS, 2012b).

The most effective way to evaluate the condition of bull trout critical habitat is to analyze the condition relative to the PBFs of the critical habitat. The effects of BLM activities that have undergone Section 7 consultation are evaluated using the Bull Trout Matrix of Pathways and Indicators (matrix) (USDI USFWS, 1998) which includes indicators that correspond to the bull trout critical habitat PBFs. The matrix contains 23 indicators, four of which are tied to subpopulation characteristics and 19 are tied to habitat. Twenty of the 23 indicators are directly or indirectly related to one or more of the nine PBFs and each PBF corresponds to one or more indicators. The refugia indicator is relevant to all PBFs because in order for the refugia indicator to be rated "functioning appropriately", most if not all of the PBFs must be present. The relationship between the associated matrix indicator and PBFs for bull trout critical habitat is displayed in Table 6.

Table 6 - Bull Trout Critical Habitat PBFs and Associated Matrix Indicators

PBF #	PBF Description	Associated Matrix Indicators
1	Springs, seeps, groundwater sources, and subsurface water connectivity (hyporheic flows) to contribute to water quality and quantity and provide thermal refugia.	Floodplain connectivity, sediment, substrate embeddedness, chemical contamination/nutrients, off-channel habitat, streambank condition, change in peak/base flows, increase in drainage network, road density and location, disturbance history, RCAs, and 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.	Physical barriers, substrate embeddedness, average wetted width/maximum depth ratio, change in peak/base flows, persistence and genetic integrity, temperature, chemical contamination/nutrients, and refugia
3	An abundant food base, including terrestrial organisms of riparian origin, aquatic macroinvertebrates, and forage fish.	Sediment, substrate embeddedness, chemical contamination/nutrients, large woody debris, off-channel habitat, floodplain connectivity, streambank condition, RCAs, and refugia
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.	Sediment, substrate embeddedness, large woody debris, pool frequency and quality, large pools, off-channel habitat, average wetted width/maximum depth ratio, streambank condition, RCAs, floodplain connectivity, road density and location, disturbance regime, and refugia
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.	Temperature, off-channel habitat, floodplain connectivity, average wetted width/maximum depth ratio, streambank condition, change in peak/base flows, road density and location, disturbance history, RCAs, and refugia
6	In spawning and rearing areas, substrate of sufficient amount, size, and composition to ensure success of egg and embryo overwinter survival, fry emergence, and young-of-the-year and juvenile survival. A minimal amount of fine sediment, generally ranging in size from silt to coarse sand, embedded in larger substrates, is characteristic of these conditions. The size and amounts of fine sediment suitable to bull trout will likely vary from system to system.	Sediment, substrate embeddedness, streambank condition, RCAs, floodplain connectivity, increase in drainage network, road density and location, disturbance regime, and refugia
7	A natural hydrograph, including peak, high, low, and base flows within historic and seasonal ranges or, if flows are controlled,	Change in peak/base flows, streambank condition, floodplain connectivity, increase in drainage network, road density and location, disturbance history, RCAs, and refugia

PBF #	PBF Description	Associated Matrix Indicators
	minimal flow departure from a natural hydrograph.	
8	Sufficient water quality and quantity such that normal reproduction, growth, and survival are not inhibited.	Temperature, chemical contamination/nutrients, streambank condition, RCAs, floodplain connectivity, increase in drainage network, road density and location, disturbance regime, and refugia
9	Sufficiently low levels of occurrence of non-native predatory (e.g., lake trout, walleye, northern pike, smallmouth bass); interbreeding (e.g., brook trout); or competing (e.g., brown trout) species that, if present, are adequately temporally and spatially isolated from bull trout.	Persistence and genetic integrity

Another factor affecting Jarbidge River bull trout and their critical habitat is climate change. The Jarbidge River watershed contains the southernmost habitat currently occupied by bull trout across the species' range. Over a period of decades, climate change may directly threaten the integrity of the essential physical or biological features described in PBFs 1, 2, 3, 5, 7, 8, and 9. Protecting bull trout strongholds and cold water refugia from disturbance and ensuring connectivity among populations are important considerations in addressing impacts to bull trout from climate change. Additionally, climate change may exacerbate habitat degradation impacts both physically (e.g., decreased base flows, increased water temperatures) and biologically (e.g., increased competition with non-native fishes).

Conservation Needs for Jarbidge River Bull Trout Critical Habitat

The conservation role of bull trout critical habitat is to support viable core area populations (75 FR 63898). The core areas (local populations) reflect the metapopulation structure (collection of local but connected populations) of bull trout and are the closest approximation of a biologically functioning unit for the purposes of recovery planning and risk analyses. Critical Habitat Units generally encompass one or more core areas and may include foraging, migratory, and overwintering areas, outside of core areas, that are important to the survival and recovery of bull trout.

The primary function of individual Critical Habitat Units 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 & McIntyre, 1993);
2. Provide for persistence of strong local populations, in part, by providing habitat conditions that encourage movement of migratory fish (MBTSG, 1998; Rieman & McIntyre, 1993).
3. Are large enough to incorporate genetic and phenotypic diversity, but small enough to ensure connectivity between populations (MBTSG, 1998; Rieman & McIntyre, 1993).

4. Are distributed throughout the historic range of the species to preserve both genetic and phenotypic adaptations (MBTSG, 1998; Rieman & Allendorf, 2001; Rieman & McIntyre, 1993).

Threats to Jarbidge River Bull Trout Critical Habitat

Throughout their range in the lower 48 states, bull trout have been negatively impacted by the combined effects of a variety of factors, including habitat degradation and fragmentation, blockage of migratory corridors, poor water quality, past fisheries management practices, entrainment, and the introduction of non-native species. Habitat alteration, primarily through the construction of impoundments, dams, and water diversions, has fragmented habitats, eliminated migratory corridors, and isolated bull trout in the headwaters of tributaries (Dunham & Rieman, 1999; Rieman & Dunham, 2000; Spruell, Rieman, Knudsen, Utter, & Allendorf, 1999). The effects of climate change and wildland fire pose an increasing threat to bull trout populations across their range.

The 2004 Draft Recovery Plan for the Jarbidge River DPS of Bull Trout (USDI USFWS, 2004) identifies the reasons for a decline in bull trout across the species range and for the Jarbidge River DPS (Core Area). In effect, the reasons for decline pose a threat to bull trout and the PBFs of designated critical habitat. The effects of climate change and wildland fire also pose an increasing threat to bull trout populations across their range. The primary effects of the threats to bull trout and the PBFs of critical habitat are briefly described below.

Dams and Diversions (PBFs 1, 2, 5 7, 8, 9)

Dams on the Snake River constructed without fish passage facilities permanently eliminated two-way connectivity between fish in the Jarbidge River Core Area and other bull trout populations. The Bliss Dam and C.J. Strike Dam, which became operational in early 1959, are the dams most likely to have influenced the Jarbidge River Core Area. Earlier smaller-scale diversion structures on the lower Bruneau River also affected fish passage and reduced flows in the reach between the Snake River and Hot Springs, Idaho. As early as the 1890s, Gilbert & Evermann (1894) noted that an irrigation dam across the lower Bruneau River had already completely blocked salmon access to the river. Water diversions from the Bruneau River into the Buckaroo Ditch have occurred since at least April 1912 and are known fish passage barriers. Together, these two ditches and the South Side Canal divert approximately 1.95 cubic meters per second (69 cubic feet per second) of water from the lower Bruneau River (IDEQ, 2000). This 23.2 kilometer (14.4 mile) reach of the lower Bruneau River is identified as water quality limited under section 303(d) of the Clean Water Act (33 USC 1251 *et seq*.) for flow alteration, nutrients, sediment, and temperature (IDEQ, 2000). The downstream dams and diversions were contributing factors in the past decline of bull trout in the Jarbidge River Core Area. However, the Jarbidge River Recovery Team does not consider these migration barriers to be a current limiting factor for recovery of bull trout. In reality, these structures are currently serving to shield bull trout from the adverse effects of non-native fish present in the Snake River.

Isolation and Habitat Fragmentation (PBFs 1, 2, 3, 7, 8, 9)

Bull trout in the Jarbidge River Core Area are geographically separate from other bull trout populations in the Snake River Basin, which are over 240 river kilometers (150 river miles) away. They are also isolated from these other bull trout populations by impassable dams and diversion structures (described above). In the Jarbidge River core area, warm water temperatures may seasonally inhibit movement of bull trout between the East and West Forks of the Jarbidge River and between local populations in their tributaries. Long-term regional climate change has also likely been a cumulative factor relating to increased stream temperatures, although there are insufficient local climatological and stream records to detect long-term air and water temperature trends. The Jarbidge River Recovery Team does consider the isolation of local populations and habitat fragmentation from elevated water temperatures to be a long-term limiting factor in bull trout recovery.

Land Management Practices (PBFs 1 through 9)

Human activities across the landscape have both direct and indirect impacts to bull trout and critical habitat. Examples of these human uses include but are not limited to: livestock grazing, transportation networks, fisheries management (i.e., harvest and introduction of non-native species), forest management practices, historic mining, recreation, and residential development. All of these activities have impacted critical habitat for bull trout within the Jarbidge Watershed. In more recent times, changes in management have reduced impacts to bull trout and critical habitat through adjustments in livestock grazing and infrastructure, reconstruction of roads and bio-engineering to stabilize cut and fill slopes within riparian areas, and the application of riparian buffers to reduce impacts from ground disturbing activities. Recent changes in fisheries management include no harvest regulations for bull trout in Idaho, and suspension of stocking program within the Jarbidge River watershed have reduced the impacts of these management activities. There currently are no mining operations within the Jarbidge Watershed but the impacts from historic mining continue to negatively affect bull trout critical habitat. Impacts due to residential development primarily occur near the historic mining town of Jarbidge, Nevada and Murphy Hot Springs, Idaho. Although residential impacts are not within BLM's discretion, BLM-managed stream segments are influenced by residential development. The Jarbidge River Recovery Team considers roads to be a current limiting factor in the recovery of bull trout due to impacts on water quality, stream channels, and riparian habitats in foraging, migratory, and overwintering habitats.

Climate Change (PBF s 1, 2, 3, 5, 7, 8, and 9)

Another factor affecting Jarbidge River bull trout and critical habitat is climate change. The Jarbidge River watershed contains the southernmost habitat currently occupied by bull trout across the species' range. Over a period of decades, climate change may directly threaten the integrity of the essential physical or biological features described in the PBFs. Protecting bull trout strongholds and cold water refugia from disturbance and ensuring connectivity among populations are important considerations in addressing impacts to bull trout from climate change. Additionally, climate change may exacerbate habitat degradation impacts both physically (e.g., decreased base flows, increased water temperatures) and biologically (e.g., increased competition with non-native fishes).

Bruneau-Jarbidge Rivers Wilderness (PBFs 1 through 9)

The United States Congress designated the 89,777 acres Bruneau-Jarbidge Rivers Wilderness in 2009. Within designated Wilderness, landscapes are to be affected primarily by the forces of nature, with the imprint of man's work substantially unnoticeable and uses that retain the landscape in an unimpaired condition. The Wilderness encompasses the lower portion of the West Fork Jarbidge River, the Jarbidge River Canyon, and the Bruneau River from the confluence with the Jarbidge River to slightly upstream of the confluence of Hot Creek, all of which are bull trout critical habitat. Other than localized impacts from recreation or wildland fire, the management of the Bruneau-Jarbidge Rivers Wilderness is likely to reduce any existing threats to the PBFs for bull trout critical habitat within the Wilderness.

Wild and Scenic Rivers (PBFs 1 through 9)

The Wild and Scenic Rivers (WSR) Act of 1968 stipulates selected rivers should be preserved in a free-flowing condition and be protected for the benefit and enjoyment of present and future generations. The Act seeks to protect and enhance a river's natural and cultural values and to provide for public use consistent with its free-flowing character, water quality, and outstandingly remarkable values and legal protection from development. The 2009 Omnibus Public Lands Management Act designated the Idaho portions of the East Fork Jarbidge River, West Fork Jarbidge River, and Dave Creek as WSR Eligible segments and the Jarbidge River from the confluence of the East and West Forks to the Bruneau River and the Bruneau River from the confluence of the Jarbidge River to slightly upstream of the confluence of Hot Creek as a Designated WSR segment (approx. 40 miles). Management of these Designated and Eligible WSR segments overlap with all but a few miles of Idaho BLM-managed bull trout critical habitat. This management is likely to reduce any existing threats to the PBFs for bull trout critical habitat within these river segments.

Bruneau Hot Springsnail

Listing Status and Recovery Plan

The Bruneau hot springsnail (*Pyrgulopsis bruneauensis*) was listed by the Service as endangered under the ESA on January 25, 1993 (58 FR 5938-5946). However, on December 14, 1993, the U.S. District Court of Idaho set aside the Final Rule listing this species as endangered. On June 29, 1995, the U.S. Court of Appeals for the Ninth Circuit Court ruled that the Service reconsider the ESA listing for this species. On June 17, 1998, the Service reaffirmed the 1993 listing of the Bruneau hot springsnail as endangered (63 FR 32981-32996).

The Recovery Plan for the Bruneau hot springsnail was approved by the Service (USDI USFWS, 2002b) on September 30, 2002, and made available to the public on December 9, 2002 (67 FR 72967). The objective of the plan is to recover this species to the point where delisting is warranted. The recovery priority is 2C on a scale of 1 to 18, indicating the Bruneau hot springsnail meets the following criteria (USDI USFWS, 2002b): 1) taxonomically, the snail is a species; 2) the species faces a high degree of threat; 3) the species is rated high in terms of recovery potential; and 4) the species may be in conflict with other economic activities.

The recovery area for the Bruneau hot springsnail includes BLM-administered lands in the Jarbidge and Bruneau Field Offices and private land (Figure 5). The recovery area begins at the point where the Bruneau River (flowing south to north) crosses the southern boundary of T08S, R06E, S12 and continues downstream (including Hot Creek from the confluence of the Bruneau

River to the Indian Bathtub) to the point where the Bruneau River crosses the northern boundary of T07S, R06E, S35 of Owyhee County, Idaho (USDI USFWS, 2002b).

The Recovery Plan (USDI USFWS, 2002b) lists nine strategies or conservation measures needed to achieve recovery of the Bruneau hot springsnail. In general, the strategies include the protection of the geothermal aquifer on which the species depends, monitoring to assess changes in the geothermal aquifer and the survival and recovery of the species and its habitat, habitat restoration, a control program for non-native fish that prey upon the Bruneau hot springsnail within the recovery area, the use of translocation to establish additional Bruneau hot springsnail colonies within the recovery area, and monitoring and evaluation of recovery actions with regard to fulfilling the recovery plan objectives.

The Recovery Plan (USDI USFWS, 2002b) included the BLM as having responsibility to not permit any activities on lands under BLM jurisdiction that would jeopardize the survival of endangered or threatened species, or destroy or adversely modify critical habitat. To this end, the BLM has installed fencing along the east and west sides of the Bruneau River and the Hot Creek watershed to prevent the trampling of riparian vegetation by cattle and the subsequent erosion and siltation of Bruneau hot springsnail habitat.

In total, the Bruneau hot springsnail Recovery Area encompasses approximately 471 acres. Of these acres, approximately 259 acres are managed by the BLM Boise District - Bruneau Field Office (west side of the Bruneau River) and 212 acres are managed by the BLM TFD – Jarbidge FO (east side of the Bruneau River). For the 212 acres within the Jarbidge FO, 123 acres (58 percent) of the Recovery Area are on BLM land and 89 acres (42 percent) are on private land. There are no State lands within the Bruneau hot springsnail Recovery Area.

For the 123 acres of the Bruneau hot springsnail Recovery Area within the Jarbidge FO, approximately 90 acres are within the Bruneau-Jarbidge Rivers Wilderness where activities that impair wilderness values are not allowed. There are 11 acres of the Recovery Area within the Lower Bruneau Canyon ACEC. As identified in the ROD for the Jarbidge Resource Management Plan (USDI BLM, 2015d), activities are allowed in the ACEC as long as they are directly related to restoration. There are approximately 22 acres of BLM (TFD) managed land within the Bruneau hot springsnail Recovery Area not encompassed by the Wilderness or ACEC management.

Species Description

The family Hydrobiidae has a worldwide distribution of freshwater snail that is represented in North America by approximately 285 species in 35 genera (Sada, 2006). In North America, most species occupy springs, and their abundance and diversity is notably high in the Great Basin, where approximately 80 species from the genus Pyrgulopsis occur (Hershler & Sada, 2002). Pyrgulopsis is the most common genus in the family with approximately 131 described species that are considered valid, 61 percent of which occur in the Great Basin (Hershler & Sada, 2002).

The Bruneau hot springsnail (*Pyrgulopsis bruneauensis)* is a small freshwater snail (Gastropoda) in the family Hydrobiidae. Hydrobiids are gill-breathing, aquatic or semi-aquatic mollusks that are restricted to permanent waters, particularly spring-fed waters. Adult Bruneau hot springsnails have a small, globose (short, fat, rounded) to low-conic (short and cone-shaped) shell up to 5.5

millimeters (mm) (0.22 inch) long, less than 2.8 mm (0.11 inch) high, and with 3.75 to 4.25 mm (0.15 to 0.22 inch) whorls. Fresh shells are thin, transparent, and white to clear, appearing black because of underlying pigmentation. Other distinguishing features of this species include a verge (male intromittent organ) with a small lobe bearing a single distal glandular ridge and elongate muscular filament (Hershler, 1990; *in:* 58 FR 5938-5946).

P. bruneauensis is endemic to thermal springs and seeps that occur along eight kilometers (km) (five miles) of the Bruneau River in southwest Idaho (USDI USFWS, 2007). This species has a temperature tolerance between 11°C to 35°C (52 to 95°F) (Mladenka, 1992). Although *P. bruneauensis* have been observed in the Bruneau River proper (Mladenka & Minshall, 2004), occurrences have been directly associated with geothermal upwelling on the river bottom (Myler, 2004). The occurrence of *P. bruneauensis* is strongly associated with suitable water temperature (58 FR 5938-5946). In late summer (July to August) water temperatures in the Bruneau River are within the temperature tolerance of *P. bruneauensis*. However, there are no known surveys that have located *P. bruneauensis* in cold water or outside of geothermal upwelling zones in the Bruneau River (USDI USFWS, 2007).

P. bruneauensis is seldom found in standing or slow-moving water and was shown in the laboratory to tolerate higher current velocities than present in nature (Mladenka, 1992). This species has been observed to drift into the Bruneau River when it is disturbed from its geothermal spring habitat (Myler, 2004). Drift as a mechanism of downstream dispersal is possible for this species. However, it is assumed that since this species has no locomotion abilities in the river current, many drifting individuals that do not settle in geothermal springs will likely perish due to their strict temperature requirements (USDI USFWS, 2007). The dispersal mechanism and long-term exposure to cold river water for this species remains uncertain.

Life History and Habitat Characteristics

P. bruneauensis are tiny gill-breathing springsnails that are aquatic throughout their life cycle (Hershler & Sada, 2002). Reproduction occurs throughout the year except when limited by high or low water temperatures (USDI USFWS, 2002b). The optimal temperature range for reproduction is between 75°F and 95°F (Mladenka, 1992). Sexual maturity occurs at approximately 2 months of age. *P. bruneauensis* are dioecious (reproductive organs in separate male and female specimens) and lay single oval eggs on hard surfaces such as rock substrates or other snail shells (58 FR 5938-5946).

The Bruneau hot springsnail appears to be an opportunistic feeder, grazing primarily on algae and diatoms (USDI USFWS, 2002b). Springsnail densities are lowest in areas with bright green algal mats and higher in areas supporting periphyton-dominated communities (Mladenka, 1992). Abundance of springsnails generally varies seasonally, and is influenced principally by water temperature, spring discharge, food availability, and food quality as measured by chlorophyll content (Mladenka, 1992; Varricchione & Minshall, 1997). During the winter period of cold ambient temperatures and icing, the springsnails are most often located on the underside of outflow substrates; habitats least exposed to cold temperatures (Mladenka, 1992).

A movement study performed in the laboratory showed that *P. bruneauensis* is capable of crawling one centimeter per minute (0.3 in/min) (Myler & Minshall, 1998). This species prefers to move over wetted substrates and has a propensity to move upstream versus downstream (Myler & Minshall, 1998).

Bruneau hot springsnails are found on exposed surfaces of various substrates, including rocks, gravel, sand, mud, algal film, and periphyton communities within geothermal spring habitats (USDI USFWS, 2002b). Current velocity is not considered a significant factor limiting springsnail distribution, since they have been observed to inhabit nearly 100 percent of the available current regimes (USDI USFWS, 2002b).

Water temperature is the primary factor influencing this species' life history and habitat requirements, while water availability is the primary factor limiting this species' abundance and distribution. Bruneau hot springsnails are found in flowing geothermal springs and seeps with temperatures ranging from 15.7°C to 36.9°C (60.3°F to 98.4°F (Mladenka & Minshall, 1996). The highest springsnail densities (greater than 837 individuals per square yard) occur in springs with temperatures between 22.8°C to 36.6°C (73.0°F and 97.9°F (Mladenka, 1992).

The habitat for Bruneau hot springsnail is vastly different than the habitat used by the other ESA-listed aquatic snails within the TFD. The Bruneau hot springsnail occurs in geothermal springs that either originate from basalt rubble or bedrock cliffs or emerge from consolidated or unconsolidated sediments (sands and silts) in the form of bank seeps (Hopper, Burak, & Hardy, 2013). These geothermal springs drain downslope to the Bruneau River as either well defined creek channels or poorly defined moist banks with little to no pooling. Most of the visible, channelized geothermal spring streams are small, being only centimeters across and no longer than several meters from their source. However there are exceptions to this, with one notable spring being greater than one meter wide, and numerous other springs in excess of 10 meters in length. The Bruneau hot springsnail only occurs within the geothermal springs and are not found within the Bruneau River in areas without geothermal upwelling where stream velocities and water temperatures are not suitable to support Bruneau hot springsnail (D. Hopper, pers.com; 2016). The geothermal springs can be relatively open or densely vegetated with numerous native species such as cattails, willow, poison ivy, hackberry, juniper, native forbs or grasses, or non-native invasive species, including Russian olive. With the exception of Russian olive, most of the vegetation along the geothermal springs is appropriate for the site.

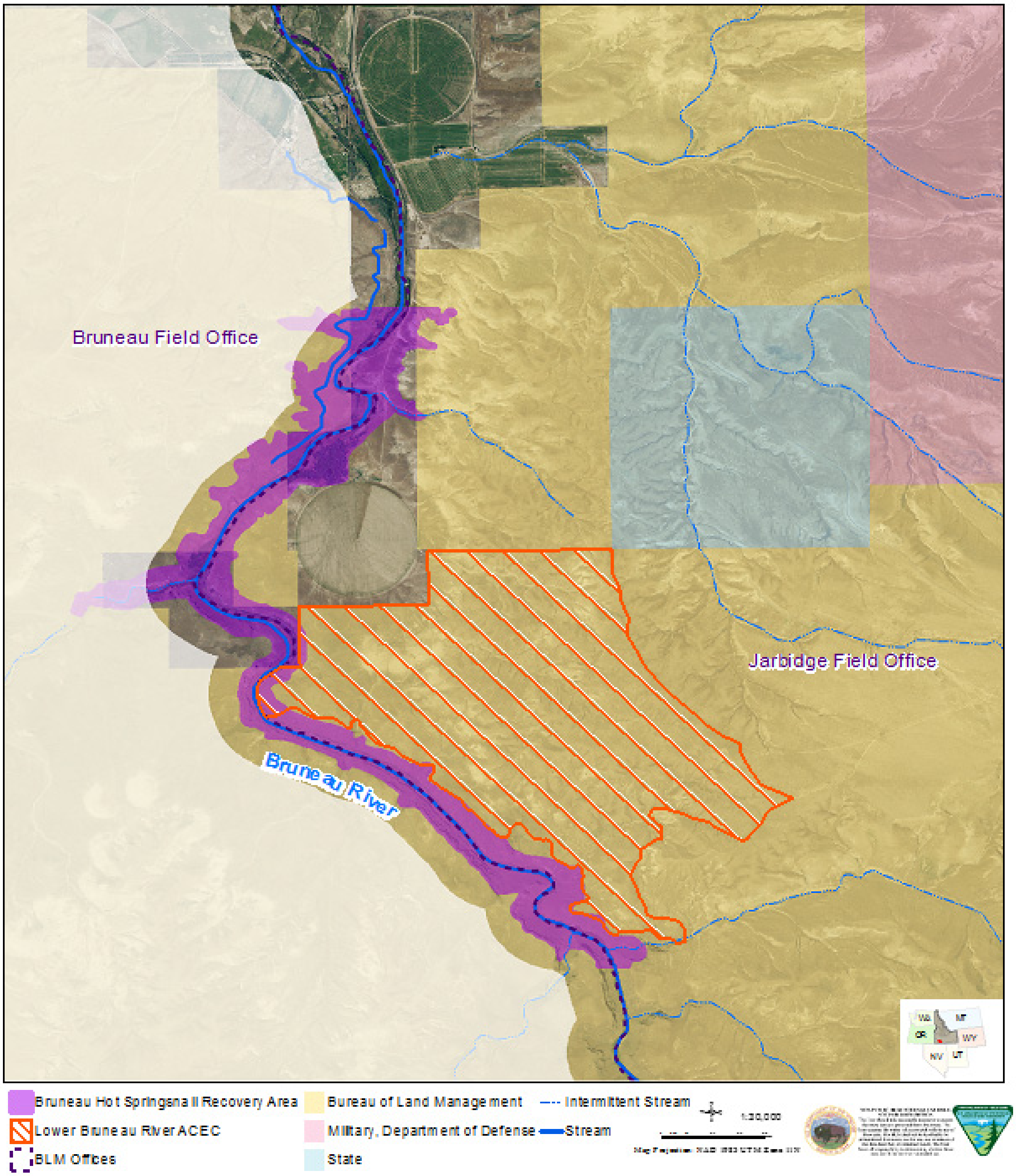
Status and Species Distribution

The Bruneau hot springsnail is only known to occur in a complex of related geothermal springs and their immediate outflows along the Bruneau River and its tributary, Hot Creek, in Owyhee County, southwestern Idaho (58 FR 5938-5946). The geothermal springs are located in the Bruneau hydrologic unit code 17050102 and are outflows of the Bruneau Valley geothermal aquifer (63 FR 32981-32996). No additional historic records exist for this species from the U.S. or elsewhere. Mollusk surveys of other thermal and cold-water springs in southern Idaho have failed to locate additional populations of *P. bruneauensis.*

Little is known about the historic range and distribution of the springsnail in the Bruneau River Basin. There is no recorded information on this species or its distribution prior to the 1950s. However, Hershler (1993) stated the presence of substantial populations of hydrobiid snails at a locality indicates the permanence of a water body and the persistence of habitat, perhaps for millennia (USDI BLM, 2006b).

Bruneau hot springsnails were first collected in springflows at the Indian Bathtub in upper Hot Creek by Borys Malkin in 1952 (58 FR 5938-5946). In 1953, J. P. E. Morrison concluded that these specimens represented a previously unknown genus and species of springsnail (USDI USFWS, 2002b). Robert Hershler formally described the species in 1990 from type specimens collected from the Indian Bathtub in Hot Creek as *Pyrgulopsis bruneauensis,* with a new common name of Bruneau hot springsnail (Hershler, 1990, *in* 58 FR 5938-5946).

Figure 5 – BLM TFD Bruneau Hot Springsnail Recovery Area



Most of the geothermal springs occupied by the Bruneau hot springsnail occur along the Bruneau River at and upstream of the confluence with Hot Creek on public lands administered by the BLM (USDI USFWS, 2002b). BLM-administered lands within this species' range along the east bank of the Bruneau River (232 acres) are within the BLM Jarbidge Field Office (FO), while those along the west bank (62.1 acres) are within the BLM Bruneau Field Office. Some additional springs occur on 164.5 acres of private land downstream of the Indian Bathtub and Hot Creek. However, most of these springs do not provide suitable geothermal conditions for the *P. bruneauensis* because of high water temperature (greater than 98.6^{o}F) (USDI BLM, 2006b).

Range-wide assessments in 2012 occurred upstream of Hot Creek, on the west and east banks combined, and determined there were 63 total geothermal springs found, of which 43 had springsnails (Hopper et al., 2013). Overall, there was a 25 percent increase in the number of occupied springs in 2012 when compared to similar surveys in 2011. It is speculated these measured increases could reflect the low water year of 2011-2012, resulting in reduced disturbance to springs and river habitats (Hooper et al., 2013). It is assumed that elevated flows in the spring of 2011 may have scoured benthic habitats, which may have negatively impacted springsnail populations, that disturbance being reflected in the large number of springs lacking snails (Hopper et al., 2013).

Although it is speculated the high river flows in the spring of 2011 explained the reduced presence of springsnails throughout the recovery area the opposite trend was observed in 2012 with lower spring flows and higher snail densities (Hopper et al., 2013). Supportive of this disturbance hypothesis is that the low water years [peak flows $\leq$ 1000 cubic feet/second (cfs)] in 2004, 2007, and 2012, were all years of relatively high snail abundance (presence at springs). However, the two higher water years in 2005 and 2010 were also high abundance years, making the relationship between spring runoff and snail abundance uncertain.

Conservation Needs

The Recovery Plan for the Bruneau hot springsnail (USDI USFWS, 2002b) identifies the following conservation measures for State and Federal agencies as actions that would reduce the threats to the species and its habitat:

- Implement conservation measures to increase water levels in the regional geothermal aquifer. Geothermal spring discharges should be permanently protected within the recovery area.
- Implement a groundwater monitoring program to assess changes in the geothermal aquifer.
- Develop a monitoring program to assess the survival and recovery of the species and habitat.
- Implement a habitat restoration program within the recovery area.
- Develop a non-native fish control program for the Bruneau hot springsnail Recovery Area.
- Manage Federal lands to promote recovery of the Bruneau hot springsnail.
- Implement a groundwater recharge model that stabilizes the geothermal aquifer at the recovery elevation. Determine the feasibility of restoring Upper Hot Creek as suitable

Bruneau hot springsnail habitat. Use translocation to establish additional Bruneau hot springsnail colonies within the recovery area.

- Seek funding for implementation of recovery tasks.
- Monitor and evaluate the success of recovery actions with regard to fulfilling the recovery objectives, criteria, actions needed, and removal of threats as outlined in the plan.

Conservation measures specific to BLM land management activities include not authorizing actions (e.g. livestock grazing or off-road vehicle travel) on Federal lands that would jeopardize the survival of endangered or threatened species or destroy or adversely modify their critical habitat. The recovery plan acknowledges the BLM has installed fencing along the east and west side of the Bruneau River and the Hot Creek watershed to prevent grazing impacts to riparian vegetation. More recent changes in management include identification of habitat used by Bruneau hot springsnail as critical suppression areas for wildland fire and specific guidelines for wildfire suppression within the occupied habitats.

Threats to the Species

The 5-Year Review for the Bruneau hot springsnail (USDI USFWS, 2007), as described below, identifies the following threats to *P. bruneauensis* and its habitat: groundwater withdrawals, livestock grazing, surface water withdrawals, recreation, predation by exotic fish, groundwater management and water quality.

Groundwater withdrawal for irrigation has resulted in a decline of the geothermal aquifer underlying the Bruneau, Sugar, and Little valleys in north-central Owyhee County, Idaho which threatens *P. bruneauensis* through the reduction or loss of geothermal habitat. The total number of geothermal springs along the Bruneau River upstream of Hot Creek (with and without *P. bruneauensis*) declined from 1991 to 2006 (Myler, 2006) and there are currently fewer high and low snail density sites with *P. bruneauensis* compared to 1991 (Myler, 2006). Because the water table has dropped dramatically, much of the geothermal spring habitat previously inhabited by *P. bruneauensis* is dry, resulting in a reduction in number of habitats, habitat area, and isolation of colonies (USDI USFWS, 2002b; USDI USFWS, 2007).

Prior to 1998, livestock grazing was considered a threat factor that impacted some geothermal spring habitats where *P. bruneauensis* occurred near Hot Creek. In the 1990s, the BLM constructed fences to exclude livestock grazing in this area, and presently, cattle are excluded from Hot Creek and all geothermal spring habitats along the Bruneau River upstream of Hot Creek. Riparian vegetation has rebounded and is providing stream cover as well as defense against instream erosion. Presently, livestock grazing is considered a low-ranking threat factor to *P. bruneauensis* colonies and the geothermal habitats it occupies in Hot Creek or along the Bruneau River upstream of Hot Creek.

Surface water withdrawals and diversions occur along the Bruneau River downstream of Hot Creek. Within the recovery area, which extends approximately 1.2 miles below Hot Creek, there are two major diversions dams; Harris Dam and Buckaroo Dam. These dams divert nearly all of the water from the Bruneau River for irrigation in the Bruneau Valley. It is unknown how *P. bruneauensis* disperses between geothermal springs; however, they have been observed to drift into the Bruneau River when disturbed (Myler, 2006). Therefore, removing the majority of the flow below Hot Creek may impede the ability of this species to migrate or disperse to other downstream geothermal springs. Surface water diversion is a low-ranking threat that only applies to habitat along the Bruneau River below Hot Creek.

The original 1993 listing (58 FR 5938-5946) stated that recreational access also impacts habitats of *P. bruneauensis* along the Bruneau River (USDI USFWS, 2007). Recreational activities continue to occur at one geothermal spring where small dams have been constructed to form thermal pools for bathing. In 1998, the Service determined that recreational use of thermal springs was not a significant threat to *P. bruneauensis* or its geothermal spring habitat (63 FR 32981-32996). Presently, only one known geothermal spring in the recovery area is used by recreational bathers, but is above the thermal maximum of 35ºC (95ºF), that *P. bruneauensis* can tolerate. Therefore, recreational use of the geothermal springs and seeps is considered a low-ranking threat to *P. bruneauensis.*

Introduced populations of redbelly tilapia (*Tilapia zilli*), and mosquito fish (*Gambusia affinis*) thrive in Hot Creek and in the geothermal springs that discharge into the Bruneau River throughout the entire range of *P. bruneauensis* (Myler, 2004). Recent laboratory studies suggest that *Tilapia zilli* will use *P. bruneauensis* as a food source (Myler & Minshall, 1998). In 1999, a controlled fish feeding experiment in enclosures in Hot Creek with *T. zilli* and *P. bruneauensis* found that all *P. bruneauensis* were absent within five days (Myler, 2000). Since *T. zilli* occur in the geothermal springs along the Bruneau River and in Hot Creek (Myler, 2004) they likely threaten the continued existence of *P. bruneauensis* through predation. In addition, Mladenka observed *G. affinis* to eat *P. bruneauensis* in the laboratory. Future declines in *P. bruneauensis* habitat increase the likelihood for population declines due to predation from these exotic fish.

Snake River Physa

Listing Status

The Service listed the Snake River physa (P*hysa natricina*) as endangered effective January 13, 1993 (57 FR 59244-59257). No critical habitat has been designated for this species. A recovery plan for the Snake River physa was published by the Service as part of the Snake River Aquatic Species Recovery Plan (USDI USFWS, 1995). The target recovery area for this species is from River Mile (RM) 553 to RM 675 (USDI USFWS, 1995), which includes the river reach downstream of Minidoka Dam, encompasses all of the Snake River reaches within the BLM TFD (Figure 6).

Species Description

The Snake River physa (or Physa) was formally described by Taylor (Taylor, 1988; Taylor, 2003), from which the following characteristics are taken. The shells of adult Snake River physa may reach seven mm in length with 3 to 3.5 whorls, and are amber to brown in color and ovoid in overall shape. The aperture whorl is inflated compared to other Physidae in the Snake River, the aperture whorl being less than half of the entire shell width. The growth rings are oblique to the axis of coil at about 40 degrees and relatively course, appearing as raised threads. The soft tissues have been described from limited specimens and greater variation in these characteristics may be present upon detailed inspection of more specimens. The body is nearly colorless, but tentacles have a dense black core in the distal half.

The Snake River physa is a pulmonate species in the family Physidae, order Basommatophora (Taylor, 1988; Taylor, 2003). The rarity of Snake River physa collections, combined with difficulties associated with distinguishing this species from other physids, has resulted in some uncertainties over its status as a separate species. Taylor (2003) presented a systematic and taxonomic review of the family, with Snake River physa being recognized as a distinct species *(Haitia (Physa) natricina)* based on morphological characters he originally used to differentiate the species in 1988. Later authors concluded that the characters described by Taylor (1988) were within the range of variability observed in the widely distributed *Physa acuia,* and placed Snake River physa as a junior synonym of *P. acuta* (Rogers & Wethington, 2007). Genetic material from early Snake River physa collections was not available when Rogers & Wethington published and their work included no discussion of the species' genetics.

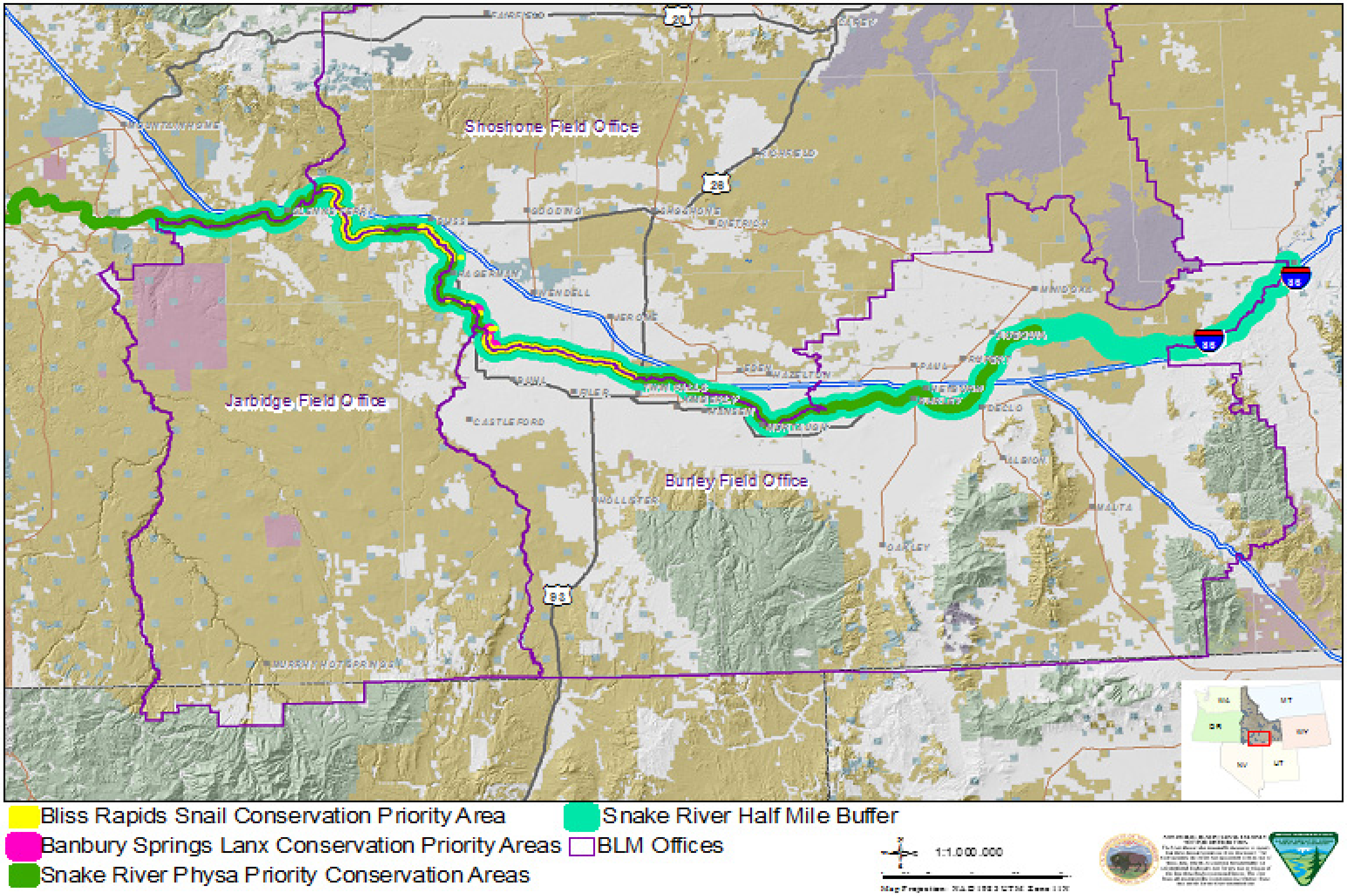
More recent collections of specimens resembling Taylor's (1988, 2003) descriptions of Snake River physa have been used to assess morphological, anatomical, and molecular uniqueness. Live snails resembling Snake River physa collected by the Bureau of Reclamation (BOR) below Minidoka Dam as part of monitoring from a 2005 Biological Opinion (USDI USFWS, 2005a) began to be recovered in numbers sufficient to provide specimens for morphological review and genetic analysis. Burch (2008) and Gates and Kerans (2010) identified snails collected by BOR as Snake River physa using Taylor's (1988, 2003) shell and soft tissue characters. Their genetic analysis found these specimens to be distinct from *P. acuta.*

Gates and Kerans (2011) also performed similar analyses on 15 of 51 live-when-collected specimens recently identified as Snake River physa (Keebaugh, 2009), and collected between 1998 and 2003 by the Idaho Power Company in the Snake River from Bliss Dam (RM 560) downstream to near Ontario, Oregon (RM 368). Gates & Kerans (2011) found these specimens were not genetically distinct from Snake River physa collected below Minidoka Dam (but were genetically distinct from *P. acuta),* and provided additional support that Taylor's (1988) shell description of Snake River physa is diagnostic.

Life History and Habitat Characteristics

Freshwater pulmonate snail species such as Snake River physa do not have gills, but absorb oxygen across the inner surface of the mantle via a "lung" or pulmonary cavity (Pennak, 1953). Some freshwater pulmonates may carry an air bubble within the mantle as a source of oxygen, which may be replenished via occasional trips to the surface, though this is not a required mode of respiration and many diffuse oxygen directly from the water into their tissues across the surface of the mantle. The later method is the likely respiratory mode for the Snake River physa. Since they live in moderately swift current, individuals that release from substrates to replenish air at the surface would mean they would likely be transported some distance downstream away from their cohort and habitat of choice, and thus away from potential mates and known food sources. The lung-like mantle cavity may also permit at least some physa species to survive for short periods out of water. *Physa virgata,* a junior synonym of *P. acuta* (Dillon, Robinson, Smith, & Wethington, 2005), have been observed to move and remain out of the water for up to 2 hours in reaction to chemical cues given off by crayfish foraging on nearby conspecifics (Alexander & Covich, 1991). Whether or not Snake River physa can survive under such conditions of desiccation is not known.

Figure 6 - BLM TFD Listed Snake River Snails



As far as is known, all freshwater pulmonates, which include Snake River physa, are able to reproduce successfully by self-fertilization (Dillon, 2000). While self-fertilization (selfing) in pulmonates can be forced under laboratory conditions by isolating individual snails, there is considerable variation within and among pulmonate genera and species in the degree of selfing that occurs in natural populations. Of the many *Physa* species in North America and world-wide, studies of self-fertilization effects on population genetics seem to have been conducted only on *P. acuta*. Selfing and its implications for genetic variation and survival are unknown for Snake River physa.

Snake River physa have yet to be reared and studied in the laboratory, and the species' reproductive biology has not been studied under natural conditions. Dillon, Earnhardt, and Smith (2004) reported mean fecundity of 39.1 hatchlings per pair per week for *P. acuta*, but whether the Snake River physa exhibits similar reproductive output is not known. *Physa gyrina* began mating and laying eggs when water temperatures reached 10° to 12° C (DeWitt, 1955), with eggs hatching in eight to ten days, and Dillon (2000) presents evidence that the period of egg-laying in gastropods is somewhat dependent on snail size and water temperature. The reproductive period for Snake River physa is not known, but might be expected to generally follow that of other Snake River gastropods, with juveniles appearing in mid- to late-spring and numbers peaking in mid-to late-summer as river temperatures increase. Most members of the genus and family are not believed to live longer than one year (Dillon, 2000). DeWitt (1955) stated that the lifespan of *P. gyrina* in southern Michigan populations was 12 to 13 months. It is reasonable to assume that Snake River physa lifespan would be similar.

The earliest descriptions of the species state that it was predominantly found in deep, fast flowing habitats such as rapids, and on boulder to bedrock substrates (Taylor, 1982). While such habitats may be utilized by the Snake River physa, the large amounts of collection data currently available have allowed for a more rigorous analysis of occupied habitat within the Snake River. Gates and Kerans (2010) found the species to be most associated with pebble to gravel sized substrate, but note that these substrate types made up 67 percent of the river sampled and the Minidoka Reach is predominantly made up of run-glide habitats, rapids making up a small proportion of habitats present. More recent analysis of the downstream data collected by Idaho Power Company support the findings of Gates and Kerans. Winslow, Bean, and Gates (2011) found that Snake River physa occurred on substrates containing gravel (pebble-gravel and cobble-gravel categories) more than expected by chance alone. In addition, such gravel substrates are more prevalent where typical river velocities are great enough to transport finer sediments, but not so high as to readily transport pebble-gravel sized sediments, representing water velocities typically encountered in runs and glides. Although these data cannot provide certainty of the habitat preference of the species, nor provide assurance that the species will not occur in other habitat types, they do provide the most supported analysis of such a preference currently available.

Gates and Kerans' (2010) detailed study, sampled cross sections of the river profile, and characterized habitat as run, glide, or pool. Mean depth of samples containing Snake River physa was 1.74 meters (m), live specimens most frequently recovered from depths of 1.5 to 2.5 m. Depths in which all specimens were recovered ranged from less than 0.5 m to over 3.0 m, and abundances of three or more Snake River physa per sample were found at depths greater than 1.5 m. Eighty percent of samples containing live Snake River physa were located in the middle 50 percent of the river channel (Gates & Kerans, 2010). This evidence may be suggestive of habitat requirements related primarily to velocity and depth as they influence substrate deposition, and possibly other factors.

Possibly of significance may be the fact that, despite intense and extensive surveys and monitoring for the Bliss Rapids snail in cold water spring habitats of high water quality, Snake River physa have never been noted in such habitats, including those with a clear connection to the Snake River such as the Thousand Springs area. Relatively cool water of a consistent temperature might represent an outside boundary to Snake River physa's habitat requirements. Water temperatures below 10° C are known to inhibit reproduction in *P. gyrina* (DeWitt, 1955), a widespread physid species that co-occurs with Snake River physa in the Snake River. Summer water temperatures of springwater flows from the Snake River Plain Aquifer, including Thousand Springs, typically range from 14° to 16° C.

Water temperature requirements and tolerances of Snake River physa are not been specifically researched. Gates and Kerans (2010) reported a mean water temperature of 22.6° C for sites occupied by the species at the time of sampling (in August and October), but it is not known if this represents an optimal range or if it happens to be the temperature range in which the species has been able to persist following anthropogenic changes to the Snake River system. Winter water temperatures in this river have historically reached freezing, though records are patchy (USDI USGS, 2003). Water temperatures for samples collected by Idaho Power Company in the Bruneau Arm of C.J. Strike Reservoir and in the Snake River between RM 559 and RM 367 in late July to mid-August between 1998 and 2002 that contained live-when-collected Snake River physa averaged 23.4° C. The maximum temperature for cold water biota established in the Clean Water Act is 22° C. Based on available information, Snake River physa appear to be able to tolerate water temperatures slightly above the cold water standard of 22° C.

Diet preferences of Snake River physa are not known. Species within the family Physidae live in a wide variety of habitats and exhibit a variety of dietary preferences to match this. Physidae from numerous studies consumed materials as diverse as macrophytes, benthic diatoms (diatom films that primarily grow on rock surfaces), bacterial films, and detritus (Dillon, 2000). *P. gyrina*, which co-occurs with Snake River physa in the Snake River, consumes dead and decaying vegetation, algae, water molds, and detritus (DeWitt, 1955; Dillon, 2000).

Status and Species Distribution

At the time of its listing, the Snake River physa was presumed to occur in two disjunct populations, one in the Lower Salmon Falls and Bliss Reaches (approx. RM 553-572), and the Minidoka Reach (approx. RM 669-675). Its historic range was believed to extend as far downstream as Grandview (RM 487) (USDI USFWS, 1995). Fossil evidence indicates this species existed in the Pliocene-Holocene lakes and rivers of northern Utah and southeastern Idaho, and as such, is a relict species from Lake Bonneville, Lake Thatcher, the Bear River, and other lakes and watersheds connected to these water bodies (Frest, Bowler, & Hershler, 1991). The species' cryptic morphology (resembling more common species within the genus), the difficulty of sampling a large river, and the species' rarity, all made determining its distribution and abundance challenging and ambiguous.

Much of the resolution on the species' distribution has come from recent advances in the use of genetic tools, which have provided a greater degree of certainty in identification, and hence confirmation of the species' abundance and distribution (USDI USFWS, 2012a). Subsequent work conducted by a number of agencies, private entities, and academics has greatly increased our understanding of the species' distribution and preferred habitat, though numerous questions on the factors limiting its distribution and abundance remain. Surveys conducted by Idaho Power Company between 1995 and 2003 (Keebaugh, 2009) and the BOR from 2006 through 2008 (Gates & Kerans, 2010), confirmed with genetic identification place its current distribution from RM 368 near Ontario, Oregon (some 128 miles downstream from its previously recognized downstream range), upstream to Minidoka Dam (RM 675). Gates and Kerans (2011) confirmed that shell morphology, diagnostic of Snake River physa, from one of the specimens collected in the Bruneau River arm of C.J. Strike Reservoir matches that of specimens with similar morphology also confirmed as Snake River physa by genetic analysis.

More recently, Idaho Power Company conducted surveys targeting the Snake River physa in the lower portion of its range for their preparation of biological assessments for the Swan Falls license in 2011. Surveys for this project were conducted from RMs 441.9 to 469.4 and collected sixty 0.25 square meter (m^2) benthic samples. These survey efforts failed to recover any living Snake River physa and no empty shells were recovered (Bean & Stephenson, 2011). In combination with the survey result provided by Keebaugh (2009), these results further support the conclusion that the species is rare outside of its core range in the river reach below Minidoka Dam.

As discussed above, while the full extent of the species’ range is considerably greater than originally thought, the snail is not uniformly distributed throughout that range and there remain extensive portions of the Snake River that have not received adequate survey. The Snake River physa is known to reach its highest densities in the upstream-most population, which is roughly delineated as occurring immediately below Minidoka Dam (RM 675), downstream to Milner Reservoir (RM 663). Gates and Kerans (2010) report Snake River physa from 19.7 percent of their samples with high density samples ranging from 30 to 63 individuals/m^2. In addition, Kerans and Gates (2008) also reported finding 7,540 empty Physa shells during their 2006 sampling effort in the Minidoka Reach, by far the largest number of Snake River physa shells reported from any surveys. The frequency of occurrence and densities both decline in this reach downstream toward Milner Reservoir where the river transitions from a lotic to more lentic and sediment-laden environment (Gates & Kerans, 2010). In contrast to the Minidoka Reach, the Physa is considerably less commonly encountered in its downstream range (below C.J. Strike), with only 4.3 percent of 787 inspected samples containing live animals and those positive plots most typically not exceeding four individuals/m^2 (Keebaugh, 2009). Other portions of the Snake River (e.g., Thousand Springs (RM 584) to Milner Reservoir) have received little to no survey effort. The action area has received limited surveys targeting Physa, but has received considerable effort for Bliss Rapids snail. However, based on these observations, the species does not appear to be a common inhabitant of this river reach (USDI USFWS, 2012a).

Lastly, early reports of the collection of two live Snake River physa above American Falls Dam (Pentec Environmental, 1991) have never been confirmed. Recent survey efforts by the Bureau of Reclamation failed to locate Snake River physa upstream of Lake Walcott (Newman, 2012, personal communication), and as such the Service considers the colonies below Minidoka Dam and spillway as the upstream-most extent of the species' current range.

Conservation Needs

Survival and recovery of the Snake River physa is considered contingent on "conserving and restoring essential mainstem Snake River and cold-water spring tributary habitats (USDI USFWS, 1995)." The primary conservation actions outlined for this species are to "Ensure State water quality standards for cold-water biota..." (USDI USFWS,1995). Priority 1 tasks consist of securing, restoring, and maintaining free-flowing Snake River habitats between the C.J. Strike Reservoir and American Falls Dam and existing cold-water spring habitats; restoring, and maintaining cold, unpolluted, well-oxygenated flowing water with low turbidity; and monitoring to further define life history, population, and habitat requirements (USDI USFWS, 1995). The Priority 2 tasks consist of updating recovery plan criteria and objectives as more information becomes available, recovery tasks are completed, or as environmental conditions change (USDI USFWS, 1995).

The Service has concluded that Snake River physa select for substrates in the pebble to gravel range, and possibly in the cobble to gravel range, and that these substrates represent the species' preferred habitat under current conditions (USDI USFWS, 2012a). Most Physa have been found in unimpounded reaches of run-glide habitats with pebble-gravel substrates; this is considered the species' preferred habitat.

Threats to the Species

Much of the following threats analysis for the Snake River physa is from the discussion in the Snake River Aquatic Species Recovery Plan, titled *Reasons for Decline*, which covers all five of the Federally-listed Snake River mollusks (USDI USFWS, 1995). Because this BA covers two of those five species (the Bliss Rapids snail and the Snake River physa), the Recovery Plan discussion of reasons for decline is presented here in its entirety and referred to in subsequent threats analyses for the Snake River Physa. The Recovery Plan (USDI USFWS, 1995) notes whether threats apply to all or only some of the listed mollusks.

The free-flowing, cold-water environments required by the listed Snake River species have been affected by, and are vulnerable to, continued adverse habitat modification and deteriorating water quality from one or more of the following: hydroelectric development, effects of hydroelectric project operations, water withdrawal and diversions, water pollution, inadequate regulatory mechanisms (which have failed to protect the habitat used by the listed species), and the possible adverse effects of exotic species.

Load-following is a frequent and sporadic practice that results in dewatering aquatic habitats in shallow shoreline areas. These daily water fluctuations prevent federally listed species and species of concern from occupying the most favorable habitats. Water temperature, velocity, dissolved oxygen concentrations and substrate type are all critical components of water quality that affect the survival of listed aquatic snails. These species require cold, clean, well-oxygenated, and rapidly flowing waters. They are intolerant of pollution and factors that cause oxygen depletion, siltation, or warming of their environment.

The Snake River is affected by runoff from feedlots and dairies, hatchery and municipal sewage effluent, and other point and nonpoint discharges. During the irrigation season, 13 perennial streams and more than 50 agricultural surface drains contribute irrigation tailwaters to the Snake River (USDI BLM, 2006b). In addition, commercial, State, and Federal fish culture facilities discharge wastewater into the Snake River and its tributaries. These factors, coupled with periodic, drought- induced low flows, have contributed to reduced dissolved oxygen levels and increased plant growth and a general decline of cold-water free-flowing river species of the Snake River. The Hagerman area receives massive cold-water recharge from the Snake River Plain aquifer. However, several of these springs and spring tributaries have been diverted for hatchery use, which reduces or eliminates clean water recharge and contributes flows enriched with nutrients to the Snake River.

Another threat to the listed Snake River snail species is the presence of the New Zealand mudsnail (*Potamopyrgus antipodarum*) in the middle Snake River. The widely distributed and adaptable mudsnail is experiencing explosive growth in the Snake River and shows a wide range of tolerance for water fluctuations, velocity, temperature and turbidity. The species seems to prefer warmer polluted waters over pristine cold spring environments. Based on recent surveys, New Zealand mudsnail directly competes with Snake River physa for suitable habitats in the Snake River.

Recovery of the listed species will require restoration of their habitat, and will entail restoration of the water quality of the middle Snake River to a level that supports and maintains a diverse and sustainable aquatic ecosystem. In particular, reduction of nutrient and sediment loading to the river and restoration of riverine conditions are needed to recover the listed species. Any factor that leads to the deterioration in water quality would likely contribute to a decline in this species. Because of stringent oxygen requirements, any factor that reduces dissolved oxygen concentrations for even a few days may prove fatal to listed snails.

Bliss Rapids Snail

Listing Status

The Bliss Rapids snail (*Taylorconcha serpenticola*) was listed as a threatened species on December 14, 1992 (57 FR 59244-59257). Critical habitat for this species has not been designated. The recovery area for this species is designated as the Snake River and tributary cold-water spring complexes between RM 547 and RM 585 (USDI USFWS, 1995) (Figure 6). On December 26, 2006, the State of Idaho and the Idaho Power Company petitioned the Service to delist the Bliss Rapids snail from the Federal list of threatened and endangered species, based on new information that the species was more widespread and abundant than determined at the time of its listing. The Service reviewed the information provided in the petition and initiated a 12-month review of the species' status. On September 16, 2009, the Service posted a notice in the Federal Register stating the Bliss Rapids snail still warranted protection as a Threatened species given its restricted range and the persistence of threats to the species (USDI USFWS, 2008b).

Species Description

The shells of adult Bliss Rapids snails are 0.08 to 0.16 inches long with 3.5 to 4.5 whorls, and are clear to white in color when empty (Hershler, Frest, Johannes, Bowler, & Thompson, 1994). The species is known to occur in at least two different color morphs, a white or pale form, and a red form. It is not known what controls these color forms, but some populations contain both.

Life History and Habitat Characteristics

The Bliss Rapids snail is dioeceous (has separate sexes). Fertilization is internal and eggs are laid within capsules on rock or other hard substrates (Hershler et al., 1994). Individual, life time fecundity is not known, but deposition of 5 to 12 eggs per cluster has been observed in laboratory conditions (Richards, Van Winkle, & Arrington, 2009b). Reproductive phenology probably differs between habitats and has not been rigorously studied in the wild. Hershler et al., (1994) stated that reproduction occurred from December through March. However, a more thorough investigation by Richards (2004) suggested a bimodal phenology with spring and fall reproductive peaks, but with some recruitment occurring throughout the year.

The seasonal and inter-annual population densities of Bliss Rapids snails can be highly variable. The greatest abundance values for Bliss Rapids snails are in spring habitats, where they frequently reach localized densities in the tens to thousands per square meter (Richards, 2004; Richards & Arrington, 2009). This is most likely due to the stable environmental conditions of these aquifer springs, which provide steady flows of consistent temperatures and relatively good water quality throughout the year. Despite the high densities reached within springs, Bliss Rapids snails may be absent from springs or absent from portions of springs with otherwise uniform water quality conditions. The reasons for this patchy distribution are uncertain but may be attributable to factors such as habitat quality (USDI USFWS, 2008b), competition from species such as the New Zealand mudsnail (Richards, 2004), elevated water velocity, or historical events that had eliminated Bliss Rapids snails in the past (e.g., construction of fish farms at spring sources, spring diversion, etc.).

By contrast, river-dwelling populations are subjected to highly variable river dynamics where flows and temperatures can vary greatly over the course of the year. Compared to springs in which water temperatures range between 14° to 17° C, river temperatures typically fluctuate between 5° to 23° C, and river flows within the species' range can range from less than 4,000 cfs to greater than 30,000 cfs throughout the course of a year (USDI USFWS, 2012a). These river processes likely play a major role in structuring and/or limiting snail populations within the Snake River (Dodds, 2002; USEPA, 2002). While Bliss Rapids snails may reach moderate densities (10s to 100s of individuals/m^2) at some river locations, they are more frequently found at low densities (<10 individuals/m^2) (Richards & Arrington, 2009; Richards, Van Winkle, & Arrington, 2009c) if they are present (USDI USFWS, 2012a). It is likely that annual river processes play a major role in the distribution and abundance of the Bliss Rapids snail throughout its range within the Snake River by killing or relocating snails, and by greatly altering the benthic habitat (Dodds, 2002; Liu & Hershler, 2009; Palmer & Poff, 1997). While declines in river volume due to a natural hydrograph are typically less abrupt than load-following (USDI USFWS, 2012a), they are of much greater magnitude, and hence it is logical to assume these natural events play an important role in limiting snail populations within the river.

A genetic analysis of the Bliss Rapids snail based on specimens collected from throughout its range (Liu & Hershler, 2009) indicated that spring populations were largely or entirely sedentary, with little to no movement between springs or between springs and river populations.

Most spring populations were highly differentiated from one another as determined by DNA microsatellite groupings. By contrast, river populations exhibited no clear groupings, suggesting that they are genetically mixed (Liu & Hershler, 2009) and without genetic barriers, or they have not been isolated long enough to establish unique genetic differentiation. This pattern supports the suggestion that the river-dwelling population(s) of the Bliss Rapids snail exist in either a continuous river population (Liu & Hershler, 2009) or as a metapopulation(s) (Richards et al., 2009c) in which small, semi-isolated populations (within the river) provide and/or receive recruits from one another to maintain a loosely connected population.

The Bliss Rapids snail is typically found on the lateral and undersides of clean cobbles in pools, eddies, runs, and riffles, though it may occasionally be found on submerged woody debris (Hershler et al., 1994) where it grazes on periphyton (benthic diatom mats) (Richards, Falter, & Steinhorst, 2006). This species appears to be restricted to aquifer spring-influenced bodies of water within and associated with the Snake River from King Hill (RM 546) to Ellison Springs (RM 604). The snails' distribution in the Snake River is, with rare exception, within reaches that are not impounded and receive significant quantities (current est. 5,000 cfs) of recharge from the Snake River Plain Aquifer (Clark et al., 1998; Clark & Ott, 1996). It has not been found within impounded reaches of the Snake River (Richards et al., 2006), but can be found in spring pools or pools with evidence of spring influence (Hopper, 2006). With few exceptions, the Bliss Rapids snail has not been found in sediment-laden habitats. It is typically found on, and reaches its highest densities on, clean gravel-to-boulder substrates in habitats with low-to-moderately swift currents, but it is typically absent from whitewater habitats (Hershler et al., 1994). Difficulties in rearing this species in a laboratory setting (Warbritton, 2009), along with its natural distribution within spring-influenced waters, suggest it requires cool water of relatively high or specific quality.

Previous observations have suggested the Bliss Rapids snail is more abundant in shallower habitats, but most sampling has been in shallow habitat since deeper river habitat is more difficult to access. Clark (2009) used a quantile regression model that modeled a 50 percent decline in snail abundance for each 3 m of depth (e.g., snail density at 3 m was approximately 50 percent less than that at shoreline. Richards, Van Winkle, & Arrington (2009a) used an analysis of variance to assess snail densities at 1-meter intervals and only found a statistical difference (increase) in densities in the first meter of depth, with no declining trends with increasing depth. Nonetheless, these authors suggest that greater than 50 percent of the river population could reside in the first 1.5 meter depth zone of the Snake River (Richards et al., 2009a).

Richards (2004) looked at periphyton (benthic diatoms) consumption by the Bliss Rapids snail and the New Zealand mudsnail *(Potamopyrgus antipodarum)* in competition experiments. He described the Bliss Rapids snail as a "bulldozer" type grazer, moving slowly over substrates and consuming most, if not all, available diatoms. Richards (2004) suggested that the Bliss Rapids snail appeared to be a better competitor (relative to the New Zealand mudsnail) in late successional diatom communities, such as the stable spring habitats where they are often found in greater abundance than the mudsnail.

Status and Species Distribution

The Service (USDI USFWS,1995) reported the Bliss Rapids snails' "modern" range extends along the Snake River from Indian Cove Bridge (RM 525.4) to Twin Falls (RM 610.5) and that it likely occurred upstream of American Falls in a disjunct population where it had been reported from springs (RM 750). The current documented range of extant populations is more restricted; this species has been identified from the Snake River near King Hill (RM 546) to below Lower Salmon Falls Dam (RM 573), and from spring tributaries as far upstream as Ellison Springs (RM 604) (Bates, Fore, Menten, & Radko, 2009). The "American Falls" occurrence was discounted after multiple surveys failed to relocate the species (USDI USFWS, 2008b). There is an isolated river population that occupies a limited bypass reach (Dolman Rapids) between the Upper and Lower Salmon Falls reservoirs (Stephenson, 2006).

Recently completed studies by the Idaho Power Company found the species to be more common and abundant in the Snake River (RM 546 to 572) than previously thought, although typically in a patchy distribution with highly variable abundance (Bean, 2006; Richards & Arrington, 2009). Most, if not all, of the river range of the species is in reaches (Lower Salmon Falls and Bliss) where recent records show an estimated 5,000 cfs of water entering the Snake River from numerous cold springs from the Snake River Plain Aquifer (Clark & Ott, 1996; Clark et al., 1998). This large spring influence, along with the steep, unimpounded character of the river improves water quality (e.g., temperature, dissolved oxygen, and other parameters) and helps maintain suitable habitat (low sediment cobble) for the snail that likely contributes to the species' presence in these reaches (Hershler et al., 1994). It is noteworthy that the species becomes absent below King Hill, where the river loses gradient, begins to meander, and becomes more sediment-laden and lake-like. Although Bliss Rapids snail numbers are typically lower within the Snake River than in adjacent spring habitats, the large amount of potential habitat within the river suggests that the population(s) within the river is/are low-density but large compared to the smaller, isolated, typically high-density spring populations (Richards & Arrington, 2009). These river reaches comprise the majority of the species designated recovery area as well as the action area.

The species' range upstream of Upper Salmon Falls Reservoir (RM 585 to 604) is restricted to aquifer-fed spring tributaries where water quality is relatively high and human disturbance is less direct. Within these springs, populations of snails may occupy substantial portions of a tributary (e.g., Box Canyon Springs Creek, where they are scattered throughout the 1.1 miles) of stream habitat) or may be restricted to habitats of only several square meters (e.g., Crystal Springs). Spring development for domestic and agricultural use has altered or degraded a large amount of these habitats in this portion of the species' range (Clark et al., 1998; Hershler et al., 1994), often restricting populations of the Bliss Rapids snail to spring source areas (Hershler et al., 1994). Within the Snake River (and with the exception of the small, isolated population in the Dolman Rapids bypass reach), the Bliss Rapids snail only occurs in the unimpounded reaches from below Lower Salmon Falls Dam (RM 573) to near the town of King Hill (est. RM 546), a total of approximately 19 river miles. In the King Hill area the gradient and velocity of the Snake River declines and the benthic habitats begin to become more sediment laden; a habitat from which the species is absent. Although the species is typically less abundant in river habitats than in springs, it is far more widespread and genetically similar in the river where it probably is distributed via river transport mechanisms during high-flow (see Life History section).

Conservation Needs

Survival and recovery of the federally listed snails in and adjacent to the Snake River, Idaho, is considered contingent on "conserving and restoring essential mainstem Snake River and cold-water spring tributary habitats" (USDI USFWS, 1995). Given the Bliss Rapids snail's habit of utilizing river and spring habitats, the above stated recovery goal is critical. The Priority 1 tasks consist of securing, restoring, and maintaining free-flowing Snake River habitats between the C.J. Strike Reservoir and American Falls Dam and existing cold-water spring habitats; restoring, and maintaining cold, unpolluted, well-oxygenated flowing water with low turbidity; and population and habitat monitoring to further define life history, population, and habitat requirements (USDI USFWS, 1995). The Priority 2 tasks consist of updating recovery plan criteria and objectives as more information becomes available, recovery tasks are completed, or as environmental conditions change (USDI USFWS, 1995).

Given the known limited distribution of the Bliss Rapids snail and its specific habitat requirements, maintaining or improving spring and river habitat conditions within its range is the primary need for this species' survival and recovery. The Bliss Rapids snail reaches its highest densities in cold-water springs dominated by cobble substrates and free, or relatively free, of fine sediments, and with good water quality. Protecting habitats that contain Bliss Rapids snails is critical to their survival and recovery.

Ensuring that water quality within the Snake River is not degraded is important for sustaining the species' river-dwelling populations. Since water quality appears to be of crucial importance to the species, protection of the Snake River Plain Aquifer is a priority. The aquifer is the source of water for the springs occupied by the snail and serves a major role in maintaining river water quality within the species' range.

Threats to the Species

The threats analysis for the Bliss Rapids snail is the same as described previously for the Snake River physa (e.g., flow alteration and diversion, impaired water quality, presence of exotic species). In addition, because the Bliss Rapids snail can occur in shallow, shore areas of the river, this species and its habitat may be subject to trampling, and possible mortality, by livestock or recreationists using the shallow water areas along the Snake River.

Banbury Springs Lanx

Listing Status

The lanx (*Lanx* n sp.) (undescribed) was listed as endangered on December 14, 1992 (57 FR 59244-59257), under the Endangered Species Act of 1973, as amended. Critical habitat has not been designated for the species.

Species Description, Status and Distribution

The lanx is a member of the family Lancidae, a small group of pulmonates that respire solely through a highly vascularized mantle. Length ranges from 2.4 to 7.1 mm, height ranges from 1.0 to 4.3 mm, and width ranges from 1.9 to 6.0 mm (USDI USFWS, 1995).

The current known range of the lanx is portions of four coldwater spring complexes along six river miles of the middle Snake River (Figure 7). These springs originate from the Eastern Snake Plain aquifer. Based on fossil records, the lanx, along with four other snails endemic to southern Idaho, likely originated in the area within Pliocene Lake Idaho and its Pleistocene successors (Taylor, 1988, *in* 57 FR 59244-59257).

The Banbury Springs lanx (lanx) only occurs in four of the coldwater springs and seeps along the northern Snake River canyon (USDI USFWS, 1995; USDI USFWS, 2006). The four coldwater springs are Thousand Springs, Box Canyon Springs, Banbury Springs, and Briggs Creek (Figure 7). Of these known occurrences, only portions of Box Canyon Springs and Briggs Creek occur on BLM-managed land. The Thousand Springs and Banbury Springs occurrences are entirely on private land. The drainage area for Box Canyon Spring (canyon rim to stream) contains approximately 91 acres of combined BLM and State land. Of these acres, the BLM manages approximately 28 acres (31 percent) and the State manages approximately 63 acres (69 percent). For the 28 acres of BLM land, 10 acres contain riparian (hydric) vegetation and approximately seven acres contain upland vegetation. The remaining 11 acres are a talus hillslope that is approximately 250 to 350 feet wide and several hundred feet high in most areas. The drainage area for Briggs Creek, from the spring source downstream to a private diversion, contains approximately 20 acres of BLM-managed and private land owned by Idaho Power Company. Of these acres, the BLM manages approximately 11 acres (55 percent) and the remaining nine acres (45 percent) are owned by Idaho Power Company. For the 11 acres of BLM land, less than one acre has riparian (hydric) vegetation and approximately 10 acres contain upland vegetation and talus hillslope.

Annual monitoring has been conducted at three of the known locations since 2012, while annual monitoring has been conducted periodically at the fourth population since 2008. Recent monitoring data suggests all four colonies are declining, but it is important to note that monitoring only provides an index of population density and trends, and not colony-wide population estimates.

Life History and Habitat Characteristics

The Banbury Springs lanx are known to occur in large, undisturbed springs containing cold, clear, and well oxygenated water where they avoid areas with large, attached plants or areas with fluctuating water levels. All known sites have swifter currents, but not turbid environments, with basalt cobbles to boulders having a minimum dimension of at least seven centimeters (cm). The average depth at which they are found is 15 cm. They appear to feed on periphyton and occur primarily on the lateral sides of rocks, but not in contact with fine sediments (Frest & Johannes, 1992). The lanx appear to move very little and reside in localized colonies. As specialized respiratory organs are lacking, lanx are particularly susceptible to fluctuations in dissolved oxygen (Baker, 1925, *in* Frest & Johannes, 1992). Densities for the lanx have ranged from 1.3 to almost 100 individuals/m^2 (Burak & Hopper, 2014), with densities closer to 40/ individuals/m^2 being more typical (Frest & Johannes, 1992). Other species of Lancidae are hermaphroditic and lay individual eggs or clusters of eggs on hard substrates.

Threats to the Species

The primary factors that threaten the existence of the Banbury Springs lanx include the effects from habitat modification, spring flow reduction, reduced groundwater quality, the invasive New Zealand mudsnail, and inadequate regulatory mechanisms (USDI USFWS, 2006). The respiratory requirements and life history attributes of the lanx make this species susceptible to small fluctuations in water temperature, dissolved oxygen, sediment, or the effects of pollutants. This species is restricted to cold water springs with high water quality and stable substrate. Habitat modification has affected this species by reducing the availability of suitable coldwater spring habitats. Examples of habitat modification at the four known locations include: hydroelectric development, aquaculture diversions, and past impoundments of spring discharge.

Aquifer springs from the Eastern Snake Plain are well documented to be declining. As spring flows continue to decline throughout the range of this species, flows appropriated for hydroelectric power generating facilities and diverted for aquaculture facilities and other uses will continue to compete for and likely reduce the available water for the lanx.

Degraded groundwater quality of the Snake River aquifer from agricultural and aquaculture practices may have contributed to the species' gradual decline and will continue to affect water quality in the coldwater spring outflows upon which this species exists. Land areas overlying the Eastern Snake River Plain Aquifer, the source of spring water occupied by this species, are under intensive agricultural use and/or changing use (e.g., increasing livestock, dairies, and domestic), and many of these agricultural uses have increased their pumping and consumption of water from this aquifer while wastes associated with these activities pose threats to groundwater quality.

The non-native New Zealand mudsnail has invaded the coldwater springs where the lanx colonies occur, and occupation of nearby coldwater spring habitat could alter the trophic dynamics of these tributary springs. Further, expansion of the mudsnail likely limits the ability of the lanx to migrate and disperse to other suitable habitat in nearby locations.

Because this species is currently restricted to four small and isolated colonies, future stochastic as well as anthropogenic disturbances could negatively impact this species. The species is restricted to small habitat areas and most have declining populations so both demographic as well as genetic stochasticity pose threats to the species.

Existing regulatory mechanisms that oversee groundwater management of the Eastern Snake River Plain Aquifer may not be adequate to reverse the declining coldwater spring outflows, or retain the water quality upon which the lanx depends.

Survival and recovery of the federally listed snails in and adjacent to the Snake River, Idaho, is considered contingent on "conserving and restoring essential mainstem Snake River and cold-water spring tributary habitats" (USDI USFWS, 1995). Given the lanx's habit of utilizing spring habitats, similar to Bliss Rapids snails, measures to restore and protect these habitats are critical for recovery of the species. The Priority 1 tasks consist of securing, restoring, and maintaining existing cold-water spring habitats; restoring, and maintaining cold, unpolluted, well-oxygenated flowing water with low turbidity; and population and habitat monitoring to further define life history, population, and habitat requirements (USDI USFWS, 1995). The

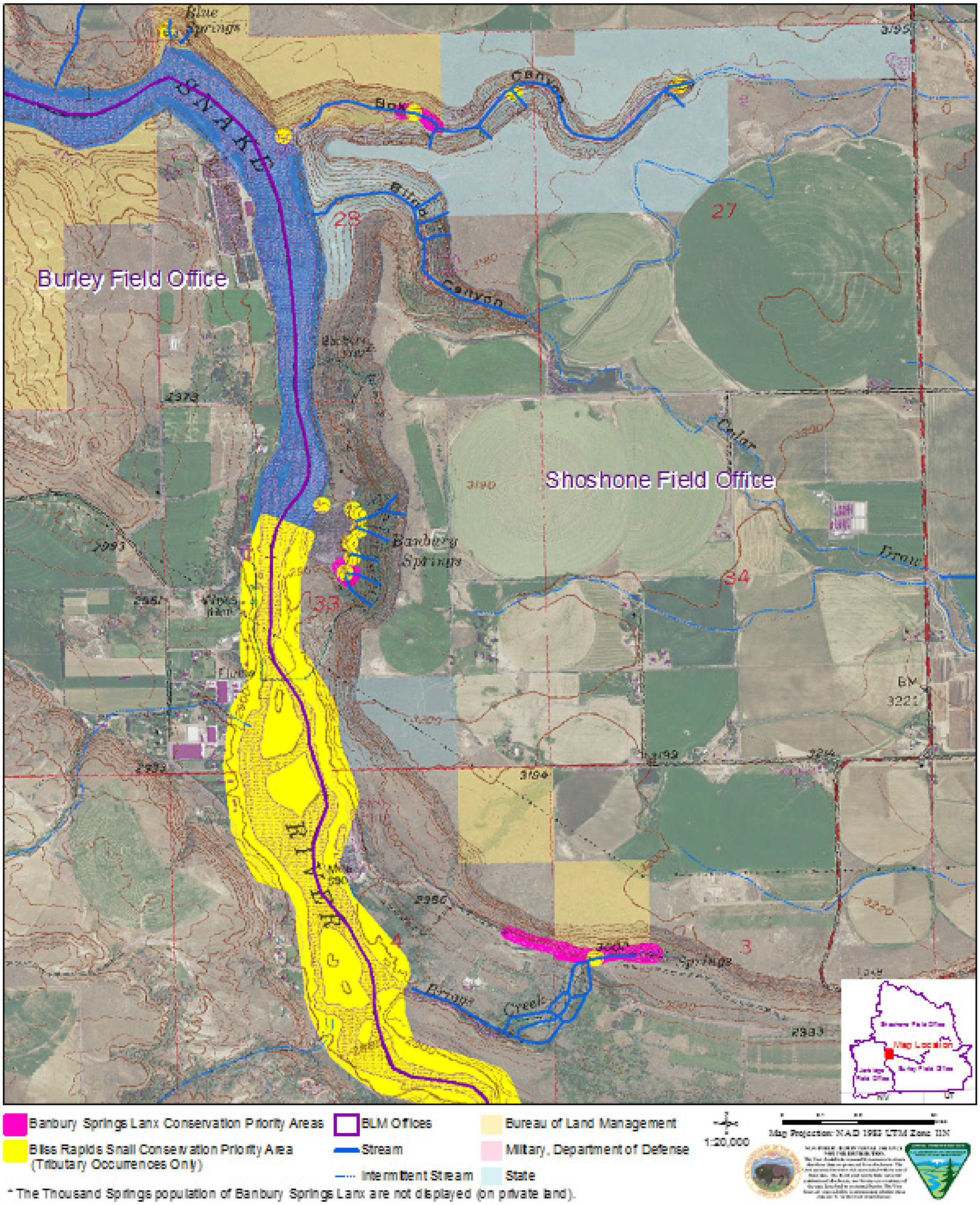
Priority 2 tasks consist of updating recovery plan criteria and objectives as more information becomes available, recovery tasks are completed, or as environmental conditions change.

Given the known limited distribution of the Banbury Springs lanx and its specific habitat requirements, maintaining or improving coldwater aquifers that sustain coldwater spring habitat conditions within its range is the primary need for this species' survival and recovery. The Banbury Springs lanx prefers cold-water springs dominated by cobble and boulder substrates that are free, or relatively free, of fine sediments, and with good water quality. Protecting habitats that contain Banbury Springs lanx from uses that reduce water quality through nutrient, sediment or thermal loading is critical to their survival and recovery.

Conservation Needs

Ensuring that water quality within the Snake River aquifer is not degraded is important for sustaining the species' unique habitats. Since water quality appears to be of crucial importance to the species, protection of the Snake River Plain Aquifer is a priority. The aquifer is the source of water for the springs occupied by the snail and serves a major role in maintaining river water quality within the species' range.

Figure 7 - BLM TFD Banbury Springs Lanx Habitat



Western Yellow-billed Cuckoo

Listing Status

Yellow-billed cuckoo in the western United States was first petitioned for listing in February 1986 and petitioned again in 1998 (65 FR 8104-8107). At the time of the petition, eastern and western yellow-billed cuckoo were found to not be different subspecies, based on morphological measurements. Genetic analyses to date are conflicting regarding whether or not there are two subspecies of yellow-billed cuckoo. A mitochondrial DNA analysis (Pruett, Gibson & Winker, 2001) indicated the western yellow-billed cuckoo (*Coccyzus americanus occidentalis*) was distinct from the eastern yellow-billed cuckoo (*C. a. americanus*) and was worthy of being classified as a distinct population. Hughes (2015) indicated separation of eastern and western populations was appropriate based on significantly different physical, behavioral, and ecological factors. However, a more recent genetics study with a larger sample size by Farrell (2013) did not support the subspecies separation. In late July, 2001, the Service determined that, based on the current information, the western distinct population segment of the yellow-billed cuckoo warranted protection under the Endangered Species Act and categorized it as a candidate species. In October 2013, the Service proposed the western distinct population segment be listed as threatened under the Endangered Species Act. On August 15, 2014, the Service published the proposed rule to designate critical habitat (79 FR 48548-48652). On October 3, 2014, the Service listed the western distinct population segment of the yellow-billed cuckoo as threatened (79 FR 59992-60038). Critical habitat remains proposed.

Species Description

Yellowed-billed cuckoos are brownish gray on the back with a white belly. They are slender medium sized birds 12 inches in length (66 FR 38611-38626; Hughes, 2015). The underside of the long tail is black with six white spots which are visible when perched or in flight. The white spots are formed by the tips of the tail feathers. The bill is dark and slightly down-curved, but the lower mandible is yellow in adults (66 FR 38611-38626). Yellow-billed cuckoos have a narrow yellow eye ring (78 FR 61622-61666). The wings are gray with a large rusty patch formed by the primary feathers in flight. Yellow-billed cuckoo calls end with a distinctive kowlp-kowlp vocalization. Female yellow-billed cuckoos occasionally lay an egg in another bird species nest. Yellow-billed cuckoo have been documented to parasitize the nests of 11 bird species including black-billed cuckoo, American robin, and gray catbird (Hughes, 2015).

Life History

Western yellow-billed cuckoos require large blocks of riparian habitat for breeding. At the landscape level, the amount of cottonwood–willow dominated vegetation cover and the width of riparian habitat influences western yellow-billed cuckoo distribution and abundance (Gaines & Laymon, 1984). Home ranges of yellow-billed cuckoo tend to be large for the size of the bird. In California, yellow-billed cuckoos rarely used smaller (<49 acres) patches of habitat, particularly when they were distantly isolated from other patches of riparian habitat (Laymon, 1998; Laymon & Halterman, 1989). They described optimal habitat for yellow-billed cuckoo in California as being more than 200 acres in extent and wider than 1950 feet (Laymon & Halterman, 1989). However, Laymon (1998) identified 9.5 percent of habitats 49 acres to 99 acres were used for nesting by yellow-billed cuckoo in California. Laymon (1998) and Laymon and Halterman (1989) concluded that habitats less than 37 acres and 328 feet wide were not suitable for cuckoo in California. Laymon and Halterman (1989) indicated that although small islands of habitat (2.5 acres) were used by yellow-billed cuckoo they are not capable of supporting viable populations. This contrasts with Jay (1911) who reported that several pairs of cuckoo nested in 40 acres of tall willow habitat also in California. On the Colorado River between Arizona and California, yellow-billed cuckoos home ranges averaged 74.3 acres (McNeil, Tracy, Stanek, & Stanek, 2013). In the Kern River California, yellow-billed cuckoo home ranges averaged 50 acres (Stanek & Stanek, 2013).

Recent radio telemetry studies on the Rio Grande in New Mexico showed yellow-billed cuckoo average home range size was 225 acres (Sechrist et al., 2013). In New Mexico, home range size varied from 3.5 acres to 696.5 acres (Sechrist, Johanson & Ahlers, 2009). On San Pedro River of Arizona, Halterman (2009) reported the average home range size as 126 acres with female cuckoo home ranges being 60 percent smaller than male home ranges.

Little information is available on the foraging habitat of western yellow-billed cuckoos. Laymon (1980) found that yellow-billed cuckoos nesting along the Sacramento River in English walnut (*Juglans* spp.) orchards captured 88 percent of their food in riparian habitat and primarily foraged in cottonwoods (*Populus fremontii*), willows (*Salix* spp.), and white alder (*Alnus rhombifolia*). Hughes (2015) noted that prior to nesting cuckoos often forage in upland areas away from riparian woodlands. Yellow-billed cuckoo studies reported by Laymon (1998) on the South Fork Kern River in California found that during wet years, cuckoo are found foraging more often in upland sites early in the season in response to survival of larvae of preferred prey (katydids and sphinx moth). During dry years, yellow-billed cuckoo early season foraging efforts tend to shift to the riparian floodplain in response to increased survival of katydid and sphinx moth larvae in the riparian zone.

Little is known about migratory habitat for the western yellow-billed cuckoo. Yellow-billed cuckoos may be found in a variety of vegetation types during migration, including coastal scrub, secondary growth woodland, hedgerows, humid lowland forests, and forest edges from sea level to 8,125 feet (Hughes, 2015). Additionally, during migration they may be found in smaller riparian patches than those in which they typically nest.

Reproduction/Development

Western yellow-billed cuckoo arrive from their wintering area in late May to early June for pair formation (Hughes, 2015). Both adults carry material for nest construction. Males may place nest material or give the material to the female for nest construction. Nesting typically occurs in June through August in the majority of the western yellow-billed cuckoo range (Hughes, 2015). Nest making takes from one to two days and incubation lasts about 11 days (Hughes, 2015). The nest itself is usually a flat twig platform with the nest cup sparingly lined with dry leaves and bark strips. Yellow-billed cuckoos typically lay an average of two eggs (with a range one to five eggs), with two or more days between each egg laid (Hughes, 2015). Large clutches of cuckoo eggs in nests may be the result of two or more females laying eggs in the same nest (Hughes, 2015). Both males and females incubate the eggs with males incubating more during the night (Hughes, 2015). Field observations in southeast Arizona of yellow-billed cuckoo involved in undisturbed incubation activities revealed that nests were never left unattended for more than 10 minutes during incubation (Halterman, 2009). Eggs hatch asynchronously (Hughes, 2015). The young are nearly fully feathered within eight days of hatching and can fly 21 days after hatching (Hughes, 2015). The eastern yellow-billed cuckoo may produce a second brood during the summer. However, western yellow-billed cuckoo probably produce one brood per year with late nesting a result of failed nest attempts earlier in the breeding season (Hughes, 2015). Little information exists on lifespan for yellow-billed cuckoos; the longest known lifespan of a banded yellow-billed cuckoo is five years (USDI USGS, 2016).

Movements

Yellow-billed cuckoo winter in South America, generally east of the Andes Mountains and south of the Amazon Basin. Yellow-billed cuckoo leave South America in March to return to nest in North America from May into August. Yellow-billed cuckoo migrate back south from September to November (Hughes, 2015) depending on the year and location. Migratory routes of western yellow-billed cuckoo are poorly documented (Hughes, 2015).

Habitat Characteristics

The western yellow-billed cuckoo currently nests almost exclusively in low to moderate elevation riparian woodlands that cover 50 acres or more within arid to semiarid landscapes (Hughes, 2015). Biologists have hypothesized that yellow-billed cuckoos may be restricted to these extensive, moist habitats because of humidity requirements for successful hatching and rearing of young (Gaines & Laymon, 1984; Hamilton & Hamilton, 1965). Saab (1998) confirmed yellow-billed cuckoo occurred in narrow-leaf cottonwood (*Populus augustifolia*) riparian habitat in southeastern Idaho. Also in southeastern Idaho, yellow-billed cuckoo were found to nest in cottonwood gallery forests in several areas (Reynolds & Hinkley, 2005).

Throughout the western DPS range, a large majority of nests are constructed in willow trees (Jay, 1911), but alder, cottonwood, mesquite (*Prosopis* spp.), walnut, box elder (*Acer negundo*), and saltcedar are also used (Hanna, 1937; Halterman, 1998; Hamilton & Hamilton, 1965; Laymon, 1980; Sogge, Sferra & Paxton, 2008). Most nests are constructed on well-foliaged horizontal branches at sites with dense canopy cover above the nest and on the outer part of the canopy away from the trunk (Jay, 1911; Laymon, 1980).

Diet

Yellow-bellied cuckoo primarily consume insects, harvestmen (*Opiliones*), spiders (*Araneae*) and other prey (Hughes, 2015). In California, Laymon (1980) reported yellow-billed cuckoo ate beetles (*Coleoptera*), grasshoppers (*Orthoptera*), flies (*Diptera*), caterpillars of moths and butterflies (*Lepidoptera*), dragonflies (*Odonata*), lacewings (*Neuroptera*) and praying mantis (*Mantodea*). A study on the Kern River in California of food items brought to the nest by yellow-billed cuckoo found 45 percent green caterpillers (primarily sphynx moth larvae), 24 percent tree frogs, 22 percent katydids, and nine percent grasshoppers (Laymon 1998). An earlier study of cuckoo in southern California conducted by Laymon (1980) found the percentage of katydids in the diet of cuckoos in early summer was seven percent, by mid-summer it was 40 percent and late summer katydids comprised 70 percent of the diet.

Diets of yellow-billed cuckoo in South America are believed to include more berries and seeds along with insects (Hughes, 2015). Hamilton and Hamilton (1965) commented that cuckoos have been known to occasionally eat tree frogs and lizards. The diet of this species in Idaho is unknown, but probably includes similar insects. In California and Arizona, cuckoos forage by flying to a perch and waiting for insects to reveal their location by moving (Hamilton & Hamilton, 1965; Laymon, 1980). Yellow-billed cuckoo foraging methods include gleaning, flycatching, and diving for prey (Hamilton & Hamilton, 1965; Hughes, 2015; Laymon, 1980). Laymon (1980) reported cuckoos occasionally hopped on the ground to catch grasshoppers.

Distribution

Yellow-billed cuckoos were historically widespread and locally common in Arizona, California, New Mexico, Oregon and Washington during the breeding season. Yellow-billed cuckoos were uncommon in scattered drainages of Idaho, Nevada, Utah, western Colorado, western Montana, western Wyoming, and British Columbia.

In Idaho, the yellow-billed cuckoo is considered a rare visitor and local summer resident that occur in scattered drainages. Most breeding occurs primarily in the southeastern portion of the State (Cavallaro, 2011; IDFG, 2005; Stephens & Sturts, 1991). In northern and central Idaho, there were only four records of yellow-billed cuckoos during the twentieth century (Taylor, 2000). Reynolds and Hinckley (2005) concluded that the few sightings in northern Idaho are most likely of transient, nomadic, or migrant individuals; with no data suggesting that the species historically or currently nests there. In southwestern Idaho the yellow-billed cuckoo has historically been considered a rare summer visitor and breeder in the Snake River Valley (IDFG, 2005).

Recent records are primarily from the southeastern portion of the State along the South Fork of the Snake River (Cavallaro, 2011; Reynolds & Hinckley, 2005; Taylor, 2000). Taylor (2000), in his review of the species' status in Idaho, concluded that they had declined greatly as a breeding bird in the state, and that there were currently fewer than a few dozen breeding pairs and possibly fewer than 10 pairs. More recent surveys of yellow-billed cuckoos continue to show that the majority of sightings are in the Snake River corridor in southeast Idaho with few or no sightings in other areas where the yellow-billed cuckoo was historically observed (Cavallaro, 2011; Reynolds & Hinckley, 2005). In addition, yellow-billed cuckoos likely nested in south-central Idaho near Stanton Crossing, Blaine County, in 2001, 2003, 2004 and 2014 (Reynolds, 2014; Reynolds & Hinckley, 2005). A survey in 2009 near Magic Reservoir on the Big Wood River located a singing male in a location that was previously unknown (Carlisle & Ware, 2010). Follow-up surveys in 2010 along the Big Wood River and Little Wood River failed to detect any yellow-billed cuckoos (Carlisle & Ware, 2010). The most recent statewide assessment estimated the breeding population in Idaho is likely limited to no more than 10 to 20 breeding pairs in the Snake River Basin (Reynolds & Hinckley, 2005).

In August, 2014, the Service issued a proposal to designate 546,335 acres of Critical Habitat for the western yellow-billed cuckoo in 80 separate units in Arizona, California, Colorado, Idaho, Nevada, New Mexico, Texas, Utah and Wyoming (79 FR 48548-48652). There are four proposed Critical Habitat Units in Idaho; three in southeast Idaho and one in south-central Idaho. The proposed Critical Habitat Unit in south-central Idaho is associated with the woody, broad-leaf deciduous riparian plant community adjacent to the Big Wood River near Stanton Crossing in Blaine County. The proposed Critical Habitat Unit ID-3 (Figure 8) contains a total of 1,129 acres which are owned or managed by the BLM, Idaho Highway Department, IDFG, IDL, and private landowners. Approximately 956 acres (85 percent) of proposed Critical Habitat Unit ID-3 are privately owned; 85 acres (eight percent) are in State ownership, and 88 acres (eight percent) are public lands managed by BLM. Proposed Critical Habitat Unit ID-3 contains a seven mile long continuous segment of the Big Wood River. Western yellow-billed cuckoo have been observed in the proposed critical habitat during the breeding season (See ; 79 FR 48569). These observations have led to the assumption that breeding occurs in the area. A listing of all known observations of yellow-billed cuckoo within the TFD is provided in Table 7.

Figure 8 – Yellow-billed Cuckoo Assessment Area and Sighting Locations (1918 – 2015)

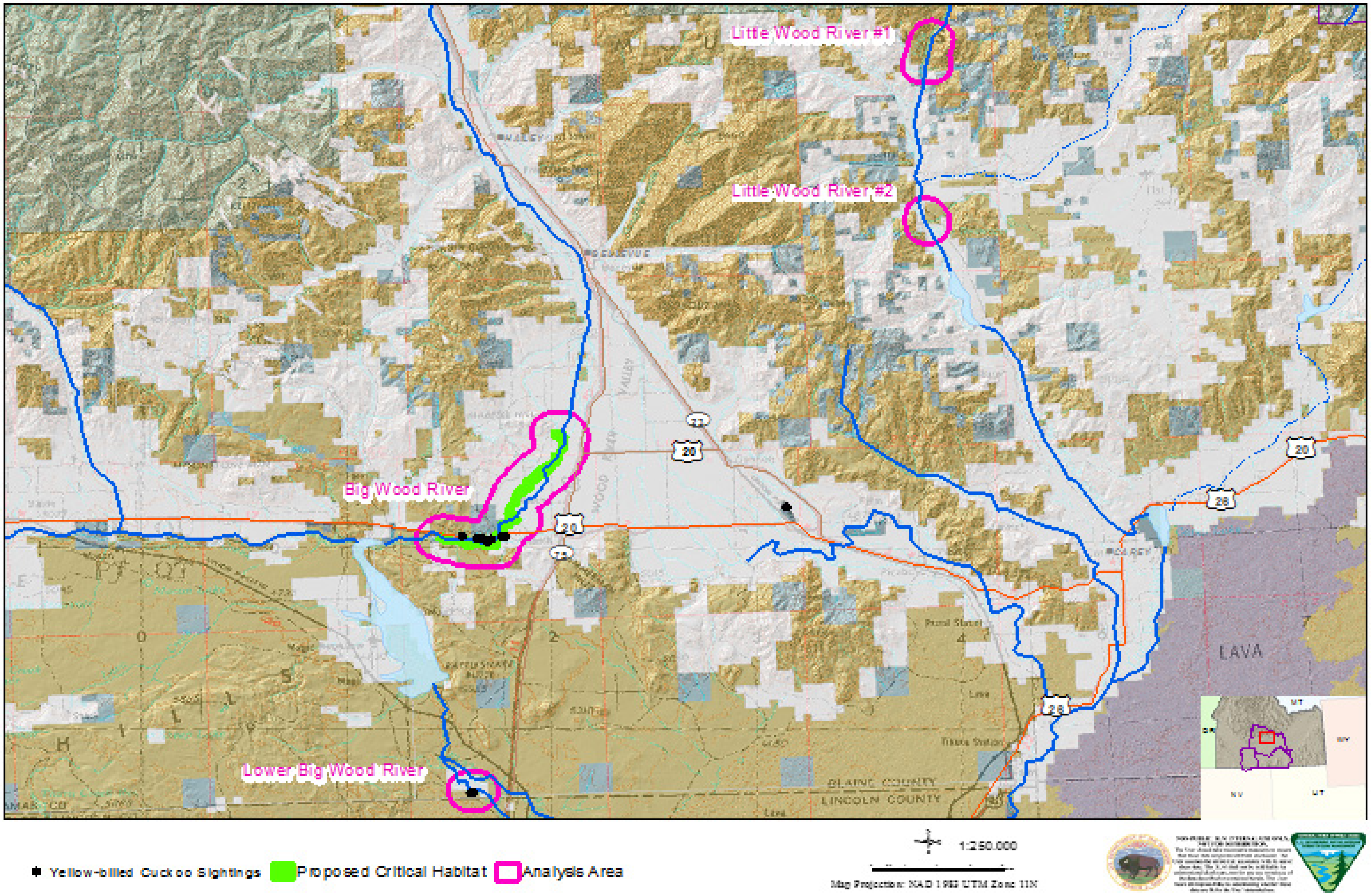


Table 7 - Yellow-billed cuckoo observations within the TFD

Number	Date	Location	Type of Observation
1	5/16/1918	Rupert Area	Nest
1	7/02/1978	Minidoka National Wildlife Refuge	Visual of adult
1	6/01/1984	Twin Falls	Mortality of adult
1	6/15/1984	Twin Falls, 4 miles NE of city	Mortality of adult
1	6/24/1984	Minidoka National Wildlife Refuge	Visual of adult
1	7/18/1984	Rupert Area	Visual of adult
2	7/28/1984	Rupert Area	Visual of adult
1	1984	Rupert Area (12/31/1984)	Visual of adult
1	6/12/1985	Minidoka National Wildlife Refuge	Mortality of adult
1	6/26/1985	Rupert	Visual of adult
1	6/29/1985	Minidoka National Wildlife Refuge. South side of river.	Visual of adult
1	6/29/1985	Minidoka National Wildlife Refuge	Visual of adult
1	7/25/1986	Rupert	Visual of adult
1	5/01/1987	Rupert	Visual of adult
1	7/07/1997	Hayspur Fish Hatchery	Visual of adult
1	6/23/2001	Stanton Crossing, Big Wood River	Visual of adult
2	6/23/2001	Stanton Crossing, Big Wood River	Visual of adult
1	8/11/2002	Southwest of Sparlin Island	Visual of adult
1	6/25/2003	Stanton Crossing, Big Wood River	Visual of adult
2	7/05/2003	Stanton Crossing, Big Wood River	Visual of adult

Number	Date	Location	Type of Observation
1	7/19/2003	Stanton Crossing, Big Wood River	Visual of adult
1	7/02/2004	Stanton Crossing, Big Wood River	Vocal response to audio recording
1	7/02/2004	Stanton Crossing, Big Wood River	Visual & vocal response to audio recording
1	7/02/2004	Stanton Crossing, Big Wood River	Visual & vocal response to audio recording
1	5/25/2005	Minidoka National Wildlife Refuge	Visual of adult
1	6/10/2009	Below Magic Dam, Big Wood River	Visual of adult
1	6/10/2009	Below Magic Dam, Big Wood River	Visual of adult
1	6/10/2009	Below Magic Dam, Big Wood River	Visual of adult
1	6/21/2014	Stanton Crossing, Big Wood River	Visual & vocal response to audio recording

1 - Idaho Fish and Wildlife Information System. Idaho Natural Heritage Data. IDFG. 2015.

<u>*Conservation Needs*</u>

Conservation recommendations developed by the Service and partners for the yellow-billed cuckoo include:

- Determine numbers and locations of remnant populations;
- Acquire and improve riparian habitats; and
- Continue to work with Federal and State wildlife and land management agencies to determine population status of the species throughout the western DPS range.

Threats Analysis

<u>*Predation*</u>

Adult yellow-billed cuckoo are prey for a variety of raptor species (Hughes, 2015) primarily during migration. Snakes; rodents, including chipmunks (*Neotamias* spp.); and corvids, including common raven (*Corvus corax*), American crow (*Corvus brachyrhynchos*), and black-billed magpie (*Pica hudsonia*) are known nest predators which eat eggs or young (Hughes, 2015). Western yellow-billed cuckoos, particularly the eggs or young in nests, are vulnerable to predation. Predation may be a significant threat in some localities and in some years, and may be influenced by several factors such as surrounding land use and size and complexity of riparian habitat. However, predation by itself does not pose a significant threat to the species at this time, and is not expected to become significant threat in the near future.

Disease

Komar (2003) included yellow-billed cuckoo as one of the 198 species of North American birds which have contracted West Nile virus. There is no other information on yellow-billed cuckoo diseases (Hughes, 2015). Although the population of the western yellow-billed cuckoo has been in decline over several decades, no evidence suggests that it has undergone a precipitous decline coincident with the relatively recent arrival of West Nile virus to the western United States. Based on the limited best available information, adverse effects of West Nile virus to yellow-billed cuckoo are not significant and do not constitute a threat at this time, and is not expected to become a significant threat in the near future.

Climate Change

Anders and Post (2006) reported that warmer weather resulted in declines of yellow-billed cuckoo density in the eastern United States because of its influence on caterpillars. Yellow-billed cuckoo which nested had three times the number and biomass of caterpillars as yellow-billed cuckoo which did not nest. Earlier and warmer springs associated with climate change were predicted to cause a long-term population decline in yellow-billed cuckoo. Shifts in climate in the western United States were modeled and indicate changes in hydrology such as earlier run-off (Barnett, et al., 2008; Stewart, Cayan & Dettinger, 2004), less snow pack due to warmer temperatures (Barnett, et al., 2008) and longer summer drought (Stewart, et al., 2004). Changes in flow regime may reduce suitable riparian habitat for yellow-billed cuckoo.

Other Threats

There have been declines in the distribution and abundance of yellow-billed cuckoos throughout the western United States, primarily attributed to habitat loss. Suspected causes of riparian habitat losses are conversion to agricultural and other uses, dams and river flow management, stream channelization and stabilization, invasive species and livestock grazing. Available breeding habitats for yellow-billed cuckoos have also been substantially reduced in size and quality by groundwater pumping and the replacement of native riparian habitats by invasive non-native plants. However, in some instances invasive species like saltcedar may be used by yellow-billed cuckoo for nesting and foraging (Sogge, et al., 2008). Fragmentation effects include the loss of patches large enough to sustain local populations, local extinctions, and the potential loss of migratory corridors. The loss of migratory corridors between areas of suitable habitat could affect the ability of yellow-billed cuckoo to recolonize vacated habitat patches.

Canada Lynx

Listing Status

The Canada lynx is listed as threatened for the Contiguous United States DPS. The final rule for the determination was published in the Federal Register on March 24, 2000. The Service published a Notice of Remanded Determination of Status for the Contiguous United States Distinct Population Segment of Canada lynx to Threatened Status on July 3, 2003, reanalyzing and reaffirming threatened status for the Contiguous United States DPS (68 FR 40076). The DPS for Canada lynx in the conterminous United States includes the states of Colorado, Idaho, Maine, Michigan, Minnesota, Montana, New Hampshire, New York, Oregon, Utah, Vermont, Washington, Wisconsin, and Wyoming. The Service published a revised DPS boundary on

September 12, 2014, to include ESA protections to wherever Canada lynx occur in the contiguous United States, including New Mexico. This rule rescinds the existing state-boundary-based definition of the lynx DPS and replaces it with a definition that extends ESA protections to lynx where they are found in the contiguous United States (79 FR 54782). This change in lynx DPS became effective October 14, 2014.

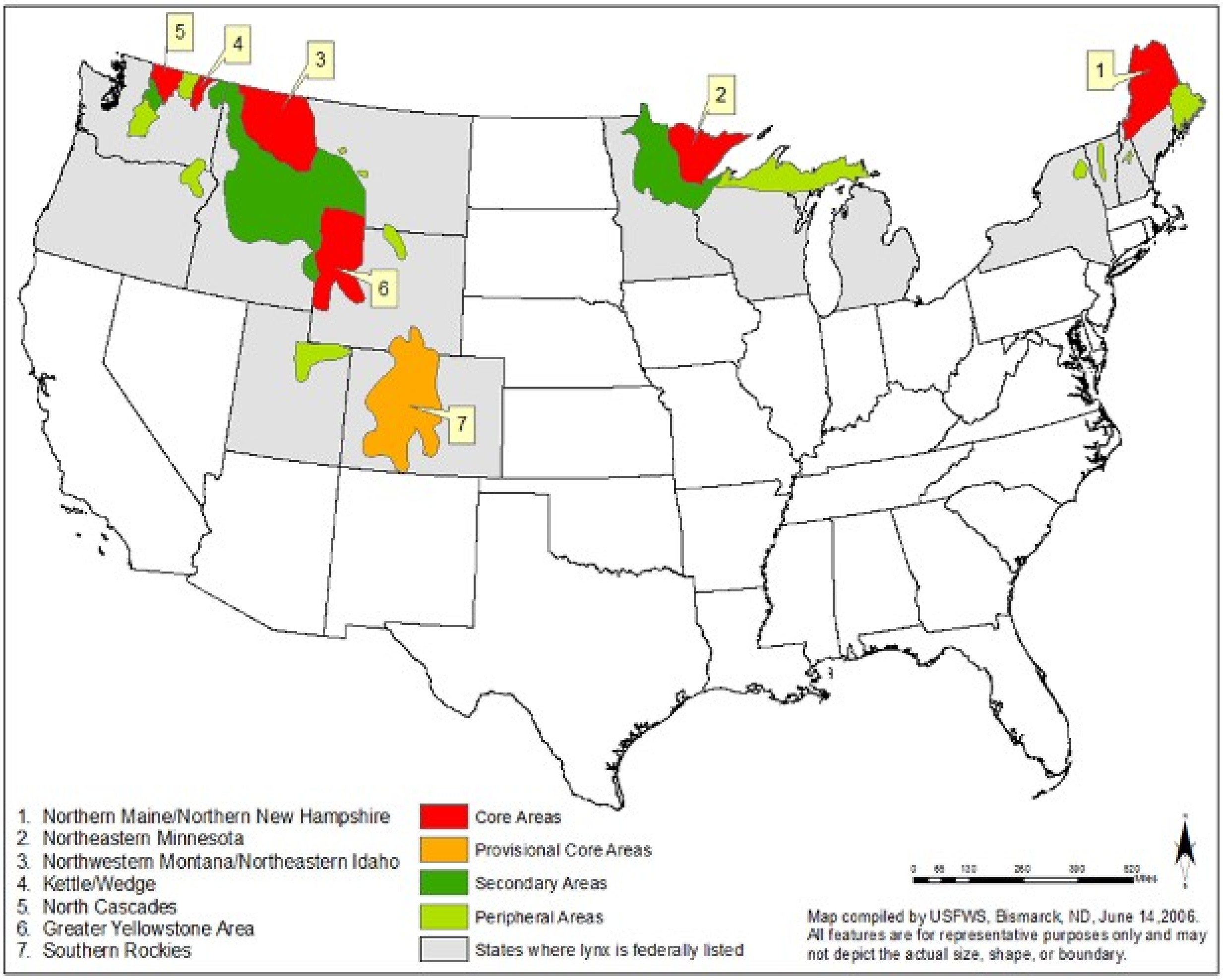
Critical habitat for Canada lynx was initially designated in three units encompassing about 1,841 square miles (mi^2) in Minnesota, Montana, and Washington on November 9, 2006, and became effective December 11, 2006 (71 FR 66007). The Service announced that it would review the initial designation of Canada lynx critical habitat on July 20, 2007. The Service published a proposed rule for the revised critical habitat on February 28, 2008 (73 FR 10860). The final rule revising critical habitat designations was published on September 12, 2014, and became effective October 14, 2014 (79 FR 54781-54846). Critical habitat for Canada lynx was revised by designating about 38,954 mi^2 in five units located Idaho, Maine, Minnesota, Montana, Washington and Wyoming.

There is no designated critical habitat for Canada lynx in or adjacent to the boundaries of the TFD. Canada lynx Critical Habitat Unit 3 (Northern Rockies) encompasses a total of 9,783 mi^2 and is located in northeastern Idaho and adjacent northwestern Montana near the Canadian border. The Idaho portion is 45 mi^2 of the Northern Rockies unit. The closest critical habitat unit in Idaho is about 300 miles north of the TFD; the Greater Yellowstone critical habitat unit in Montana and Wyoming is located about 140 miles northeast of the TFD.

Because of the distance (140 miles) of designated critical habitat from the TFD and any treatments that would be implemented under the proposed action, critical habitat will not be further addressed in this document.

The Service developed a Canada Lynx Recovery Outline in 2005, which provided preliminary recovery objectives and actions for the contiguous United States DPS of lynx until a recovery plan is completed (USDI USFWS, 2005c). During the preparation of the recovery outline, the Service’s team examined historical and recent evidence of lynx habitat and occurrence in an effort to identify and refine core areas, secondary areas, and peripheral areas of importance to lynx. Core areas are the areas with the strongest long-term evidence of the persistence of lynx populations supported by a sufficient quality and quantity of habitat. Focusing conservation efforts in the core areas is a key component of the recovery outline to ensure the continued persistence of lynx in the contiguous United States. The Service determined that secondary and peripheral areas may contribute to lynx persistence by enabling successful dispersal and recolonization of core areas, but their role in sustaining populations in the contiguous United States remains unknown (Interagency Lynx Biology Team, 2013). Figure 9 shows the location of core, secondary and peripheral areas.

Figure 9 - Core, secondary, and peripheral areas as depicted in the Canada Lynx Recovery Outline (USDI USFWS, 2005c)



Core areas were identified by Service where there was strong evidence of long-term persistence of lynx populations, including both historical records of lynx occurrence over time, and recent (within the past 20 years) evidence of presence and reproduction. A core area contains large, connected patches of boreal forest, encompassing at least 480 mi^2.

Secondary areas were identified by the Service where there were historical records of lynx presence, but fewer than in core areas, and no recent documentation of presence or reproduction; or where there were historical records of lynx, but current status is unknown due to lack of recent surveys.

Peripheral areas were identified by the Service where there were sporadic historical records of lynx, which generally correspond to cyclic population highs in Canada, and there was no evidence of reproduction. Because boreal forest in peripheral areas occurs in small and more isolated patches (such as an isolated mountain range), these areas are considered to be incapable of supporting self-sustaining populations of lynx.

The Canada Lynx Recovery Outline does not include any portion of the TFD in any of the three lynx population persistence and habitat quality category classifications. The contribution of lynx occurring outside of core areas to population dynamics and persistence within core areas is unclear. It has been suggested that secondary and peripheral areas might contribute to lynx persistence by supporting successful dispersal or exploratory movements. Lynx habitat in secondary/peripheral areas appears to be inherently more patchy and less productive than in core areas.

Species Description

Canada lynx are medium-sized cats, 30-35 inches long and weighing 18-23 pounds (Quinn & Parker, 1987). They have large feet adapted to walking on snow, long legs, tufts on the ears, and black-tipped tails. Their historical range extends from Alaska across much of Canada (except for coastal forests), with southern extensions into parts of the western United States, the Great Lakes states, and New England.

Life History

Lynx occur primarily in the boreal, sub-boreal, and western montane forests of North America (Koehler & Aubry, 1994). In Canada, lynx typically inhabit boreal spruce-fir forests on terrain of low to moderate relief, with deep winter snow packs.

Over their existing range, lynx occur in habitats where snowshoe hare (*Lepus americanus*) are most abundant (Koehler, 1990; Koehler, Hornocker & Hash, 1979; Parker, Maxwell, Morton, & Smith, 1983; Ward & Krebs, 1985). The average 10-year cycle in population densities for both lynx and snowshoe hares in the boreal forests of Canada and Alaska is well known (Brand & Keith, 1979; Nellis, Wetmore & Keith, 1972). While this phenomenon is important for the management of lynx populations in northern boreal forests, neither lynx (Koehler, 1990) nor snowshoe hare populations in the mountains of the northwestern United States seem to exhibit such cycles (Dolbeer & Clark, 1975; Koehler, 1990; Wolff, 1980). Wolff (1980) and Koehler (1990) feel that the populations of these two species occur in the northwestern United States at relatively stable densities comparable to the population lows in the northern boreal forests. Studies conducted in the Canadian provinces found that during periods of low hare numbers, lynx congregate around pockets of hare activity (Ward & Krebs, 1985); which are typically areas of dense shrubs or trees where hares seek refuge (Wolff, 1980).

While lynx are generally considered specialized predators of snowshoe hares, they are also opportunistic, preying on a variety of wildlife species. The differing ecology and life cycle requirements of the various prey species results in the seasonal occurrence of some prey species. Regional availability of some prey species also seems to exert an influence on the number and kind of different prey species found in lynx diets across its occupied range. An accounting of alternate prey species for Canada lynx is located below in the section on lynx diet.

Although cover is important to lynx when searching for food (Brand, Keith, & Fischer, 1976), lynx often hunt along the edges of forests (Mowat, Poole & O'Donoghue, 2000; Staples, 1995) and dense riparian willow stands (Shenk, 2008). Less dense stands may improve visibility for lynx and increase the vulnerability of hares (Fuller, Harrison & Vashon, 2007; O'Donoghue et al., 1998).

Canada lynx home range sizes are quite variable across the southern extension of their range (Interagency Lynx Biology Team, 2013). Home ranges in the western United States are larger than those reported from the eastern United States or from northern Canada during peaks in snowshoe hare abundance (Aubry, Koehler & Squires, 2000). The lynx home range size for males in the western United States varied from 92 mi^2 in northwestern Montana to 27 mi^2 in north-central Washington (Interagency Lynx Biology Team, 2013). The home range size for female lynx in the western United States varied from to 44 mi^2 in northwestern Montana to 15 mi^2 in north-central Washington (Interagency Lynx Biology Team, 2013).

Reported causes of lynx mortality vary between studies. The most commonly reported causes include starvation of kittens (Koehler, 1990; Quinn & Parker, 1987), and human-caused mortality, mostly fur trapping (Bailey, Bangs, Portner, Malloy & McAvinchey, 1986; Ward & Krebs, 1985).

In cyclic populations of the north, significant mortality due to starvation has been demonstrated during the first two years of hare scarcity (Poole, 1994; Slough & Mowat, 1996). Various studies have shown that, during periods of low snowshoe hare numbers, starvation can account for up to two-thirds of all natural lynx deaths

Reproduction/Development

The common component of denning habitat is large woody debris, either downed logs or root wads (Mowat et al., 2000). Den sites may be located within older regenerating stands (>20 years since disturbance) and in mature conifer or mixed conifer-deciduous (typically spruce/fir or spruce/birch) forests (Koehler, 1990; Mowat et al., 2000). Stand structure appears to be of more importance than forest cover type (Mowat et al., 2000).

Large amounts of large coarse woody debris provide escape and thermal cover for kittens. Kittens are left alone at the den site when the female lynx hunts during the first few months of life. During this period, downed logs and overhead cover provide protection from predators, such as owls, hawks, and other carnivores. Denning structure must be available throughout the home range, because it is likely that temporary dens are used when the kittens are old enough to travel but not hunt, similar to bobcat behavior (Bailey, 1974).

Breeding occurs through March and April in the north (Quinn & Parker, 1987). Kittens are born in May to June in southcentral Yukon (Slough & Mowat, 1996). The male lynx does not help with rearing young (Quinn & Parker, 1987).

Litter size of adult females averages four to five kittens during periods of hare abundance (Mowat, Slough & Boutin, 1996). Koehler (1990) found that lynx productivity over a seven-year time period in Washington was comparable to that reported during the decline or low phase of snowshoe hares at more northern latitudes.

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Movements

Daily movement distances vary. Ward and Krebs (1985) documented an increase in daily cruising radius from 1.6 miles during moderate to high hare densities, to 3.2 miles during low hare densities.

Lynx perform defined exploratory movements defined as long-distance movements beyond identified home range boundaries, in which the animal returned to its original home range (Aubry et al., 2000). Exploratory movements by lynx have been documented to occur within most of the geographic areas occupied by lynx (Interagency Lynx Biology Team, 2013). Exploratory movements by resident lynx were recorded during the summer months in the Montana and Wyoming lynx population (Squires & Laurion, 2000; Squires & Oakleaf, 2005). The distances and duration these exploratory movements were performed in Montana ranged from about nine to 25 miles, and for a duration of one week to several months from the home range (Squires & Laurion, 2000). The movement of a resident lynx in Wyoming was monitored for three summers and was documented to travel a minimum total distance of 452 miles from its home range (Squires & Oakleaf, 2005).

In studies in Montana and Wyoming, adult lynx made exploratory movements outside their normal home ranges (Squires & Laurion, 2000). These movements occurred in the summer months, with distances of at least 12-18 miles recorded.

Both adult and subadult lynx are known to make long-distance movement of up to 600 miles, particularly when dispersing during periods of prey scarcity in the north (Mech, 1980; Poole, 1997; Slough & Mowat,1996). During dispersal, the minimum daily travel rate was one to five miles per day (Ward & Krebs, 1985), suggesting that dispersing lynx do not travel farther per day than resident lynx (Mowat et al., 2000).

Dispersing lynx have been found to cross large rivers and lakes, and to occur in agricultural areas or far south of their normal range (Mech, 1980; Poole, 1997). In the western U.S., lynx have been documented in habitats such as shrub-steppe, juniper, and ponderosa pine which are not normally associated with snowshoe hares (Lewis & Wenger, 1998).

Periodically, influxes of dispersing lynx have occurred in the northern United States during lows in the snowshoe hare cycle. There is no evidence that immigrating lynx are able to successfully colonize southern areas (McKelvey, Ortega, Koehler, Aubry, & Brittell, 2000). Nevertheless, connectivity between habitats in Canada and United States is necessary for the persistence of southern lynx populations, which otherwise may be isolated into small populations.

Hunger related stress, which induces dispersal, exposes lynx to other forms of mortality such as trapping and highway collisions (Bailey et al., 1986; Brand & Keith, 1979; Carbyn & Patriquin, 1983; Ward & Krebs, 1985). During periods of low hare populations, trapping mortality may be additive rather than compensatory (Brand & Keith, 1979).

Habitat Characteristics

Lynx primarily inhabit boreal and mesic forests, and are closely associated with its primary prey snowshoe hare (USDA FS, 2007). Across its range, dense horizontal cover, persistent snow, and moderate to high snowshoe hare densities are common attributes of lynx habitat. The elevation at which lynx habitat occurs depends on local moisture patterns and temperatures, and varies across the range of the species. Spruce-fir forests are the primary vegetation type that characterizes lynx habitat in the contiguous United States (Koehler & Brittell, 1990; Koehler et al., 2008; McKelvey et al., 2000; Squires, Decesare, Kolbe & Ruggiero, 2010). In Idaho, lynx primarily occur in high elevation, cold forest habitats that support spruce, subalpine fir, whitebark pine, lodgepole pine, or moist Douglas-fir habitat. Canada lynx are associated with mesic forests, and "dry forests" do not provide lynx habitat (USDA FS, 2007). Habitat for Canada lynx in Idaho generally consists of subalpine forests that receive deep snow, and have high-density populations of snowshoe hares.

Squires et al. (2010) found forest stands in Montana with mature and large diameter trees were used less often during summer. Lynx broadened their selection to include younger regenerating stands composed of Engelmann spruce and subalpine fir with abundant small diameter and pole sized trees, abundant total shrubs, and high horizontal cover (Squires et al., 2010). Lynx generally avoided forest types with high proportions of Douglas-fir, grass in the understory, or snags. Elevations used by lynx were on average 450 feet higher in summer than during the winter but still occurred in the montane zone between the alpine zone and the dry forests of the lower montane zone (Squires et al., 2010).

Some lynx habitats in the Rocky Mountains of the western U.S. are islands of coniferous forest surrounded by shrub-steppe habitats. Lynx are capable of dispersing long distances from areas that support populations and during such movements have historically occurred intermittently and temporarily in suboptimal, marginal, and unsuitable habitats (79 FR 54787). The distance of these areas from source populations of lynx reduces the likelihood that these area will receive the demographic support, via dispersal and immigration from other populations thought to be important to the maintenance of the lynx population (79 FR 54788). Evidence suggests that these areas of the Rocky Mountains may not contain the PBFs essential to the conservation of lynx in adequate quantity and spatial arrangement to support a lynx population over time (79 FR 54788).

Diet

Snowshoe hares (*Lepus americanus*) are the primary prey of lynx, comprising 35-97 percent of the diet throughout the range of the lynx (Koehler & Aubry, 1994). Other prey species include red squirrels (*Tamiasciurus hudsonicus*), grouse (*Bonasa umbellus*), flying squirrels (*Glaucomys sabrinus*), ground squirrels (*Urocitellus richardsoni, U. columbianus*), deer mice (*Peromyscus maniculatus*), voles (*Microtus* spp., *Myodes* sp.), porcupines (*Erethrizon dorsatum*), beaver (*Castor canadensis*), and ungulates as carrion or occasionally as prey (Brand & Keith, 1979; Brand et al., 1976; Koehler, 1990; Nellis et al., 1972; O'Donoghue et al., 1998; Saunders, 1963; van Zyll de Jong, 1966).

Lynx diets appear to vary by region. Most research has focused on the winter diet. An analysis of 87 lynx scat samples collected in Minnesota during winter contained no red squirrel remains (Burdett, 2008; Hanson & Moen, 2008). In Montana, Squires and Ruggiero (2007) located 86 lynx kills that included seven prey species. Snowshoe hare accounted for 69 of the kills and 11 were red squirrel. Red squirrels made up two percent of the biomass of the winter diet (Squires & Ruggiero, 2007). Indications are that the summer diet includes a greater diversity of prey species (Koehler & Aubry, 1994; Quinn & Parker, 1987). The summer diet of lynx has not been quantified in the southern portion of its range although there is some anecdotal information (Interagency Lynx Biology Team, 2013).

During the cycle when hares become scarce, the proportion of other prey species, especially red squirrels, increases in the diet (Apps, 2000; Brand et al., 1976; O'Donoghue et al., 1998). However, Koehler (1990) suggested that a diet of red squirrels alone may not be adequate to ensure lynx reproduction and survival of kittens.

Lynx seem to prefer to move through continuous forest, and particularly use ridges, saddles, and riparian areas (Koehler, 1990). Although cover is important to lynx when searching for food (Brand et al., 1976), lynx often hunt along edges (Mowat et al., 2000). Staples (1995) reported that lynx hunted along the edge of mature stands within a burned forest matrix. Lynx have been observed (via snow tracking) to avoid large openings (Koehler, 1990) during daily movements within the home range.

Distribution

In North America, Canada lynx are distributed across the range of the snowshoe hare, its primary prey (68 FR 40076-40101; 78 FR 59429-59474). Range distribution maps indicate lynx predominately occupy Alaska and Canada (68 FR 40077). Distribution within the conterminous U.S. is limited to southern boreal/hardwood forest ecotones adjacent to the border of Canada in Maine and Minnesota, and limited presence along the Continental Divide in Montana, Idaho, Wyoming, and Colorado and the Northern Cascade Mountain Range in Washington (68 FR 40079; 78 FR 59430). A listing of all known observations of Canada lynx within the TFD is provided in Table 8.

Table 8 – Canada lynx observations within the TFD[1]

Number	Date[3]	Location	Type of Observation
1	1/01/1896	Sawtooth City site[2]	Visual of adult
1	1/01/1959	Cabin Creek 2 miles north of Alturas Lake[2]	Visual of adult
1	1/01/1960	Alturas Lake[2]	Visual of adult
1	1/01/1970	Murtaugh Lake[2]	Visual of adult
1	1/01/1972	Two miles southwest of Carey	Visual of adult
1	1/01/1972	Five miles south of Hansen[2]	Visual of adult
1	1/01/1972	Bellevue	Visual of adult
1	12/01/1972	Two miles west of Hazelton	Visual of adult

Number	Date[3]	Location	Type of Observation
2	1/01/1976	Two miles south of Alturas Lake[2]	Visual of adult
1	1/01/1977	Two miles southwest of Alturas Lake	Visual of adult
1	1/07/1984	One mile south of Bellevue	Visual of adult
1	1/01/1989	Emma Creek 26 miles west of Ketchum[2]	Visual of adult
1	1/01/1991	Newman Creek 12 miles northwest of Ketchum	Visual of adult
1	2/27/1998	Two miles southwest of Alturas Lake	Visual of adult
1	5/25/2014	Elkhorn Gulch 4 miles east of Ketchum	Visual of adult

1 - Idaho Fish and Wildlife Information System. Idaho Natural Heritage Data. IDFG. 2015.
2 - Idaho Natural Heritage Data records indicate low precision in location information
3 - Lynx observations reported only as winter were assigned to January 1 of the year of the observation.

An initial effort by the USFS and the BLM to provide a consistent and effective approach to conserve Canada lynx on Federal lands in the conterminous United States resulted in the preparation of an action plan titled the Lynx Conservation Assessment and Strategy (LCAS; Ruediger, et al., 2000) in January 2000. The 2000 LCAS identified risk factors that were comprised of practices and activities with the potential to negatively influence lynx or lynx habitat. A Second Edition of the LCAS containing a number of changes was published in August 2000. The list of risk factors in the Second Edition of the LCAS was extensive with the objective of capturing and addressing all likely potential impacts to lynx. The LCAS has been updated in 2013 by publication of the Third Edition (Interagency Lynx Biology Team, 2013). The Third Edition LCAS (2013) effort has revised and refined the original risk factors, created a list of anthropogenic influences that may affect lynx and lynx habitat, and grouped them into two tiers. The two tiers are grouped by those that have the potential to negatively affect lynx populations and habitat, and those that may affect individual lynx, but are not likely to have a substantial effect on lynx populations and lynx habitat. The first tier of anthropogenic influences includes climate change, vegetation management, wildland fire and fragmentation of habitat. Each of these can directly affect both snowshoe hare and lynx population dynamics. The grouped anthropogenic influences and associated conservation measures almost exclusively apply to activities in core areas. The second tier of anthropogenic influences includes several activities that were previously identified as "risk factors" in the Second Edition of the LCAS. This second tier of anthropogenic influences includes recreation management, minerals and energy exploration and development, forest/backcountry roads and trails and livestock grazing. Vegetation management actions in secondary/peripheral areas are supported by conservation measures that provide a greater degree of flexibility in providing prey for individual lynx that infrequently may move through or reside temporarily in the area.

The LCAS defines Lynx Analysis Units (LAUs) that are intended to facilitate analysis and monitoring of the effects of management actions on lynx habitat. Initial efforts to provide for the conservation of Canada lynx included identification of potentially suitable lynx habitat by means of existing timber stand aerial mapping information. The initial delineation of potential lynx habitat in the area was based on several factors: mapped forest vegetation types described as cold, wet and mesic; structural condition of the forest habitat; the seral stage of the forest vegetation type occurring on Federal land in the area; and juxtaposition of potentially suitable conifer stand types to ascertain whether suitable habitat connectivity is provided amongst and between the timber stand types. Locally this information was then assessed at the sixth level hydrologic unit code (HUC) to determine if the mapped potentially suitable habitat contains all the necessary habitat conditions to provide for the life cycle requirements of a female lynx. If not, HUCs were commonly combined to assure the combined area provided for the annual needs of a female lynx. These resulting LAUs were used as a means to analyze and monitor management actions on lynx habitat. Lynx Analysis Units do not depict actual lynx home ranges, but should approximate the size of a female's home range and contain year-round habitat components. Maintaining good quality and distribution of denning and foraging resources within a LAU will help to assure survival and reproduction by adult females, at least 10 mi^2 of primary vegetation (e.g., spruce/fir) must be present in the LAU to support a female lynx (Interagency Lynx Biology Team, 2013).

The general types of habitat that lynx may use in the LAUs that occur in the TFD include boreal, riparian and upland habitats. The plant communities contained in the boreal habitat used by lynx has been described previously. The boreal habitat would be used by lynx for foraging activities as well as denning habitat. The riparian habitat is comprised of broadleaf dominated riparian, mixed tree riparian and shrub dominated riparian vegetation groups. Lynx would use the riparian habitat primarily for foraging activities and as a travel corridor. Many of the lynx alternate prey species utilize and occur in riparian habitats. Lynx use of the upland habitat primarily occurs where it is located immediately adjacent to boreal or riparian habitats. Lynx use of the upland edge habitat would be for exploratory or dispersal movement activities as well as opportunistic foraging.

The Southwest EcoGroup comprised of the Boise, Payette and Sawtooth National Forests have mapped and subdivided potential lynx habitat in and adjacent to the three national forests into LAUs roughly based on sixth order hydrologic unit code boundaries. This mapping effort was conducted at a large, coarse scale. The coverage was developed for national forest planning and analysis purposes and continues to be utilized for specific project analysis. Figure 10 shows the location of the LAUs as initially drawn to include lands outside the National Forest boundary. Table 9 contains acreages for land ownership in LAUs and lynx habitats within the LAUs. No denning habitat is known to occur on BLM lands within the TFD.

Figure 10 - Canada Lynx Analysis Units and Sighting Locations

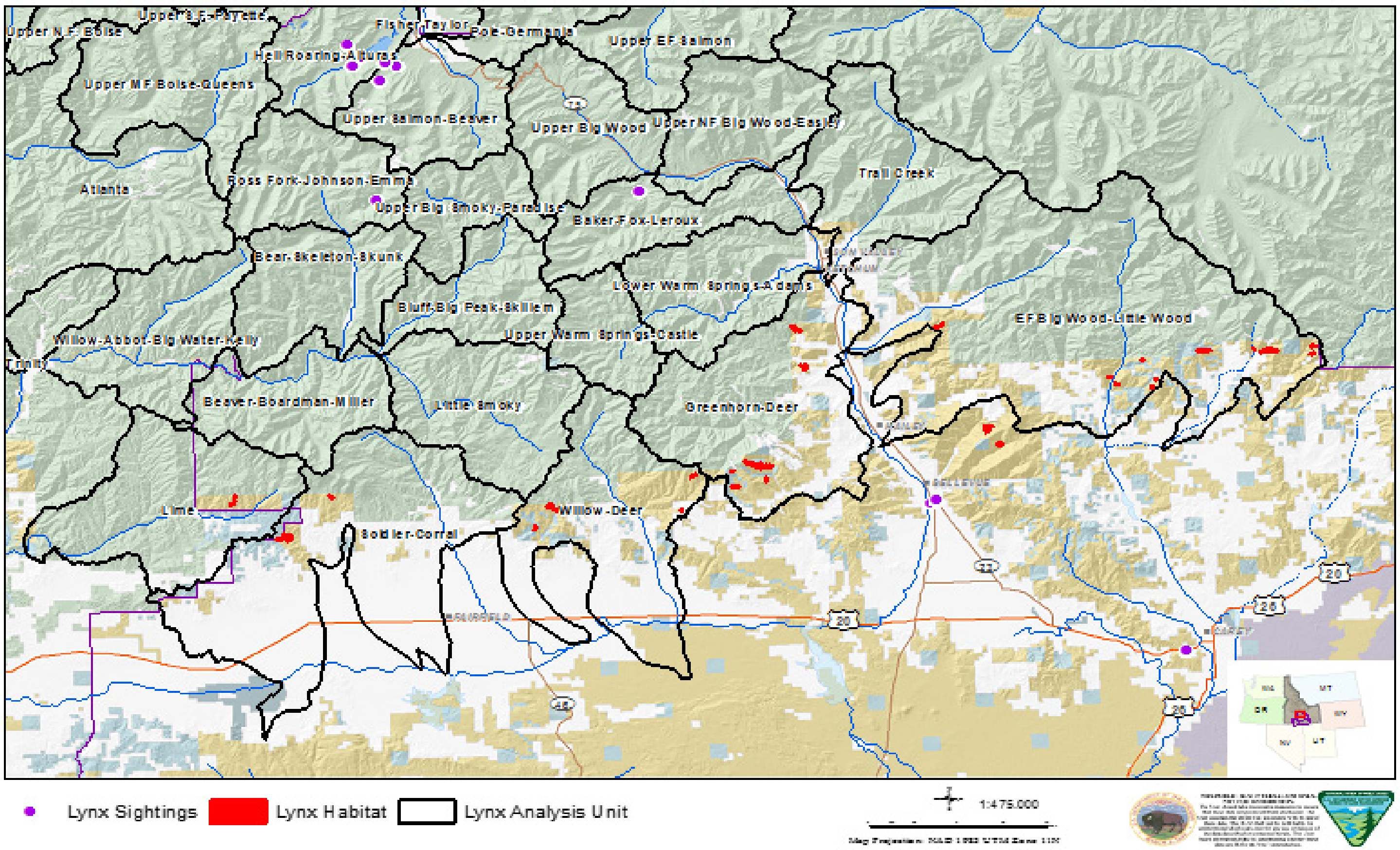


Table 9 - Ownership and Acreage in Lynx Analysis Units in TFD

Name of Lynx Analysis Unit	Land Ownership in LAU (Acres)					Lynx Habitat (Acres)		
	USFS	BLM	State	Private	Total	USFS	BLM	Den[1]
Baker-Fox-Leroux	40,082	48	0	772	40,902	18,489	0	8,104
EF Big Wood-Little Wood	116,355	37,906	0	35,450	189,711	29,717	255	7,800
Greenhorn-Deer	43,382	18,429	0	21,629	83,440	15,156	324	4,180
Lime	56,456	3,683	0	4,158	64,297	14,054	44	1,196
Lower Warms Springs-Adams	42,907	866	0	2,951	46,724	18,528	0	6,527
Soldier-Corral	30,424	7,997	1,018	74,650	114,089	31,313	139	1,400
Trail Creek	52,624	1,261	0	2,906	56,791	18,842	0	6,799
Willow-Deer	21,773	18,988	5	32,111	72,877	15,055	117	1,524
Total	**404,003**	**89,178**	**1,023**	**174,627**	**668,831**	**161,154**	**879**	**37,530**

1 Timber stand and site characteristics that may potentially contain suitable denning habitat was only modeled on USFS lands.

Conservation Needs

- Determine the effects of climate change on lynx, lynx habitat, snowshoe hares, and boreal forests in the contiguous United States.
- Refine and expand techniques to document presence and distribution of lynx throughout their range.
- Refine and improve techniques to determine the effects of vegetation management activities on lynx population distribution and density
- Determine management actions that are needed to maintain connectivity across the international border.
- Expand research to investigate the effects of silvicultural practices on snowshoe hare.
- Evaluate the extent to which winter recreational activities and developments, such as skiing and snowmobiling, influence lynx behavior and habitat use.
- Determine the role, if any, that secondary and peripheral areas as identified in the recovery outline play in the long- term persistence of lynx and in maintaining occupancy of core areas.

Threats Analysis

The LCAS identified the potential risk factors that may influence lynx or lynx habitat (Ruediger et al., 2000). In general, habitat characteristics that provide adequate foraging and denning habitat, particularly conditions that support adequate abundance of prey, are essential for maintaining lynx productivity. Activities that change forest structure can affect habitat quality for lynx and showshoe hares, their primary prey source, and pose a threat to lynx populations.

Reduction in Habitat Quality and Quantity

Much of the mapped potential lynx habitat in the TFD has not been actively managed in the past in a way that would have altered age class, stand structure, and species composition. The notable exceptions are wildfire suppression, thinning, and prescribed burning for fuels reduction. Some areas that historically had patches of trees in mixed ages, sizes, and species have been replaced by larger stands of even-aged but older trees in or approaching climax conditions. Long-term fire suppression in the TFD has generally reduced lynx foraging habitat, but has likely increased amounts of denning habitat. Although a large amount of potentially suitable lynx habitat has burned in and immediately adjacent to public lands within the TFD within the last 10 to15 years, it is estimated that after another 15 to 30 years some of these recently burned areas may provide suitable lynx foraging habitat (Ruediger et al., 2000). Recently burned areas are not considered suitable lynx foraging habitat until they contain sufficient vegetation to support lynx prey (snowshoe hare) and cover for lynx.

Habitat Fragmentation

Human activities have reduced connectivity between patches of suitable lynx habitat. Development for residential, commercial, and agricultural use, as well as roads, railroads, and utility corridors, have all interrupted linkage corridors. Still, much of the land within the TFD remains largely undeveloped and lynx habitat remains relatively intact and well connected.

Improved Access for Competing Carnivores

Lynx have evolved a competitive advantage in deep, soft snow environments; their large paws allow them to hunt prey where other predators cannot. This capability has made winter foraging habitat available to lynx that is unavailable to other carnivores. However, snow compacted by human activity may allow other predators access to prey in deep snow conditions where historically they were excluded. Winter road use, skiing, and to a greater extent, snowmobiling, all have the effect of compacting snow. Advances in snowmobile capabilities have raised concerns about intrusion and new snow compaction in areas previously inaccessible to humans in winter. In addition, building new roads in lynx habitat can make more areas accessible during winter. These routes could be used by snowmobiles even if new roads are designated as closed to motorized public travel during other seasons. Human activities associated with the two large ski areas located in the northern portion of the TFD combined with the increase in human use of adjacent lands may also reduce the lynx’s competitive advantage in areas that typically receive deep snows.

Human Caused Mortality

Roads are a factor in human-caused lynx mortality where they provide access to areas where lynx occur, increasing the risk of negative interactions between people and lynx. Roads bisect many areas that provide potential or suitable lynx habitat. In Idaho, trapping lynx is no longer legal, though there continues to be some risk to the species associated with capture in traps intended for other species. In their predator management activities, Wildlife Services recognizes there is some risk for inadvertent capture of lynx. Illegal harvest of lynx, through shooting or trapping, is occurring, though its importance to lynx is unknown (USDI USFWS, 2003). As noted above, there are only a few documented incidents of vehicle collisions killing lynx. Single, rare mortality events could be significant because of the extremely low number of lynx in Idaho and the action area (TFD).

North American Wolverine

Listing Status

North American wolverine is proposed for listing as threatened under the ESA. The wolverine was first petitioned for listing as endangered or threatened in August, 1994, resulting in a finding published in April, 1995, (60 FR 19567) that the petitioner failed to provide substantial information indicating that listing the wolverine in the contiguous United States was warranted. A second petition to list the wolverine as an endangered or threatened species and to designate critical habitat for the species was received in July, 2000. In October, 2003, the Service found that the petition failed to present substantial scientific and commercial information indicating that listing the wolverine may be warranted (68 FR 60112). The U.S. District Court, Montana District, ruled on September 29, 2006, that the 2003 petition finding (68 FR 60112) was in error. The court ordered the Service to submit a new 12-month finding for the wolverine.

The Service published a finding of ‘‘not warranted’’ for the wolverine in the contiguous United States (73 FR 12929) in March, 2008. The principle premise of the 2008 finding was that the wolverine in the contiguous United States did not constitute a DPS or a significant portion of the range and so was not a listable entity. The Service reached a settlement agreement with litigants in 2009 and in December, 2010, published a finding that the wolverine in the contiguous United States constituted a DPS and warranted listing under ESA, but that listing was precluded by higher priority listing actions (75 FR 78030). The 2010 finding was due primarily to the anticipated impact that climate change may have on the depth and persistence of snow cover in wolverine denning habitat. The Service conducted additional review and analysis of climate predictions in preparation of proposed rules or to withdraw warranted findings for wolverine. The Service concluded in August, 2014, (79 FR 47522) that the climate studies previously utilized did not provide a sufficiently rigorous prediction of changes in snow cover to a degree that it would threaten wolverines within the foreseeable future. The finding published by the Service in 2014 withdrew the proposed rule to list the DPS of wolverine in the contiguous United States as a threatened species. A U. S. District Court ruling in April, 2016, vacated the 2014 Service withdrawal of the proposed listing of wolverine as a threatened species.

Species Description

The wolverine is the largest terrestrial member of the family Mustelidae. Adult males weigh 26 to 40 pounds (lb), and adult females weigh 17 to 26 lb (Banci, 1994). The wolverine resembles a small bear with a bushy tail. It has a broad, rounded head; short, rounded ears; and small eyes. Each foot has five toes with curved, semi-retractile claws used for digging and climbing (Banci, 1994).

Life History

Reproduction/Development

Across their worldwide distribution, wolverines are dependent on persistent spring snow cover for successful reproduction (Aubry, McKelvey, & Copeland, 2007; Copeland, 1996; Copeland et al., 2010; Copeland & Whitman, 2003; Inman, Magoun, Persson, & Mattisson, 2012; Magoun & Copeland, 1998). No records exist of wolverines denning anywhere but in snow, despite the wide availability of snow-free denning opportunities within the species' geographic range. There are no known dens within the TFD.

Breeding generally occurs from late spring to early fall (Magoun & Valkenburg, 1983; Mead et al., 1991). Females undergo delayed implantation until the following winter or spring, when active gestation lasts from 30 to 40 days (Rausch & Pearson, 1972). Litters are born from mid-February through March, containing one to five kits, with an average in North America of between one and two kits (Copeland, 1996; Copeland & Yates, 2008; Inman, Inman, Packila & McCue, 2007b; Krebs & Lewis, 2000; Magoun, 1985).

Deep snow that persists into the month of May is essential for wolverine reproduction (78 FR 7880). Female wolverines use natal (birthing) dens that are excavated in snow. Persistent, stable snow greater than five feet deep appears to be a requirement for natal denning, because it provides security for offspring and buffers cold winter temperatures (Banci, 1994; Copeland, 1996; Copeland et al., 2010; Inman et al., 2007b; Magoun & Copeland, 1998). Female wolverines go to great lengths to find secure den sites, suggesting that predation is a concern (Banci, 1994). Natal dens consist of tunnels that contain well-used runways and bed sites and may naturally incorporate shrubs, rocks, and downed logs as part of their structure (Inman et al., 2007b; Magoun & Copeland, 1998). In Idaho, natal den sites occur above 8,200 feet on rocky sites, such as north-facing boulder talus or subalpine cirques (steep-walled semicircular basin carved by a glacier) in forest openings (Copeland, 1996; Magoun & Copeland, 1998). In Montana, natal dens occur above 7,874 feet and are located on north aspects in avalanche debris, typically in alpine habitats near timberline (Inman et al., 2007a).

Females may move kits to multiple secondary (maternal) dens as they grow during the month of May (Copeland & Whitman, 2003), although use of maternal dens may be minimal (Inman et al. 2007b). Timing of den abandonment is related to accumulation of water in dens (due to snow melt), the maturation of offspring, disturbance, and geographic location (Copeland & Whitman, 2003; Magoun, 1985). After using natal and maternal dens, wolverines may also use rendezvous sites through early July. These sites are characterized by natural (unexcavated) cavities formed by large boulders, downed logs (avalanche debris), and snow (Inman et al., 2007b).

Female wolverines are capable of becoming pregnant when they are two years old and produce average litter sizes of one to two kits. However, the age at which a female wolverine begins to breed varies. In one study of 10 known-aged females, none reproduced at age two, three first reproduced at age three, and two did not reproduce until age four. The average age at first reproduction was 3.4 years (Persson, Landa, Andersen & Segerstrom, 2006). Another study indicated that the average age at first reproduction is likely more than three years (Inman et al., 2007b). Pregnant females commonly resorb or spontaneously abort litters prior to giving birth (Copeland, 1996; Inman et al., 2007b; Magoun, 1985; Persson et al., 2006). This may in turn preserve resources to increase reproductive success in subsequent years (Persson, 2005). By age three, nearly all female wolverines become pregnant every year, but energetic constraints due to low food availability result in termination of about half of all pregnancies annually. It is likely that, in many places in the range of wolverines, it takes two years of foraging for a female to store enough energy to successfully reproduce (Persson, 2005). It is also likely that, despite the high rate of initiation of pregnancy, actual rates of successful reproduction in wolverines are among the lowest known for mammals due to the spontaneous abortion of litters resulting from resource limitation (Persson, 2005).

Movement

Wolverines require a lot of space. The availability and distribution of food is likely the primary factor in determining female wolverine movements and home range size (Banci, 1994; Hornocker & Hash, 1981).

Wolverines travel long distances over rough terrain and deep snow, and adult males generally cover greater distances than females (Banci, 1994; Copeland & Yates, 2008; Hornocker & Hash, 1981; Inman et al., 2007a; Moriarty et al., 2009). Home ranges of wolverines are large and vary greatly in size depending on the availability and distribution of food and gender and age of the animal. Home ranges of adult wolverines also vary in size depending on geographic location. Home ranges in Alaska were approximately 38.5 mi^2 to 348 mi^2 (Banci, 1994). Average home ranges of resident adult females in central Idaho were 148 mi^2 and average home ranges of resident adult males were 588 mi^2 (Copeland, 1996). Wolverines in Glacier National Park had average adult male home ranges of 193 mi^2 and adult female home ranges of 55 mi^2 (Copeland & Yates, 2008). Wolverines in the Greater Yellowstone Ecosystem had average adult male home ranges of 311 mi^2, and average adult female home ranges of 128 mi^2 (Inman et al., 2007a). These home range sizes are large relative to the body size of wolverines, and may indicate that wolverines occupy a relatively unproductive niche in which they must forage over large areas to consume the amount of calories needed to meet their life-history requirements (Inman et al., 2007a).

Habitat Characteristics

In North America, wolverines occur within a wide variety of alpine, boreal, and arctic habitats, including boreal forests, tundra, and western mountains throughout Alaska and Canada. The southern portion of the species' range extends into the contiguous United States, including high-elevation alpine portions of Washington, Idaho, Montana, Wyoming, California, and Colorado (Aubry et al., 2007; Banci, 1994; Copeland & Whitman, 2003; Hash 1987, Moriarty et al., 2009). Wolverines do not appear to specialize on specific vegetation or geological habitat aspects, but instead select areas that are cold and receive enough winter precipitation to reliably maintain deep persistent snow late into the warm season (Copeland et al., 2010). The requirement of cold, snowy conditions means that, in the southern portion of the species' range where ambient temperatures are warmest, wolverine distribution is restricted to high elevations. Wolverines are present at lower elevations in the far north (Copeland et al., 2010). In the contiguous United States, wolverine year-round habitat is found at high elevations centered near the tree line in conifer forests (below tree line) and rocky alpine habitat (above tree- line) and in cirque basins and avalanche chutes that have food sources such as marmots, voles, and carrion (Copeland, 1996; Hornocker & Hash, 1981).

Diet

Wolverines are opportunistic feeders and consume a variety of foods depending on availability. They primarily scavenge carrion, but also prey on small animals and birds, and eat fruits, berries, and insects (Banci, 1994; Hash, 1987; Hornocker & Hash, 1981). Wolverines have an excellent sense of smell that enables them to find food beneath deep snow (Hornocker & Hash, 1981).

Distribution

The wolverine has a Holarctic distribution including northern portions of Europe, Asia, and North America. The currently accepted taxonomy classifies wolverines worldwide as a single species, *Gulo gulo,* with two subspecies. Old World wolverines are found in the Nordic countries of Europe, Russia, and Siberia and are part of the subspecies *Gulo gulo gulo.* The wolverines in the contiguous United States are a part of the New World subspecies, *G. g. luscus:* the North American wolverine (78 FR 7866).

Wolverine reproductive dens have been located in alpine, subalpine, taiga, or tundra habitat (Copeland & Whitman, 2003; Magoun & Copeland, 1998). Wolverines rarely, or never, den in lower elevation forested habitats, although they may occupy these habitats occasionally (Magoun & Copeland, 1998).

Wolverines naturally occur in low densities with a reported range from one animal per 25 mi^2, to one animal per 130 mi^2 (Copeland, 1996; Copeland & Yates, 2008; ; Hash 1987; Hornocker & Hash, 1981; Inman et al., 2007a; Squires, Copeland, Ulizio, Schwartz & Ruggiero, 2007). No systematic population census exists over the entire current range of wolverines in the contiguous United States, so the current population level and trends are not known with certainty. However, current knowledge of occupied wolverine habitat and wolverine densities in this habitat, it is reasonable to estimate that the wolverine population in the contiguous United States numbers approximately 250 to 300 individuals (78 FR 7868). The bulk of the current population occurs in the northern Rocky Mountains, with a few individuals in the North Cascades (78 FR 7868).

Wolverines often move long distances in short periods of time; for example, when dispersing from natal ranges, wolverines may transit through habitats that are unsuitable for long-term survival (Aubry et al., 2007; Copeland & Whitman, 2003; Moriarty et al., 2009). Such movements make it difficult to distinguish with certainty between occurrence records that represent established populations in suitable habitats and records that represent short-term occupancy or exploratory movements without the potential for establishment of home ranges, reproduction, or populations.

The general types of habitat that wolverine may use in the TFD include boreal/upland and lower elevation riparian and upland habitats. The plant communities contained in the boreal/upland habitat used by wolverine has been described previously. The boreal/upland habitat would be used by wolverine for foraging activities as well as occurring near denning habitat. However, there are no known dens in the TFD and suitable denning habitat does not occur. The lower elevation riparian habitat is comprised of broadleaf dominated riparian, mixed tree riparian and shrub dominated riparian vegetation groups. Wolverine would use the riparian habitat primarily for foraging activities and as a travel corridor. A number of small mammalian prey species utilized by wolverine occur in riparian habitats. The lower elevation upland habitat is comprised of shrub steppe plant communities dominated by big sagebrush.

A listing of all known observations of wolverine occurring within the TFD from 1891 to 2015 is provided in Table 10. Figure 11 displays locations of wolverine observations within the TFD. The ownership or administration of the land where the wolverine observation occurred are as follows: USFS - 57; BLM - two; National Park Service - two; State of Idaho - one; Private - 10.

Table 10 – Wolverine observations within the TFD[1]

Number	Date	Location	Observation	Survey Method
1	1/16/1891	Headwaters of Salmon River	Specimen	Incidental Observation
1	4/06/1891	Headwaters of Salmon River	Specimen	Incidental Observation
1	6/01/1962	Upper Big Wood River	Seen	Incidental Observation
1	10/01/1976	Headwaters of Salmon River	Specimen	Incidental Observation
1	8/01/1979	Upper Big Wood River	Seen	Incidental Observation
3	8/15/1980	Upper South Fork Boise River	Seen	Incidental Observation
1	1/01/1984	Upper South Fork Boise River	Seen	Incidental Observation
2	1/01/1985	Little Wood River	Seen	Incidental Observation
1	6/15/1985	Upper South Fork Boise River	Seen	Incidental Observation
1	5/15/1986	Little Wood River	Seen	Incidental Observation
2	7/01/1986	Little Wood River	Seen	Incidental Observation
1	11/15/1986	Headwaters of Salmon River	Tracks	Incidental Observation
1	1/01/1987	Upper South Fork Boise River	Tracks	Incidental Observation

Number	Date	Location	Observation	Survey Method
1	9/19/1987	Headwaters of Salmon River	Seen	Incidental Observation
1	12/01/1987	Upper Big Wood River	Tracks	Incidental Observation
1	12/15/1987	Upper Big Wood River	Tracks	Incidental Observation
1	12/15/1987	Upper Big Wood River	Seen	Incidental Observation
1	1/01/1988	Upper South Fork Boise River	Tracks	Incidental Observation
1	2/14/1988	Upper Big Wood River	Seen	Incidental Observation
1	6/15/1988	Upper Big Wood River	Seen	Incidental Observation
1	11/15/1988	Upper Big Wood River	Tracks	Incidental Observation
1	12/15/1988	Headwaters of Salmon River	Tracks	Incidental Observation
1	12/15/1988	Upper Big Wood River	Tracks	Incidental Observation
1	1/01/1989	Headwaters of Salmon River	Seen	Incidental Observation
1	4/01/1989	Upper Big Wood River	Seen	Incidental Observation
1	10/17/1989	Upper Big Wood River	Tracks	Incidental Observation
1	1/15/1990	Headwaters of Salmon River	Tracks	Inventory/Targeted Survey
1	1/21/1990	Headwaters of Salmon River	Tracks	Inventory/Targeted Survey
1	2/28/1990	Upper South Fork Boise River	Tracks	Inventory/Targeted Survey
1	3/01/1990	Upper South Fork Boise River	Tracks	Inventory/Targeted Survey
1	3/07/1990	Headwaters of Salmon River	Tracks	Inventory/Targeted Survey
1	3/07/1990	Headwaters of Salmon River	Tracks	Inventory/Targeted Survey

Number	Date	Location	Observation	Survey Method
1	4/09/1990	Upper Big Wood River	Seen	Incidental Observation
1	5/04/1990	Upper Big Wood River	Seen	Incidental Observation
1	9/29/1990	Upper Big Wood River	Seen	Incidental Observation
1	1/01/1992	Upper South Fork Boise River	Tracks	Inventory/Targeted Survey
1	2/28/1992	Headwaters of Salmon River	Other, Indirect Evidence	Inventory/Targeted Survey
1	2/28/1992	Headwaters of Salmon River	Other, Indirect Evidence	Inventory/Targeted Survey
1	3/12/1992	Headwaters of Salmon River	Hand	Inventory/Targeted Survey
1	3/16/1992	Headwaters of Salmon River	Hand	Inventory/Targeted Survey
1	3/22/1992	Headwaters of Salmon River	Hand	Inventory/Targeted Survey
1	6/10/1992	Upper Big Wood River	Seen	Incidental Observation
1	10/15/1992	Upper South Fork Boise River	Seen	Incidental Observation
1	1/15/1993	Headwaters of Salmon River	Hand	Inventory/Targeted Survey
1	2/07/1993	Upper South Fork Boise River	Hand	Inventory/Targeted Survey
1	3/02/1993	Upper Big Wood River	Seen	Incidental Observation
1	3/03/1993	Upper South Fork Boise River	Hand	Inventory/Targeted Survey
1	7/20/1993	Upper Big Wood River	Seen	Incidental Observation
1	7/31/1993	Upper Big Wood River	Seen	Incidental Observation

Number	Date	Location	Observation	Survey Method
1	8/06/1993	Upper Big Wood River	Seen	Incidental Observation
1	8/13/1993	Upper Big Wood River	Seen	Incidental Observation
1	3/25/1994	Headwaters of Salmon River	Hand	Inventory/Targeted Survey
1	4/04/1994	Headwaters of Salmon River	Hand	Inventory/Targeted Survey
1	4/11/1994	Headwaters of Salmon River	Hand	Inventory/Targeted Survey
1	2/10/1995	Upper South Fork Boise River	Hand	Inventory/Targeted Survey
1	4/18/1995	Headwaters of Salmon River	Hand	Inventory/Targeted Survey
1	5/28/2001	Snake River Plain	Specimen	Incidental Observation
1	4/30/2004	Snake River Plain	Seen	Incidental Observation
1	3/28/2005	Snake River Plain	Seen	Incidental Observation
1	6/19/2007	South Hills	Seen	Incidental Observation
2	3/16/2008	Upper Big Wood River	Seen	Incidental Observation
1	4/01/2008	Snake River Plain	Seen	Incidental Observation
1	1/29/2009	Headwaters of Salmon River	Seen	Incidental Observation
2	7/26/2009	Headwaters of Salmon River	Seen	Incidental Observation
1	8/24/2009	Snake River Plain	Seen	Incidental Observation
1	6/30/2013	Upper Big Wood River	Photographed	Observed on TrailCam
1	7/16/2013	Upper Big Wood River	Photographed	Observed on TrailCam
3	7/26/2013	Upper Big Wood River	Photographed	Observed on TrailCam

Number	Date	Location	Observation	Survey Method
1	11/04/2013	Upper Big Wood River	Sample	Incidental Observation
1	11/07/2013	Upper Big Wood River	Seen, Tracks	Inventory/Targeted Survey
1	2/20/2014	Snake River Plain	Photographed	Observed on TrailCam
4	10/23/2014	Little Wood River	Seen, Tracks, Photo-graphed	Incidental Observation

1 - Idaho Fish and Wildlife Information System. Idaho Natural Heritage Data. IDFG. 2015

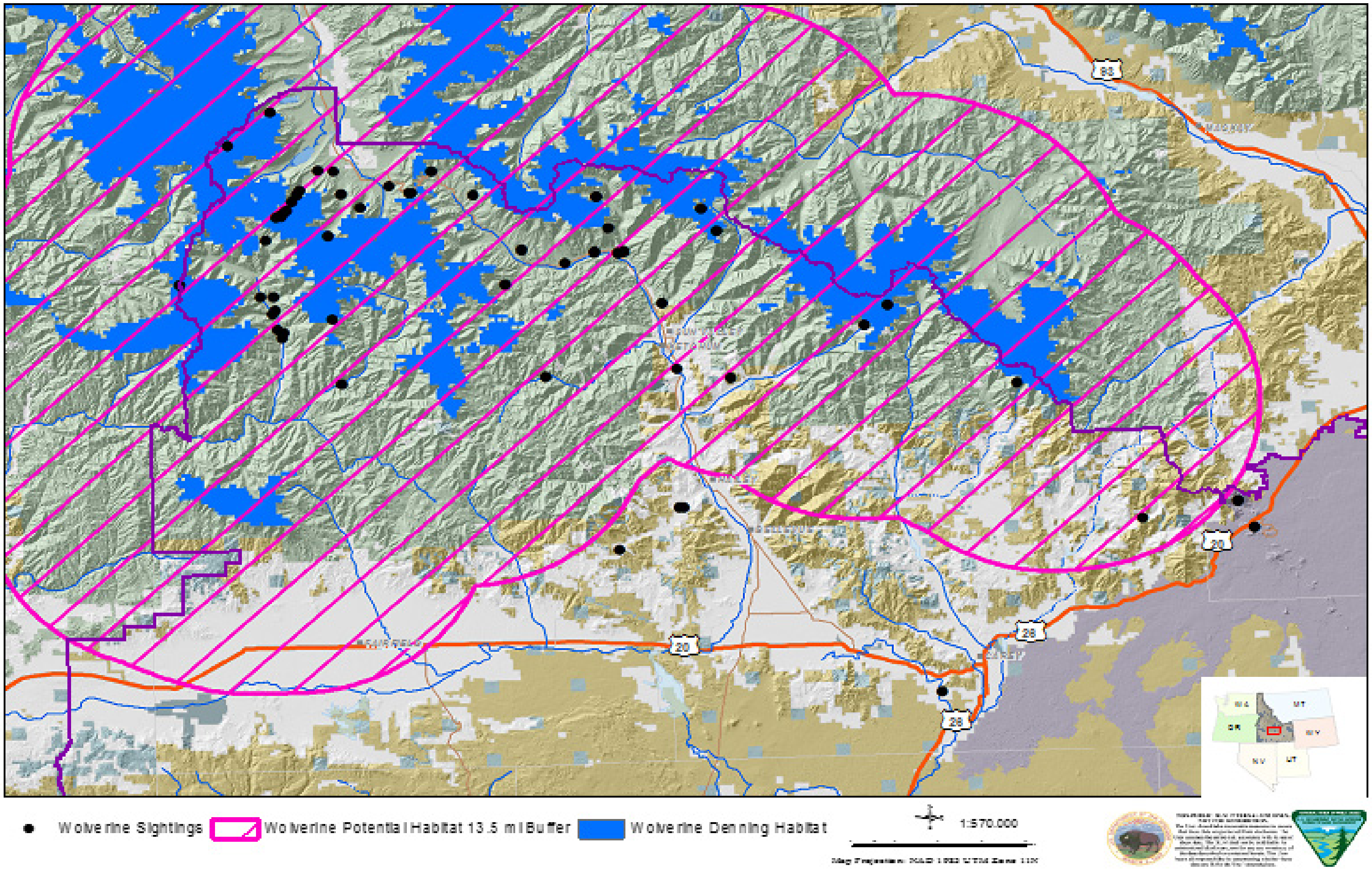
Conservation Needs

- Monitoring of wolverine presence, numbers, and genetic health range-wide at a scale informative to management.
- Reducing human-caused mortalities of wolverine.
- Working cooperatively with local, State, and Federal governments, Tribes, and other stakeholders to facilitate continued wolverine expansion in occupied areas and population expansion to isolated areas of suitable habitat.
- Continued research into possible human impacts to wolverines and their habitat to ensure that human activities remain non-threatening.
- Refinement of a science-based model to more accurately identify suitable habitat for North American wolverine.

Threats Analysis

Climate change is the primary threat to wolverines as the loss of persistent snowpack would limit denning habitats. Copeland et al., (2010) ran climate simulations in an effort to project likely persistence of spring snow to define occupied wolverine habitat. McKelvey et al., (2011) utilized the habitat model developed by Copeland et al., (2010) in an effort to predict future impacts from changes in climate to wolverine habitat. Peacock (2011) ran the newest version of the Community Climate System Model which predicted the high elevation areas of the northwest where wolverines now reside will warm dramatically causing an earlier loss of snowpack in the spring and warmer temperatures in the summer. Results of the climate computer model by Peacock (2011) predict a reduction in habitat suitability for wolverine in currently occupied habitat in the conterminous United States due to loss of suitable denning habitat conditions and higher summer temperatures. Impacts to wolverine habitat distribution, connectivity and dispersal corridors are expected to occur from this predicted change in climatic conditions.

Figure 11 - Wolverine Assessment Area and Sighting Locations



Slickspot Peppergrass

Listing Status

Slickspot peppergrass (*Lepidium papilliferum*) was proposed as a candidate for listing under the ESA in 1999 (64 FR 57534-57547). In November 2001, the Service was sued by the Committee for Idaho's High Desert and Western Watersheds Project for failure to issue an emergency rule to list the plant and for failing to proceed with a proposed rule to list the plant as endangered. Pursuant to a settlement agreement, the Service agreed to publish a final listing determination by July 15, 2003. In July 2002, the Service proposed listing the plant as endangered under the ESA (67 FR 46441-46450). In July 2003, the Service extended the date for publication of a final listing decision to January 15, 2004, because of disagreement over whether available data for slickspot peppergrass populations were sufficient to indicate a continuing trend of decline towards extinction (68 FR 42666-42668).

In 2003, the State of Idaho, BLM, private landowners who were also BLM livestock grazing permittees, and the Idaho Army National Guard finalized a Candidate Conservation Agreement for slickspot peppergrass. In addition, the U.S. Air Force finalized their Integrated Natural Resources Management Plan in January 2004. Based on these conservation efforts, the certainty of their implementation, their effectiveness in reducing risks to the species after implementation, and the then current lack of strong evidence suggesting a negative population trend, the Service withdrew the proposal to list slickspot peppergrass as endangered in January 2004 (69 FR 3094-3116). In April 2004, the Service was sued by Western Watersheds Project for failure to list slickspot peppergrass as threatened or endangered under the ESA. In August, 2005, the U.S. District Court for the District of Idaho reversed the decision to withdraw the proposed rule to list slickspot peppergrass as endangered, with directions that the case be remanded to the Secretary of the Department of the Interior for reconsideration of whether a proposed rule listing slickspot peppergrass as either threatened or endangered should be adopted. In October 2005, the Service requested new information for slickspot peppergrass as a result of that court decision. Between May and August, 2006, the BLM and the Service developed updated conservation measures and entered into a Consultation Agreement to implement the conservation measures through implementation of land use plans. In fall, 2006, the BLM and the Service met multiple times to develop a biological assessment that addressed the potential effects of BLM's existing land use plans and ongoing actions on slickspot peppergrass. The Service withdrew the proposed determination to list slickspot peppergrass as endangered in January 2007 (72 FR 1622-1644) and efforts to complete section 7 consultation on existing land use plans and ongoing actions ceased. The withdrawal of the proposal to list slickspot peppergrass was based on the conclusion that, while its sagebrush-steppe habitat was becoming increasingly degraded, the best available information at the time provided no evidence indicating that this degradation was impacting slickspot peppergrass within its slickspot microsites. On April 6, 2007, Western Watersheds Project filed a lawsuit challenging the decision to withdraw the proposed rule to list slickspot peppergrass. On June 4, 2008, the U.S. District Court for the District of Idaho reversed the Service's decision to withdraw the proposed rule, with directions that the case be remanded to the Service for further consideration (Western Watersheds Project v. Kempthorne, Case No.CV 07-161-E-MHW [D. Idaho]). After issuance of the court's remand order, the Service published a public notification of the reinstatement of the July 15, 2002, proposed rule to list slickspot peppergrass as endangered and announced the re-opening of a public comment period on September 19, 2008 (73 FR 54345-54346).

Slickspot peppergrass was listed as a threatened species under the ESA on October 8, 2009 (74 FR 52014-52064).

The Service published a proposed rule for the designation of critical habitat for slickspot peppergrass and an accompanying 60 day comment period on May 10, 2011 (76 FR 27184-27215). On July 7, 2011, the public comment period was extended an additional 60 days (76 FR 39807-39808).

Following the 2009 listing, Idaho Governor C.L. "Butch" Otter, the Idaho Office of Species Conservation, Theodore Hoffman, Scott Nicholson, and L.G. Davison & Sons, Inc., challenged the listing under the Administrative Procedures Act and the ESA. On August 8, 2012, the listing decision was reversed and remanded to the Service for further consideration on the grounds that the term "foreseeable future" was not adequately defined (Otter v. Salazar, No. 1:11-cv-00358-CWD, 2012 U.S. Dist. LEXIS 111743). The Service addressed the deficiency and published the final rule on August 17, 2016, (81 FR 55058-55084) listing the species as threatened, effective September 16, 2016.

Species Description

Slickspot peppergrass is a small white-flowered member of the mustard family (Brassicaceae). It is a tap-rooted annual or biennial plant with leaves branching above the root crown. It is generally small, only reaching heights of four to 16 inches. The stems and leaves are pubescent. Leaves are pinnate to bipinnate with linear segments. Flowers are numerous and produced at the terminal end of branches. The small flowers have four white petals and four sepals. Anther filaments are covered with club-shaped hairs. Although individual flowers are small, slickspot peppergrass can be showy when it blooms because the inflorescences show up as mounds of white on its slickspot habitat within the larger sagebrush or grass community. The small disk-shaped, flattened fruits are about 0.12 inches long (Moseley, 1994).

Life History and Habitat Characteristics

Slickspot peppergrass has two potential life-history strategies – it can occur as either an annual or biennial plant. Like many short-lived plants growing in arid environments, the number of slickspot peppergrass plants can widely fluctuate from one year to the next based on annual precipitation patterns (Mancuso, 2001; Mancuso, Murphy, & Moseley, 1998; Meyer, Quinney, & Weaver, 2005). Mancuso et al. (1998) noted that sites with thousands of above-ground plants one year may have none the next, and vice versa. Above-ground plants represent only a portion of the population; the seed bank contributes the other portion and in many years, constitutes the majority of the population (Mancuso et al., 1998). Slickspot peppergrass seeds can remain in the soil as a seed bank where they are viable for at least 11 years (Meyer et al., 2005).

The vast majority of slickspot peppergrass seeds in slickspots are located near the soil surface (Meyer et al., 2005; Palazzo, Lichvar, Cary, & Bayshore, 2005). Palazzo et al. (2005) found that seeds were most abundant in the upper five centimeters (two inches) of soil both inside and outside of slickspots. Flowering usually occurs in late April and May, fruit set occurs in June, and seeds are released in late June or early July. Seeds are dormant for at least a year before germinating. Following this year of dormancy, about six percent of the initially viable seeds produced in a given year germinate annually (Meyer et al., 2005).

Slickspot peppergrass is primarily an outcrossing species requiring pollen from separate plants for more successful fruit production, and has a low seed set in the absence of insect pollinators (Billinge & Robertson, 2008; Robertson, 2003; Robertson & Klemash, 2003; Robertson & Ulappa, 2004). Slickspot peppergrass is able to self-pollinate, however, with a self-reproduction rate of only 12 to 18 percent (Billinge, 2006; Robertson, Leavitt, & Billinge, 2006a). Known slickspot peppergrass insect pollinators include several families of bees (Hymenoptera), including Apidae, Halictidae, Sphecidae, and Vespidae; beetles (Coleoptera), including Dermestidae, Meloidae, and Melyridae; flies (Diptera), including Bombyliidae, Syrphidae, and Tachinidae; and others (Robertson & Klemash, 2003; Robertson, Novak, Leavitt, Stillman, & White, 2006b).

Slickspot peppergrass grows in the semiarid sagebrush-steppe ecosystem of the Snake River Plain, Boise Foothills, and the Owyhee Plateau of southwestern Idaho. It is associated with basalt ridges and plains, stable piedmont, and alluvial floodplains and deposits (Fisher, Eslick, and Seyfried, 1996). Menke and Kaye (2006) described high-quality conditions for slickspot peppergrass as “sagebrush-steppe habitat in late seral condition”.

Slickspot peppergrass plants are found in visually distinct microsites known as slickspots, also known as mini-playas or natric sites, where the sodium and clay content are higher than adjacent, unoccupied habitat. Intact slickspots form shallow depressions where the higher salt and clay content have sealed the surface, resulting in seasonally pooled water and longer moisture retention compared to the surrounding habitat (Moseley, 1994). In native plant communities, slickspots tend to have low vegetation cover due to edaphic conditions in the slickspots resulting from seasonal flooding and saline conditions. The restricted distribution of slickspot peppergrass is likely due to its adaptation to the specific conditions within these slickspot habitats (Fisher et al., 1996). Historically, shrub communities dominated by sagebrush and/or rabbitbrush surrounded slickspots containing slickspot peppergrass in the Jarbidge FO area. However, as a result of wildfire and resulting vegetation change, much of the habitat is currently dominated by either native perennial, seeded native or non-native perennial, or non-native invasive annual grass communities.

Biological soil crusts are a component of high quality habitat for slickspot peppergrass (Moseley, 1994). Biological soil crusts consist of a variety of cyanobacteria, green algae, lichens, mosses, microfungi, and other bacteria. They positively affect the soil environment by reducing erosion (both wind and water), fixing atmospheric nitrogen, retaining soil moisture, and providing a living organic surface mulch (Belnap & Phillips, 2001). In addition, an intact crust appears to aid in preventing the establishment of invasive plants (Brooks & Pyke, 2001; Serpe, Orme, Barkes, & Rosentreter, 2006).

Status and Species Distribution

The range of slickspot peppergrass is restricted to the volcanic plains of southwest Idaho, occurring primarily in the Snake River Plain and its adjacent northern foothills, with a single disjunct population in the Inside Desert of the Jarbidge FO. The plant occurs at elevations ranging from approximately 2,200 feet to 5,400 feet in Ada, Canyon, Gem, Elmore, Payette, and Owyhee Counties (Moseley, 1994). Based on differences in topography, soil, and relative abundance, populations have been divided into three physiographic regions: the Boise Foothills, Snake River Plain, and Northern Basin and Range (formerly the Owyhee Plateau physiographic region). Currently there are 109 extant slickspot peppergrass element occurrences (EOs) occurring on 15,823 acres rangewide. Of that total 87 percent (13,728 acres) of the acreage is managed by the federal government, 9 percent (1,502 acres) is managed by the State of Idaho, and 4 percent (593 acres) is private land (Kinter, 2016a).

The action area contains only the Northern Basin and Range physiographic region. The Northern Great Basin and Range population occurs on 69,750 acres of occupied habitat, which includes individual EOs plus a surrounding 0.5 mile insect pollinator buffer. Approximately 79% (55,350 acres) of this occupied habitat is managed by BLM (USDI USFWS, 2015a). Within the area identified as occupied habitat, 41 EOs (38 percent of all EOs) occur on 2,696 acres (17 percent of the total acreage). Of this area, 614 acres (23 percent) are managed by BLM, 1,948 acres (72 percent) are managed by the U.S. Air Force in the Juniper Butte Training Range, and 133 acres (5 percent) are managed by the State of Idaho. There is no private land occupied by slickspot peppergrass in the Northern Basin and Range physiographic region (Kinter, 2016a; Figure 12).

The action area contains proposed critical habitat Unit 4, which is limited to portions of the occupied habitat and covers 27,709 BLM-managed acres and 1,482 acres managed by the State of Idaho (79 FR 8405).

Potential habitat for the species occurs over about 421,000 BLM-managed acres, or about 31 percent of the Jarbidge FO area (Figure 12, Table 11Table 11). Potential habitat was broadly defined by a GIS model utilizing soil type, elevation, and potential plant community. To better address the needs of the species, BLM developed another GIS model to focus inventory efforts on areas that would have a higher probability of finding slickspot peppergrass plants. This model used updated information for soils, existing vegetation communities, fire frequency, slope, and elevation to further refine potential habitat and to categorize the habitat into potential categories for finding the species. As a result of this model, potential habitat was classified as having high, medium, or low potential for slickspot peppergrass to occur (Table 11). Habitats with the highest potential for slickspot peppergrass to occur are remnant native shrub stands (USDI USFWS, 2015a). Habitats with low potential for slickspot peppergrass to occur are typically in poor vegetative condition and dominated by noxious weeds and/or invasive plants, which is usually the result of past repeated fire. Habitats with medium potential for slickspot peppergrass to occur have lost some vegetation community components such as shrubs, primarily due to past fire, but are not dominated by noxious weeds and/or invasive plants (BLM GIS data, 2016).

The Northern Basin and Range population was discovered in 1993 by a BLM biologist. Inventories of potential habitat have occurred since that time. Since 1996, contractors for the U.S. Air Force completed inventories and consecutive year surveys for slickspot peppergrass in the Saylor Creek Range, Juniper Butte Training Range, and associated sites. In 1999-2002, BLM contracted inventories of the Inside Desert area to define the location and extent of populations in that area (Popovich, 1999; Popovich, 2000; Popovich, 2001; Popovich, 2002). In 2001, the Idaho Natural Heritage Program (INHP) conducted systematic inventories in the Bruneau Desert to the north of the known occupied habitat. Fifty areas covering about 3,600 acres were searched;

no new slickspot peppergrass populations were found (Mancuso & Cooke, 2001). Potential habitat for slickspot peppergrass throughout the Jarbidge FO was systematically inventoried in 2006 and 2007 as part of a Stipulated Settlement Agreement in preparation of the Jarbidge RMP revision. This inventory involved generation of random points within potential habitat using GIS. Botanists navigated to approximately 700 random points, searching for slickspots and slickspot peppergrass on the way to and back from the random point. Different routes were walked during ingress and egress. Slickspots were not recorded unless occupied by slickspot peppergrass. Slickspot peppergrass was not located outside of the existing range.

Figure 12- Slickspot peppergrass occupied and potential habitats and proposed critical habitat. These habitats only occur in the Jarbidge Field Office portion of the action area.

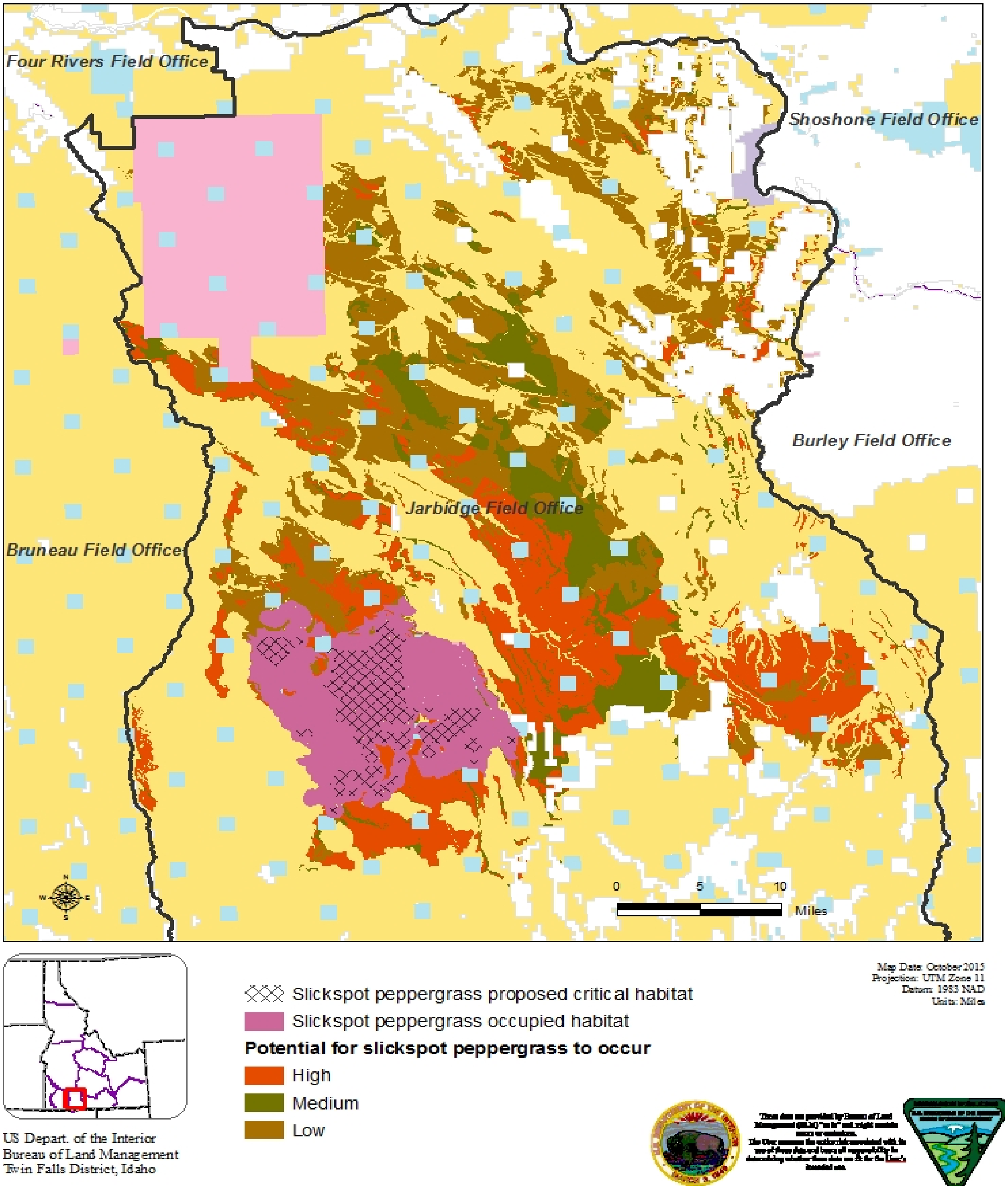


Table 11 - Potential habitat categories and acreages for slickspot peppergrass (BLM GIS data, 2016)

Potential for slickspot peppergrass to occur	Acres of habitat category
High	152,000
Medium	69,000
Low	200,000
Total	**421,000**

In addition, no slickspot peppergrass plants were observed while conducting extensive inventories for special status wildlife conducted in 2006; ecological site inventories at 492 points throughout the field office in 2006; or during field-based rangeland health assessments conducted in 2012 through 2016 on 93 grazing allotments in the Jarbidge FO. This included assessment of about 345 sage-grouse Habitat Assessment Framework (HAF) and 375 rangeland health assessment sites. Some of these assessments were at the same location and not all were in potential or occupied slickspot peppergrass habitat. However, no slickspot peppergrass was found outside of the known occupied habitat.

Surveys are on-going to determine if potential habitat has slickspots and if those slickspots are occupied by the species. Surveys follow a standard protocol to determine the presence or absence of slickspots within potential habitat (Stage1) and slickspot peppergrass within slickspot microsites (Stage 2; USDI BLM, 2010; USDI BLM, 2015a). Inventories are repeated to determine if slickspot peppergrass is present at least once in three years of inventory where spring rainfall is at least 60 percent of “average” (Stage 3). If repeated inventories document slickspots but fail to detect slickspot peppergrass plants, the potential habitat is classified as unoccupied. If slickspots are not present the potential habitat is reclassified as non-habitat.

Between 2010 and August 2016, roughly 129,000 acres of potential habitat were inventoried for presence of slickspots and slickspot peppergrass plants (Table 12). Of the 129,000 acres, about 7,400 acres were inventoried twice and 9,700 acres were inventoried three times. These inventories focused primarily on habitat with high and medium potential for slickspot peppergrass to occur. No plants were observed.

As a result of all inventory efforts, no slickspot peppergrass plants have been detected outside of the currently known occupied habitat in the Inside Desert. No plants have been located in suitable habitats west of the Jarbidge River canyon or east of the East Fork Bruneau River canyon (Clover Creek).

Table 12 - Completed potential habitat inventory acres for slickspot peppergrass

Potential for slickspot peppergrass to occur	Acres Inventoried			
	Inventoried once	Inventoried twice	Inventoried three times	Total
Occupied	653	1	0	654
High	40,176	5,108	7,603	52,887
Medium	24,585	340	896	25,821
Low	20,831	260	1,080	22,171
Non-habitat	25,511	1,669	119	27,299
Total	**111,756**	**7,378**	**9,698**	**128,832**

Non-habitat consists of areas classified as potential habitat prior to development of the potential for occurrence model. Areas were re-classified to non-habitat due to habitat degradation from repeated fire and subsequent dominance by invasive plants.

Part of the area supporting the Northern Basin and Range population burned in the 2007 Murphy Complex and Inside Desert fires and the 2013 Bruneau Fire, affecting 11 element occurrences (79 FR 8421). Slickspot peppergrass is known to persist in grass-dominated sites following wildfire in the action area. However, studies have shown that slickspot peppergrass abundance goes down as the number of wildfires in an area increase. Abundance also declines with increased non-native invasive annual plant cover (i.e. cheatgrass) within and adjacent to slickspot microsites (Sullivan & Nations, 2009). Much of the slickspot peppergrass potential habitat in the Jarbidge FO has burned one or more times in past fires, further threatening the plant and its habitat. Efforts to restore sagebrush to both occupied and potential habitat are on-going via post-fire rehabilitation and sagebrush-steppe habitat restoration projects which include seeding sagebrush post-fire and planting sagebrush into good condition native and non-native perennial grass communities.

The INHP performs Habitat Integrity and Population (HIP) monitoring annually for slickspot peppergrass. The monitoring occurs in three geographic areas (GAs): the Snake River Plain GA, Foothills GA, and Jarbidge GA. The Jarbidge GA is located in the Northern Basin and Range physiographic region and the action area.

Table 13 displays slickspot peppergrass plant numbers resulting from HIP monitoring over an 11 year period in the Jarbidge GA only and totals over the entire species' range. The Jarbidge GA had the lowest number of plants recorded in all GAs in 2011 (410 plants). However, the Jarbidge GA has not exhibited the amount of population fluctuation seen in the other two GAs (Kinter, Clay, Fulkerson, & Miller, 2012). The HIP monitoring data demonstrate the high amount of variability that occurs in slickspot peppergrass populations from year to year.

Table 13 - Slickspot peppergrass plant counts for the Jarbidge GA and for all three GAs combined, 2005-2015 (Kinter, 2016b)

Geographic Area	Year										
	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015
Jarbidge GA only	3,568	1,747	1,097	1,500	2,841	1,936	410	663	1,218	1,479	2,052
Total of all GAs	29,702	17,529	21,910	46,570	22,940	58,920	16,458	9,244	6,351	45,569	26,871

Anticipating any trend in slickspot peppergrass abundance over time is complicated by multiple factors. Since individual plants may act as either an annual or a biennial, there will be annual variation in the number of plants acting as spring-flowering annuals versus overwintering rosettes. The relative proportions of these two life history forms can fluctuate annually depending on a variety of factors, including the amount and timing of precipitation, temperature, abundance of rosettes produced the previous year (Sullivan & Nations, 2009; Unnasch, 2008), and seed predation by harvester ants (White & Robertson, 2009). In addition, slickspot peppergrass has a long-lived seed bank, likely as an adaptation to unpredictable conditions in which years of good rainfall favorable for germination and survival may be followed by periods of drought. A persistent seed bank provides a population buffer against years of poor reproductive potential in a highly variable environment (Meyer et al., 2005). Meyer et al. (2005) estimated that only about six percent of slickspot peppergrass seeds germinate annually, resulting in an estimated longevity of 11 years for seeds in the seed bank. The presence of this persistent seed bank confounds the ability to determine any trend in abundance over time, as the number of above-ground plants that can be counted in any one year represents only a subset of the latent population that is present in the seed bank.

In addition to determination of annual plant numbers, results from HIP monitoring inform standardized ranking of EOs from A (excellent) to D (poor) based on three key factors: population size, occurrence condition, and landscape condition (Kinter & Miller, 2016). Kinter & Miller (2016) determined that there were no A-ranked EOs, four B-ranked EOs, six C-ranked EOs, one CD-ranked EO, and eight D-ranked EOs in the Jarbidge GA. EO ranking assists in identification of disturbance factors and threats and thus help formulate management needs for preservation of the species.

Conservation Measures

Although recovery planning has not been completed for slickspot peppergrass, the Service anticipates that providing for its survival and recovery will entail reducing the threats that are the basis for its listing under the ESA: habitat loss, degradation, and fragmentation primarily caused by increased fire frequencies and the associated invasion of non-native plants; lack of sufficient gene flow between populations; and reduced viability of seed banks (USDI USFWS, 2015a). The

Service anticipates that the following factors will be important for survival and recovery of the species:

- Protection, restoration, and maintenance of suitable habitat conditions for all life stages of slickspot peppergrass;
- Reduction and mitigation of negative effects caused by increased fire frequencies and non-native invasive plants on slickspot peppergrass;
- Establishment of vegetation management goals and objectives that are compatible with slickspot peppergrass recovery;
- Identification of processes necessary to conserve genetic diversity and gene flow among populations of slickspot peppergrass; and monitoring to ensure that this diversity and gene flow are being maintained;
- Implementation of an adaptive management-based research and monitoring program that uses feedback from implemented, site-specific recovery tasks to implement and evaluate slickspot peppergrass recovery activities;
- Use of all available conservation programs and regulations to protect and conserve slickspot peppergrass and sagebrush-steppe habitats, including slickspot microsites; and
- Development of a management area-based recovery program that relies on adaptive management to implement and revise, as appropriate, recovery actions for slickspot peppergrass.

Threats Analysis

Wildfire and associated habitat modification are the primary threats to slickspot peppergrass (81 FR 55062-55066). Wildfire return intervals have accelerated from historic averages of 60 to 100 years to less than five years in the action area. Following fire, native sagebrush-steppe plant communities may become dominated by non-native invasive annual grasslands or, if seeded, perennial native and/or non-native perennial grasses, forbs, and shrubs.

The most common non-native invasive annual plant known to occur in slickspot peppergrass habitat in the action area is cheatgrass. Other species include clasping pepperweed, Russian thistle, tumble mustard, and bur buttercup (Colket, 2005). Some plant materials used commonly in the past can be invasive in slickspot peppergrass habitat, including forage kochia, intermediate wheatgrass, and crested wheatgrass. The 2015 Jarbidge RMP limits the use of these plant materials in slickspot peppergrass habitats.

The Owyhee harvester ant has been identified as a slickspot peppergrass seed predator. Harvester ants have become more common in areas where sagebrush has been removed by fire due to greater availability of nest sites and seed sources used for food (Robertson, 2011). Owyhee harvester ants remove mature, seed-bearing fruits and carry them to nests outside of slickspots. Harvester ants can remove up to 90 percent of slickspot peppergrass fruits and seeds, either directly from the plant or by scavenging seeds that drop to the ground. Seventy-five percent of slickspots with flowering slickspot peppergrass located within 66 feet of a harvester ant nest showed evidence of seed predation; research suggests that this is the maximum foraging distance for the Owyhee harvester ant (White and Robertson, 2009).

Additional threats that can exacerbate degraded habitat conditions resulting from wildfire and non-native invasive plants include residential and commercial development and agricultural conversions; livestock use; recreational activities such as off-road vehicle use; military training; factors associated with climate change; wildfire management, including ground disturbing activities such as establishment of fire lines; and post-wildfire rehabilitation treatments. The latter may use mechanical seedbed preparation and seeding methods that disturb the soil surface. These may injure or kill plants and disrupt the silt and clay layers in slickspots, resulting in habitat modification and seed burial too deep for germination. In addition, chemical herbicides can also result in damage or mortality of plants or seed (74 FR 52036-52042). These methods can also be used in vegetation treatments that do not follow wildfire, such as fuels reduction or vegetation restoration.

Chapter 4 – Description of the Action Area

The TFD manages approximately 3.9 million acres of public land in south-central Idaho. The District contains the Burley FO, Jarbidge FO, Shoshone FO, and BLM portions of Craters of the Moon National Monument (Craters). The counties (or portions of counties) occurring within the boundaries of the TFD are: Blaine, Butte, Camas, Cassia, Custer, Elmore, Gooding, Jerome, Lincoln, Minidoka, Oneida, Owyhee, Power, and Twin Falls counties, Idaho, and Elko County, Nevada.

The TFD can be described as having several north-south trending basins and mountain ranges, separated by broad valleys and vast agricultural lands. The Snake River, which is a major tributary to the Columbia River, flows through the center of the TFD.

There are a variety of natural landscapes within the field offices, differing in elevation and precipitation. Average elevations range from a low of about 3,000 feet on the Snake River to more than 9,000 feet on Blizzard Mountain, located northeast of Carey, Idaho. Average annual precipitation varies from 6 inches or less in the Raft River drainage and along the Snake River to 22 inches or more in higher elevation areas. Most of the precipitation falls during the winter and spring months. Mean temperatures vary from 15 degrees Fahrenheit in January to 94 degrees Fahrenheit in July. Temperature extremes of -50 degrees Fahrenheit to greater than 100 degrees Fahrenheit can occur for short periods.

Soils

Soils in the TFD are affected by several physical properties, including topography, and parent materials. The topography is characterized by rolling basalt and alluvial plains with slopes ranging from 1 to 12 percent. The following soil orders are found within the TFD: Aridisols, Mollisols, Entisols, Vertisols, Inceptisols, Alfisols, Andisols and Ultisols. The two most commonly occurring soil orders are Ardisols and Mollisols which are briefly described below.

1) Aridisols are semi-desert and desert soils. They tend to be coarse textured and are susceptible to wind erosion. Sandy and loamy soils, types of Aridisol soils, are susceptible to accelerated wind erosion when vegetation cover is removed. Sandy loam soils have a moderate to high wind erosion potential, but will usually not erode readily unless the surface is disturbed and the vegetation is sparse. Water erosion can occur on steeper slopes.
2) Mollisols are generally found in grasslands, shrub-steppe, mountain shrublands, and along riparian zones; within a wide range of precipitation zones. They are finer grained than Aridisols and are subject to water erosion and soil compaction when wet. The finer textured soils on steeper slopes have a moderate to high water erosion potential when disturbed. They are also subject to wind erosion when their surfaces are exposed.

Biological crusts have a significant influence on soil quality in the arid and semi-arid lands that comprise much of the TFD. Biological crusts consist of a variety of cyanobacteria, green algae, lichens, mosses, microfungi, and other bacteria. They positively affect the soil environment by reducing erosion (both wind and water), fixing atmospheric nitrogen, retaining soil moisture, and providing a living organic surface mulch (Belnap and Phillips, 2001). Annual invasive plant expansion and associated increased fire frequency reduces biological soil crust, which in turn affects cycling, water infiltration, and potential soil erosion.

Water Resources

The Snake River is the primary river within the TFD. The major tributaries to the Snake River include: Bruneau River, Big Wood River, Camas Creek, Clover Creek, Goose Creek, Jarbidge River, Little Wood River, Malad River, Raft River, and Salmon Falls Creek. Some of the TFD managed lands in these watersheds occur in Nevada (e.g., portions of the Bruneau and Jarbidge Rivers) and Utah (e.g., portions of the Raft River and Goose Creek).

Peak flows of the Snake River and its tributaries occur between mid-April and mid-June as a result of snowmelt and rainfall. Spring and early summer run off may be 20 to 50 times greater than base flows. During the summer, high intensity and widely dispersed thunderstorms produce sporadically high discharges of precipitation for short durations; however, overland flow and runoff are generally insufficient to sustain flows for an extended period of time. Base flows are maintained during the remainder of the year by ground water and spring discharges. Stream flows in the Snake River are managed by a series of dams within and upstream of the TFD.

The TFD contains a variety of stream types and floodplains, from very small spring-fed creeks to medium and large rivers. Streams and their floodplains occur in a wide variety of landscapes, from high elevation slow-moving headwater meadow reaches to mid- and low elevation fast-flowing basalt canyon reaches. Stream and river conditions vary from undisturbed river and vegetative communities in inaccessible rocky canyons to deep, erodible soil banks in the lower elevations. Other surface waters include shoreline and open water habitat on lakes, reservoirs, ponds, and natural groundwater fed springs. Playas are also present and provide a water source to livestock and wildlife during some times of the year. Playas collect water from small basins and have no external drainage. Playas typically lack water from late June to December.

Riparian areas and wetlands are generally associated with streams, rivers and springs/seeps and are broadly distributed across the TFD. Riparian areas provide cover and food for wildlife and fish as well as water quality benefits by filtering out nutrients from runoff, maintaining stream temperature by providing shade and controlling erosion. Wetlands are commonly associated with riparian areas but are also found in upland areas in association with springs and seeps. Wetlands associated with springs/seeps often provide surface and subsurface water to downslope streams and rivers.

Vegetation

Vegetation in the TFD is primarily classified as Semi-Desert Shrubland and Grassland with a small amount of Forest and Woodland occurring at the northern and southern extremes. These broad vegetation types are further divided into 14 sub-divisions, per BLM national vegetation classification standards (USDI BLM, 2013; Table 14). Vegetation mapping of plant communities is based on on-the-ground inventory, remote imagery with field verification, and vegetation treatment data. Plant communities were aggregated into sub-divisions and macrogroups. Table 14 is followed by a more detailed description of sub-divisions where vegetation is present; recent burn, sparse vegetation, agriculture, and developed sub-divisions are not included. Acreages of some vegetation types are dynamic and may vary year-to-year dependent on acres burned in wildland fire, vegetation treatments implemented, and rates of natural recovery and seeding establishment. Therefore, Table 14 shows general proportions for vegetation sub-divisions throughout the district.

Table 14 - Vegetation sub-divisions found in the TFD

Sub-Division	Description	BLM Acres	Percent of Total BLM Acres
Conifer	Conifers are the dominant life-form with ≥30% canopy cover. Shrubs, if present, are a minor component of the community with < 10% cover.	97,600	2
Deciduous Woodland	Deciduous tree species are the dominant life-form with ≥30% canopy cover and <25% conifer cover. Areas with conifer encroachment have with ≥25% and <30% conifer cover.	22,700	<1
Shrub/Tree Mix	Areas with ≥10% shrub cover and <30% tree cover.	11,000	<1
Shrub/Native Understory	Areas with ≥10% shrub overstory and dominant native herbaceous understory.	1,571,600	40
Shrub/Non-Native Perennial Understory	Areas with ≥10% shrub overstory and understory dominated by non-native perennial vegetation.	95,000	2
Shrub/Non-Native Annual Understory	Areas with ≥10% shrub overstory and an understory dominated by non-native annual vegetation.	1,600	<1
Native Perennial Grass	Areas with ≥50% cover of native perennial grass cover and <10% shrub cover. If the area is a seeding, may include non-native perennial grasses and forbs with cover of <50%.	774,300	20
Non-Native Perennial Grass	Areas with ≥50% cover of non-native perennial grass and <10% shrub cover. These seeded areas may have seeded or naturally-occurring native perennial grasses with cover of <50%.	428,300	11
Non-Native Annual	Areas with 50% cover of non-native annual vegetation.	468,700	12
Recent Burn	Areas are reviewed yearly following the disturbance event. Burned areas may be a result of wildfire or prescribed fire.	332,000	8

Sub-Division	Description	BLM Acres	Percent of Total BLM Acres
Sparse Vegetation	Areas with <10% vegetation cover. This sub-division includes sand dunes, canyon walls, rock outcrops, or other areas lacking vegetation through natural or man-caused means.	53,300	1
Agriculture	Land that has been converted to cropland and is dominated by agricultural species.	15,400	<1
Developed	Area converted by human development.	1,100	<1
No Data	Areas that have been modified from the potential native vegetation, but have not been mapped.	55,500	1
Totals		**3,928,100**	

The Conifer, Deciduous Woodland, Shrub/Tree Mix, Shrub/Non-Native Perennial Understory, and Shrub/Non-Native Annual Understory contribute to a low percentage of the overall acreages of vegetation sub-divisions. Although these communities provide potentially critical values and may receive vegetation treatments to enhance or modify the vegetation composition, the bulk of the vegetation treatments would occur in the sub-divisions that comprise nearly two-thirds of the landscape in the TFD. These main vegetation sub-divisions include Shrub/Native Understory, Shrub/Non-Native Perennial Understory, Shrub/Non-Native Annual Understory, Native Perennial Grass, Non-Native Perennial Grass, and Non-Native Annual.

Chapter 5 – Effects Analysis and Determinations

Effects of Herbicide Treatments Common to all ESA-listed and proposed species

This BA incorporates by reference the supplemental information on the effects of herbicide use on BLM lands from the Final BA for Vegetation Treatments on BLM Lands in 17 Western States (USDI BLM, 2007a) and the Final BA for Vegetation Treatments Using *Aminopyralid, Flourxypyr,* and *Rimsulfuron* on BLM Lands in 17 Western States (USDI BLM, 2015b). These BAs included Ecological Risk Assessments (ERAs) that summarized the ecological risks to both plants and animals from applications of the 20 approved herbicides identified for use on BLM lands. The ERAs were created by an interagency group that was established to identify uncertainties about effects of herbicides on listed species and to develop information for completing Endangered Species Act (ESA) consultations (USDI BLM, 2002; ID-2002-027). The purpose of this effort was to gather, in one place, the known information on direct and indirect effects, and in particular, sub-lethal effects, on ESA-listed and proposed species. These documents are intended to compile the best available information on the fate and transport for each of the herbicides approved for use on BLM land. The methodology used in creating the ERAs and their findings for each of the identified herbicides can be found in their entirety in Appendix C of the BA for the 2007 PEIS (USDI BLM, 2007a) and the BA for the 2016 PEIS (USDI BLM, 2015b; AECOM, 2014). The findings of the ERAs were fully considered in the development of the design features and conservation measures that will be applied to herbicide treatments in the TFD in habitats containing ESA-listed and proposed species.

All on-going and larger-scale noxious weed and invasive plant treatments would include design features and conservation measures to reduce or eliminate the potentially adverse direct and indirect effects to sensitive resources, including ESA-listed and proposed species (See Chapter 2). These measures were derived from land use plans, conservation plans and agreements, existing NEPA documents, and current ESA Section 7 consultations. The conservation measures from the RODs and BAs for the 2007 and 2016 PEISs are included, as appropriate (USDI BLM, 2007a; USDI BLM, 2007b; USDI BLM, 2015b; USDI BLM, 2016). Where multiple design features or conservation measures in different documents addressed the same resource, the most protective option would be applied to reduce the risk for direct or indirect effects to ESA-listed or proposed species or their habitats.

Effects of Use of Spray Adjuvants and Surfactants

Under the proposed action, spray adjuvants and surfactants would be used to improve the effectiveness of herbicide treatments. Examples of adjuvants include compatibility agents for mixing herbicides, drift retardants, suspension aids, and spray buffers to change the spray solution acidity. Surfactants are a type of adjuvant designed to improve the dispersing, emulsifying, absorbing, spreading, sticking and/or penetrating properties of the spray mixture. Herbicide effectiveness improves with the use of adjuvants and surfactants and reduces the need for increased amounts of active ingredient or additional treatments to control undesirable vegetation (USDI BLM, 2007a). The ERAs for the herbicides analyzed in the 2007 and 2016 PEISs included the use of adjuvants and surfactants and the results of the ERAs were incorporated into the BAs for the PEISs. The potential direct and indirect effects from using these agents were fully considered in the effects analysis of herbicide treatments for each of the ESA-listed and proposed species in this BA.

Effects of Accidental Spills

For all herbicide treatments, the potential exists for an accidental spill during the process of mixing herbicides or during the transport of herbicides to or within the treatment area. The ERAs from the BAs for the 2007 and 2016 PEISs assessed the potential risks to ESA-listed and proposed species from an accidental spill of terrestrial and aquatic herbicide formulations (USDI BLM, 2007a; USDI BLM, 2015b). The severity of the effects from an accidental spill would vary by treatment method, location, quantity and type of herbicide spilled, amount of plant material affected, timing of the spill, and distance from the occupied habitat. The proposed action includes species specific design features and conservation measures to reduce or eliminate the potential for direct or indirect effects from accidental spills. The potential direct and indirect effects from accidental spills were fully considered in the effects analysis of herbicide treatments for each of the ESA-listed and proposed species.

Effects of Surface Runoff of Herbicides:

The BAs for the 2007and 2016 PEISs (USDI BLM, 2007a; USDI BLM, 2015b) identified surface runoff of herbicides as a source of potential impact to ESA-listed and proposed species or habitats. The proposed action includes design features and conservation measures that would avoid the potential for herbicides to run-off the identified treatment area (e.g., no spray if precipitation is expected within 24 hours of treatment). In addition, herbicide application rates would be consistent with manufacture label requirements and would not exceed the identified maximum rate. The potential direct and indirect effects due to surface runoff were fully considered in affects analysis for herbicide treatments for each of the ESA-listed and proposed species.

Jarbidge River Bull Trout and Bull Trout Critical Habitat

Direct and Indirect Effects

This effects analysis focuses on noxious weed and invasive plant treatments within watersheds containing bull trout critical habitat. The assessment of potential effects to bull trout critical habitat includes an evaluation of the nine PBFs identified by the Service as important components of bull trout critical habitat (Table 6). Noxious weed and invasive plant treatments outside of bull trout occupied watersheds would result in no direct or indirect effects to bull trout and bull trout critical habitat. The use of design features and conservation measures were fully considered when determining if an action may affect or would have no effect to bull trout and bull trout critical habitat.

Noxious weeds and invasive plants can have substantial negative effects on stream channels and their associated riparian areas by displacing deep-rooted riparian vegetation which can alter aquatic habitats and natural ecosystem processes (e.g., reduced streambank stability, undercut banks, overhanging vegetation, pool depth and volume, detrital and nutrient inputs). Changes in hydric vegetation can also increase erosion which can cause fine sediment deposition, increased stream channel width, and altered thermal relationships (i.e., water temperature regimes) (USDI BLM, 2007a, pp. 5-58).

Actions Determined to Have No Effect

Several noxious weed and invasive plant treatment methods were determined to have no potential for short- or long-term, direct or indirect effects to bull trout or bull trout critical habitat. The no effect determination was reached because the treatment method would not be applied in occupied RCAs or the distance between the treatment and the occupied RCA was sufficient to avoid any potential for direct or indirect effects to bull trout or its habitat. The treatments determined to have no effect to bull trout or bull trout critical habitat and the rationale for the no effect determinations are provided in Appendix M.

Actions that May Affect Bull Trout and Bull Trout Critical Habitat

This analysis identifies the potential for on-going (small-scale) and larger-scale noxious weed and invasive plant treatments to have short- or long-term, direct or indirect effects to bull trout and bull trout critical habitat (PBFs 1 through 9). In general, the may affect determinations were made because the treatment methods had the potential for effects to bull trout individuals or to water quality or hydric vegetation in occupied RCAs.

All noxious weed and invasive plant treatments would be designed using the RCA widths from INFISH (USDA FS, 1995). The INFISH RCAs were recommended in INFISH (USDA FS, 1995) and the Interior Columbia Basin Science Assessment and literature review (Quigley & Arbelbide, 1997), which concluded these RCA widths are sufficient to protect streams from sediment due to non-channelized flow and provide for riparian function. These RCAs were officially adopted by the BLM in bull trout occupied watersheds (USDI BLM, 1995). INFISH acknowledges that actions may be needed within RCAs to improve riparian and instream conditions and meet recovery objectives for special status fish. Site-specific analysis allows for adjustments in the RCA widths to achieve aquatic resource objectives.

The potential direct and indirect effects for the “may affect” treatment methods and the rational for the determination are discussed below and summarized in Appendix M.

Effects of Manual Treatments

Treatments using manual methods can be applied in a manner that avoids actions that could result in direct or indirect effects to bull and bull trout critical habitat. Manual methods are the preferred treatment method in sensitive habitats such as riparian areas because they are not ground disturbing and the type and amount of vegetation removed is completely controllable. Manual treatments in mixed upland and riparian vegetation types within 300 feet of occupied streams but away from the waters’ edge can be applied in a manner that results in no direct or indirect effects to water quality (i.e., sediment, water temperature) or hydric vegetation due to work crews being present within occupied RCAs. Manual treatments within 15 feet of occupied streams pose the greatest risk for sediment-related effects to water quality. However, using manual methods allows for refinement of how treatments are applied so the potential for direct and indirect effects can be avoided or reduced to effects that are insignificant (not meaningfully measured, detected, or evaluated) and discountable (extremely unlikely to occur).

Some short-term localized soil disturbance would occur during the hand removal (i.e., pulling) of noxious weeds and invasive plants from the soil, but it would not be widespread or have a major effect on water quality in occupied RCAs. Due to the potential for localized, short-term effects to water quality that are insignificant and discountable, manual treatments may affect but are not likely to adversely affect bull trout and bull trout critical habitat. Manual treatments would reduce the potential for noxious weeds and invasive plants to invade or expand in occupied RCAs and displace the native hydric vegetation that is essential to maintain suitable habitat conditions for bull trout. Manual treatments would reduce the occurrence of noxious weeds and invasive plants in and adjacent to occupied RCAs which would benefit bull trout and bull trout critical habitat in the long-term.

Determination – Effects of Manual Treatments

Treatments using manual methods to remove noxious weeds and invasive plants from occupied RCAs *may affect, but are not likely to adversely affect, bull trout and bull trout critical habitat* (PBFs 1 through 6, and 8). These treatments have the potential for localized, short-term direct or indirect effects to water quality due to sediment from treatments within 15 feet of streams containing bull trout or bull trout critical habitat. Potential effects would be insignificant and discountable. Manual treatments to remove noxious weeds and invasive plants from occupied RCAs would maintain or improve PBFs 1 through 6, and 8 and therefore would have a *long-term beneficial effect to bull trout and bull trout critical habitat*. These treatments would reduce the potential for noxious weeds and invasive plants to invade or expand in occupied RCAs and displace the native hydric vegetation that is essential to maintain suitable habitat conditions for bull trout.

Effects of Biological Control Treatments

The use of biological controls is strictly controlled and permitted by the USDA APHIS following rigorous testing to ensure controls are host-specific (USDI BLM, 2007c). Based on this testing, biological controls are expected to be effective in reducing noxious weeds and invasive plants in and adjacent to bull trout occupied RCAs without having direct or indirect effects to native hydric vegetation or aquatic species. Use of biological controls would result in a gradual loss of noxious weeds and invasive plants, and therefore is not likely to have a measureable decrease in vegetative cover within occupied RCAs. Soil disturbance from workers releasing biological controls is not expected. The release of biological controls would not have measurable short-term direct or indirect effects to water quality or hydric vegetation in occupied RCAs. Therefore, effects are insignificant and discountable. In the long-term, beneficial effects to bull trout and critical habitat (PBFs 3 and 4) are expected as noxious weeds and invasive plants are reduced in and adjacent to occupied RCAs over time.

Determination – Effects of Biological Control Treatments

Treatments using biological controls to reduce or eliminate noxious weeds and invasive plants in and adjacent to occupied RCAs *may affect, but are not likely to adversely bull trout and bull trout critical habitat* (PBFs 3 and 4). Short-term direct or indirect effects to hydric vegetation or water quality due to sediment are not expected from releasing biological controls in occupied RCAs. Any potential effects related to treatments using biological controls would be insignificant and discountable. These treatments would have a *long-term beneficial effect to bull* *trout and bull trout critical habitat* (PBFs 3 and 4) because they would reduce the potential for noxious weed and invasive plants to invade RCAs and alter habitat conditions for bull trout and for bull trout critical habitat.

<u>*Effects of Herbicide Treatments*</u>

The proposed action allows for using the 20 herbicide active ingredients approved for use on public lands by the RODs for the 2007 and 2016 PEISs (USDI BLM, 2007b; USDI BLM, 2016). A list of the chemicals approved for use on BLM land is provided in Appendix C and the application criteria are in Appendix D. Herbicide treatments would include both aerial and ground-based methods. Ground-based methods would include spraying from all-terrain vehicles (e.g., ATV, UTV, truck, or tractor) or on foot (e.g., backpack or horse). Aerial methods from a helicopter or fixed wing aircraft would be used for larger-scale treatments and would include use restrictions for some herbicides (i.e., no aerial application of *bromacil, chlorsulfuron, diquat, diuron, metsulfuron methyl*) or area restrictions for sensitive resources. Aerial treatments are restricted within (i.e., no aerial herbicide treatments within 300 feet of the canyon rim for the Bruneau River or Jarbidge River and its tributaries. This restrictive buffer expands to 0.5 mile from the Bruneau River in the Bruneau hot springsnail Recovery Area, which overlaps the bull trout critical habitat (see Figure 5). Additional conservation measures are identified in the proposed action (Chapter 2).

The proposed action does not allow for broadcast spraying of terrestrial herbicide formulations in areas with hydric vegetation (i.e., *aminopyralid, bromacil, chlorsulfuron, clopyralid, dicamba, diflufenzopyr+dicamba (Overdrive®), diuron* (with additional restrictions for listed species), *fluroxypyr, hexazinone, imazapic, metsulfuron methyl, picloram, rimsulfuron, tebuthiuron*) within RCAs containing bull trout and bull trout critical habitat. These upland herbicides can be used for spot treatments (manual methods) in upland vegetation types within RCAs, but cannot be used within 15 feet of areas with hydric vegetation (Figure 3). On-going, small-scale treatments would be used on a limited basis to control or eradicate existing or new infestations in upland vegetation types in RCAs. For example, *chlorsulfuron* or *metsulfuron methyl* could be used to spot treat individual plants of a white top infestation because it is the most effective herbicide to control or eradicate the infestation.

The herbicides that could be used in occupied RCAs in areas with riparian vegetation include the aquatic formulations of *2,4-D, diquat, fluridone, glyphosate, imazapyr,* and *triclopyr*. Additional information on these herbicides approved for riparian use can be found in Appendix D. *Diquat* and *fluridone* would only be used in closed water systems not connected to RCAs containing bull trout or bull trout critical habitat. Because these herbicides would not be used in or adjacent to occupied waters, no potential for direct effects to bull trout or critical habitat (PBFs 1 through 9) are identified.

The effects analysis below focuses on the potential direct and indirect effects from ground-based and aerial herbicide treatments using upland and riparian herbicides in or adjacent to RCAs containing bull trout critical habitat. Ground-based and aerial herbicide treatments consistent with the design features and conservation measures would be effective in reducing or removing noxious weeds and invasive plants from areas in and adjacent to occupied RCAs. Actions to control or eliminate noxious weeds and invasive plants from adjacent upland areas would reduce the risk for the noxious and invasive plants to invade occupied RCAs and alter suitable habitat conditions for bull trout. This would result in a beneficial effect to bull trout and bull trout critical habitat (PBFs 1 through 6, and 8) in the long-term.

Herbicide treatments in upland vegetation types that are outside of (not adjacent to) occupied RCAs would have no direct or indirect effects to bull trout or bull trout critical habitat.

Effects Common to all Ground-based Herbicide Treatments

Ground-based herbicide treatments would occur in and adjacent to RCAs containing bull trout or bull trout critical habitat and would include measures to improve riparian conditions to meet the recovery objectives for ESA-listed aquatic species. Design features and conservation measures (e.g., no mixing of herbicides or fueling in occupied RCAs, limitations on herbicide use and treatment methods in RCAs, etc.), would be applied to all on-going (small-scale) and larger-scale herbicide treatments to minimize the potential for direct or indirect effects to bull trout and bull trout critical habitat to the extent possible. However, the potential exists for some treatments to result in localized, short-term direct or indirect effects to bull trout or bull trout critical habitat where treatments occur in or adjacent to occupied RCAs.

Herbicide treatments in or adjacent to occupied RCAs could potentially result in direct adverse effects to bull trout individuals if they were to come into contact with herbicide contaminated water. The mechanisms by which herbicides could enter aquatic habitats include direct spray (accidental), off-site drift, surface run-off of herbicides sprayed in uplands adjacent to aquatic habitats, or as a result of an accidental herbicide spill before, during, or after the treatment. The potential risks to aquatic species from the direct contact with the herbicides approved for BLM use were assessed in ERAs (USDI BLM, 2007a; USDI BLM, 2015b). The ERAs determined if aquatic species were to come into contact with herbicide contaminated water, there would be the potential for sub-lethal effects such as altered behavior, stunted growth, reduced reproductive success, and physiological changes that make the organism more susceptible to environmental stresses (USDI BLM, 2007a, pp. 5-63). Additionally, depending on how they are applied, herbicides could result in a localized reduction in riparian (hydric) vegetation, which would have the potential to alter habitats used by bull trout.

With the inclusion of design features and conservation measures (Chapter 2), prevention measures (Appendix B), herbicide application criteria (Appendix D), and SOPs (Appendix E), on-going (small-scale) and larger-scale noxious weed and invasive plant treatments within occupied RCAs would have a low potential for direct effects to individual bull trout. Direct or indirect effects to bull trout individuals for herbicide treatments using a low boom sprayer method are expected to be insignificant and discountable because treatments would not occur within 50 feet of occupied habitats. Herbicide treatments using hand methods have would pose the greatest risk for direct effects to bull trout individuals because treatments could occur within 15 feet of occupied waters. However, with the limitations on the herbicides available for use in occupied RCAs (i.e., limited use of upland herbicides in upland vegetation types and use of riparian herbicides in areas with hydric vegetation) and the restrictions on treatment method (i.e., spot treatments, hand methods), the potential for direct herbicide contact to individual bull trout is extremely unlikely to occur and therefore is discountable. In addition, the timing of treatments can be adjusted at the project level to avoid habitats when bull trout are likely to be present within a given stream reach. For example, treatments could be applied in the Jarbidge or Bruneau river canyons during the summer when bull trout are in the upper tributaries where water temperature are more suitable for rearing and spawning (Appendix G). Although the potential for herbicides to accidently enter surface waters when bull trout are present will be reduced to the extent possible, all potential for short-term localized, indirect affects to bull trout critical habitat cannot be completely discounted where treatments occur within 15 feet of bull trout occupied streams. Overall, herbicide treatments may affect, but are not likely to adversely affect individual bull trout because potential effects to bull trout critical habitat are insignificant, but may not be completely discountable.

Herbicides that unintentionally come into contact with hydric vegetation may indirectly affect bull trout critical habitat by reducing or removing woody or herbaceous hydric plants in occupied RCAs. The potential short- and long-term effects of reducing or removing hydric vegetation from these habitats, some of which may provide necessary habitat components for aquatic species, include loss of overhead cover, streamside shading, and a source of nutrients that support the aquatic food base. These effects are likely to be localized in scale, but could be short- or long-term depending on the type and quantity of herbicide coming into contact with hydric vegetation (USDI BLM, 2007a; pg. 5-58, 5-64). However, the limitations on treatment method and herbicide use would reduce the potential for effects to hydric vegetation to the extent possible. Potential effects to bull trout critical habitat (PBF 1 through 6, and 8) due to accidental herbicide effects to hydric vegetation are likely to be insignificant but not completely discountable because treatments could occur within 15 feet of occupied streams.

The proposed action allows the use of terrestrial (upland) herbicide formulations in upland vegetation types in RCAs containing bull trout or bull trout critical habitat. These herbicides can be applied as spot treatments using hand methods and direct application only (no broadcast spraying), but cannot be used within 15 feet of hydric vegetation. With the design features and conservation measures for RCAs, the potential indirect effects to hydric vegetation from these on-going spot treatments would occur at the transition zone between upland and hydric vegetation. Potential effects would be due to herbicide drift and are likely to be insignificant and discountable. Therefore, treatments using upland herbicides in and adjacent to occupied RCAs may affect, but are not likely to adversely affect bull trout and bull trout critical habitat (PBFs 1 through 6, and 8). No direct or indirect effects to bull trout or bull trout critical habitat would occur from applying these herbicides in upland vegetation types outside of (not adjacent to) bull trout occupied RCAs.

Effects of Herbicide Treatments using Low Boom Methods

Riparian herbicides could be applied using a low boom sprayer mounted on an ATV or UTV in upland vegetation types from 100 to 50 feet from hydric vegetation in occupied RCAs. Treatments using a low boom sprayer have a low potential for herbicide drift onto hydric vegetation because of the low boom height on the sprayer (20 inches and below). Applying the conservation measures (i.e., weather conditions, herbicide use and handling) would reduce the potential for short-term direct or indirect effects to hydric vegetation and surface water to the extent possible. Because treatments may occur up to 50 feet from occupied waters, the potential for localized, short-term direct or indirect effects to hydric vegetation and water quality cannot be completely discounted, but will likely be insignificant. Therefore, treatments using low boom methods within occupied RCAs may affect, but are not likely to adversely affect bull trout and bull trout critical habitat (PBFs 1 through 6, and 8).

Effects of Herbicide Treatments using Hand Methods

Riparian herbicides could be applied in occupied RCAs using hand methods which include spot spraying of individual plants using a backpack sprayer or ATV/UTV mounted spray equipment 50 to 15 feet of occupied waters. These treatments pose an increased risk for direct or indirect effects to bull trout and its critical habitat due to accidental direct chemical exposure or due to herbicide drift. Because hand methods are highly controllable, the potential for herbicides to come in direct contact with occupied water is low. Applying the conservation measures (i.e., wind velocity, herbicide use and handling) would reduce the potential for short-term direct and indirect effects to hydric vegetation and surface water in bull trout occupied streams to the extent possible and will likely be insignificant. Because localized, short-term direct or indirect effects to hydric vegetation and water quality cannot be completely discounted, treatments using hand methods from 50 to 15 feet from occupied waters may affect, but are not likely to adversely affect bull trout and bull trout critical habitat (PBFs 1 through 6, and 8).

Treatments using riparian herbicides from 15 feet up to the water's edge would pose the most risk for direct exposure of herbicides to bull trout and bull trout critical habitat. To reduce the potential for adverse effects due to accidental direct spray or off-site drift, treatments would be limited to spot treatments using hand methods only (i.e., spot spraying or wicking, wiping, dipping, painting, or injecting) of only herbicide formulations approved for aquatic use (riparian herbicides) with no adjuvants or surfactants. In bull trout occupied watersheds, spot spraying of herbicides on individual plants could occur within 15 feet of the water's edge. Because treatments may occur up to the water's edge, the potential for localized, short-term direct or indirect effects to hydric vegetation and water quality due to accidental direct exposure or herbicide drift cannot be completely discounted. Therefore, treatments using hand methods within 15 feet of occupied waters may affect, but are not likely to adversely affect bull trout and bull trout critical habitat (PBFs 1 through 6, and 8).

Herbicide treatments using hand methods (i.e., spot spray, wicking, wiping, dipping, painting, or injecting) in upland vegetation types more than 50 feet from hydric vegetation in occupied RCAs would have no direct or indirect effects to bull trout or bull trout critical habitat. This distance is sufficient to prevent direct or indirect herbicide exposure of surface waters or hydric vegetation in the occupied RCAs.

Determination – Effects of Ground-Based Herbicide Treatments

Ground-based herbicide treatments to reduce or eliminate noxious weeds and invasive plants in and adjacent to occupied RCAs *may affect, but are not likely to adversely affect bull trout and bull trout critical habitat* (PBFs 1 through 6, and 8). Herbicide treatments have the potential for localized, short-term direct and indirect effects to bull trout or bull trout critical habitat from direct accidental exposure or herbicide drift into areas with hydric vegetation or surface water. The design features and conservation measures would reduce the potential for effects to insignificant, but all potential effects may not be discountable. Ground-based herbicide treatments would have a *long-term beneficial effect to bull trout and bull trout critical habitat* (PBFs 1 through 6, and 8) by reducing the potential for noxious weeds and invasive plants to invade or expand in occupied RCAs and alter habitat conditions suitable for bull trout and bull trout critical habitat.

Effects from Herbicide Treatments using Aerial Methods

Herbicide treatment using aerial methods (e.g., helicopter or fixed-wing aircraft) would be used to reduce or eliminate noxious weeds and invasive plants across broad areas where other treatments methods would be impractical. Consistent with the RODs for the 2007 and 2016 PEISs, *bromacil, chlorsulfuron, diquat, diuron*, or *metsulfuron methyl* would not be applied using aerial methods. Except for these herbicides, aerial methods could be used to apply the other upland herbicides approved for BLM use.

To reduce the potential for direct or indirect effects to bull trout and bull trout critical habitat, herbicide treatments using aerial methods would not be used within 300 feet of the canyon rim for the Jarbidge River and its tributaries (i.e., East Fork Jarbidge River, Dave Creek, West Fork Jarbidge River, Buck Creek, Deer Creek, Jack Creek) and the Bruneau River except in the Bruneau hot springsnail Recovery Area which has a 0.5 mile no treatment buffer. The standard RCAs would be applied to herbicide treatments using aerial methods in the tributaries to the Jarbidge River that do not contain bull trout or bull trout critical habitat (e.g., Cougar, Dorsey, Columbet, Poison, or Clover creeks). Conservation measures for weather conditions (i.e., wind speed, precipitation), herbicide use and handling, and SOPs (Appendix E) would be applied to aerial herbicide treatments.

Herbicide treatments using aerial methods adjacent to the canyon rim for the Jarbidge and Bruneau Rivers have the potential for indirect effects to hydric vegetation or surface water in RCAs containing bull trout or bull trout critical habitat. Any potential direct or indirect effects would be due to aerial drift from treatments more than 300 feet from the canyon rim. This buffer, combined with the added distance of the talus slope between the canyon rim and the Jarbidge and Bruneau River RCAs (GIS estimate of 780 to 1,400 feet) is sufficient to avoid direct effect to bull trout individuals and bull trout critical habitat. There is the potential for aerial treatments to have localized, short-term indirect effects to water quality or hydric vegetation within the occupied RCAs due to herbicide drift. However, with the 300 foot buffer combined with the added distance between the canyon rim and talus slope, any potential indirect effects to hydric vegetation or water quality would be insignificant and discountable. Because there is the remote potential for herbicides to drift into the Bruneau or Jarbidge river canyons, herbicide treatments using aerial methods may affect, but are not likely to adversely affect bull trout and bull trout critical habitat.

Herbicide treatments using aerial methods in the tributaries to the Jarbidge or Bruneau rivers would be applied using the standard RCA widths and conservation measures for RCAs and special status aquatic species. None of these tributaries contain bull trout or bull trout critical habitat, but are tributaries to bull trout critical habitat. Any potential effects to bull trout occupied streams from treatments using aerial methods in these tributaries would be indirect effects to hydric vegetation or water quality due to herbicide drift. Given the distance between the treatment areas and the occupied RCAs, combined with conservation measures for weather conditions (i.e., wind speed, precipitation), herbicide use and handling, and SOPs (Appendix E), the potential indirect effects to bull trout and bull trout critical habitat would be insignificant and discountable. Therefore, herbicide treatments using aerial methods may affect, but are not likely to adversely affect bull trout and bull trout critical habitat.

Determination – Effects of Aerial Herbicide Treatments

Herbicide treatments using aerial methods to reduce or eliminate noxious weeds and invasive plants in and adjacent to occupied RCAs *may affect, but are not likely to adversely affect bull trout and bull trout critical habitat* (PBFs 1 through 6, and 8). Aerial treatments have the potential for localized, short-term indirect effects to bull trout and bull trout critical habitat from accidental exposure due to herbicide drift into areas with hydric vegetation or surface water. The design features and conservation measures would reduce the potential for effects to insignificant and discountable. Herbicide treatments using aerial methods would have a *long-term beneficial effect to bull trout and bull trout critical habitat* (PBFs 1 through 6, and 8) by reducing the potential for noxious weed and invasive plants to invade or expand in occupied RCAs and alter habitat conditions suitable for bull trout and bull trout critical habitat.

Effects of Re-vegetation Treatments

In occupied RCAs, re-vegetation treatments using manual methods would be used to improve or restore native hydric vegetation where noxious weeds and invasive plants have reduced hydric plant diversity or abundance. Mechanical methods would not be used to restore hydric vegetation in RCAs. Re-vegetation treatments in RCAs would be designed to restore woody (e.g., willows, aspen, alder, dogwood) and herbaceous (e.g., sedges, carex, or rushes) hydric vegetation through seedings or seedling plantings. Avoidance measures would be used during re-vegetation treatments to reduce the potential for effects to bull trout and bull trout critical habitat due to sediment, alteration of streambanks or streamside vegetation, or inadvertent trampling of instream habitats (e.g., pools, pool tailouts). Re-vegetation treatments may also occur in wetland areas or springs that provide surface or groundwater to bull trout critical habitat (PBF 1). Where the Bruneau hot springsnail Recovery Area overlaps bull trout critical habitat, conservation measures designed to avoid adverse effects to Bruneau hot springsnail would also protect bull trout critical habitat. Seedings and seedling plantings using manual methods outside of occupied RCAs would have no effect to bull trout or bull trout critical habitat.

Seedings of hydric plants would be conducted from the streambank using manual methods which are not ground disturbing and therefore can be implemented in a manner that results in no short-term direct or indirect effects to water quality or hydric vegetation occupied RCAs. Over time, the result of these localized treatments would be an increase in the diversity and/or abundance of hydric vegetation within the treatment area which would benefit bull trout and bull trout critical habitat (PBFs 1 through 6, and 8) in the long-term.

Re-vegetation treatments to plant seedlings of hydric vegetation would consist of using tools such as planting bars and power augers to dig a hole at the desired planting location. The disturbance associated with hand planting consists of the area within a two to six-inch radius of the desired planting site and would occur within the zone of water influence (surface or groundwater) between the outer edge of the stream channel to the outer edge of the hydric vegetation (Figure 3). Seedling plantings in areas more than 15 feet from the stream channel (i.e., streambank) would result in no short-term direct or indirect effects to water quality due to sediment entering an occupied stream. Seedling plantings within 15 feet of the stream channel (along the streambank) would have some potential for impacts to water quality due to sediment. The risk for impacts would be localized, short-term and primarily limited to the time during actual plantings. The use of manual methods would allow for refinement of how re-vegetation treatments are applied and would reduce the potential for short-term direct and indirect effects to insignificant and discountable. Therefore, re-vegetation treatments (seedling plantings) using manual methods in occupied RCAs may affect, but are not likely to adversely affect bull trout and bull trout critical habitat (PBFs 1 through 6, and 8).

Re-vegetation treatments in occupied RCAs would have beneficial effects to bull trout and bull trout critical habitat in the long-term (PBF 1 through 6, and 8). The benefits for planting of woody species would be related to increases in streamside shading (thermal insulation), reduced water temperatures, and restored woody debris and nutrient contributions to the stream channel. The benefits from seedings or plantings of herbaceous hydric species would be related to streambank stabilization and floodplain function (i.e., dissipate energy and fine deposition during high flow events), and narrowing of the stream channel, which improves instream and riparian conditions in occupied RCAs.

Determination – Effects of Re-Vegetation Treatments

Re-vegetation treatments (seedings and plantings) using manual methods in occupied RCAs *may affect, but are not likely to adversely affect bull trout and bull trout critical habitat* (PBFs 1 through 6, and 8) in the short-term. Seedings of hydric plants can be implemented in a manner that results in no short-term direct or indirect effects to water quality of hydric vegetation occupied RCAs. Seedling plantings within 15 feet of the stream channel (along the streambank) would have some potential for impacts to water quality due to sediment that are insignificant and discountable. Re-vegetation treatments in occupied RCAs would have a *beneficial effect to bull trout and bull trout critical habitat in the long-term* (PBFs 1-6, 8) as woody and herbaceous hydric vegetation recovers over-time.

Bull Trout Critical Habitat

The assessment of potential effects of noxious weed and invasive plant treatments on bull trout critical habitat includes an evaluation of the nine PBFs identified by the Service as important components of bull trout critical habitat (Table 15). A description of the nine PBFs and the potential for short-term direct or indirect effects from noxious weed and invasive plant treatments are summarized below. The potential for treatments to maintain, improve, or degrade each of the nine PBFs is also identified. Overall, on-going small-scale and larger-scale noxious weed and invasive plant treatments would maintain or improve seven of the nine PBFs for bull trout critical habitat in the long-term. PBFs seven and nine would not be affected by the on-going (small-scale) and larger-scale noxious weed and invasive plant treatments.

Table 15 - Direct and Indirect Effects to Bull Trout Critical Habitat PBFs from Noxious Weed and Invasive Plant Treatments

PBF #	**PBFs**	**Direct and Indirect Effects to PBFs (Maintain, Improve, or Degrade)**
1	Springs, seeps, groundwater sources, and subsurface water connectivity (hyporheic flows)	Treatments in seeps and springs in occupied RCAs may have localized, short-term indirect effects to water quality due to sediment or accidental chemical exposure that are

PBF #	PBFs	Direct and Indirect Effects to PBFs (Maintain, Improve, or Degrade)
	to contribute to water quality and quantity and provide thermal refugia.	insignificant but may or may not be discountable. Treatments would maintain surface and subsurface water connectivity and thermal refugia in occupied RCAs in the short and long-term. PBF 1 would be maintained in the long-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.	Treatments in migration habitats may have localized, short-term direct or indirect effects to water quality due to sediment or accidental chemical exposure that are insignificant but may or may not be discountable. Treatments would maintain inland migration and foraging habitats in the short and long-term. Treatments would reduce noxious and invasive plants in and adjacent to occupied RCAs and benefit bull trout critical habitat in the long-term. PBF 2 would be maintained or improved in the long-term.
3	An abundant food base, including terrestrial organisms of riparian origin, aquatic macroinvertebrates, and forage fish.	Except for biological controls, treatments in occupied RCAs may have localized, short-term effects to the food base due to sediment (aquatic organisms) or accidental chemical exposure of hydric vegetation (terrestrial organisms) that are insignificant but may or may not be discountable. All treatments would reduce noxious and invasive plants in and adjacent to occupied RCAs and benefit bull trout critical habitat in the long-term. PBF 3 would be maintained or improved in the long-term.
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.	Except for biological controls, treatments in occupied RCAs may have localized, short-term direct or indirect effects to water quality due to sediment or hydric vegetation due to accidental chemical exposure (direct exposure or herbicide drift) that are insignificant but may or may not be discountable. Habitat complexity or structure would be maintained in the short and long-term. All treatments would reduce noxious and invasive plants in and adjacent to occupied RCAs and benefit bull trout critical habitat in the long-term.

PBF #	PBFs	Direct and Indirect Effects to PBFs (Maintain, Improve, or Degrade)
		PBF 4 would be maintained or improved in the long-term.
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.	Treatments in occupied RCAs may have localized, short-term effects to hydric vegetation due to accidental chemical exposure (direct exposure or herbicide drift) that are insignificant but may or may not be discountable. Potential effects to hydric vegetation would not alter streamside shading or thermal regimes in bull trout critical habitat. Treatments would reduce noxious and invasive plants in and adjacent to occupied RCAs and benefit bull trout critical habitat in the long-term. PBF 5 would be maintained or improved in the long-term.
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.	Treatments in occupied RCAs may have localized, short-term direct or indirect effects to water quality due to sediment that are insignificant but may or may not be discountable. Particle size of spawning or rearing substrates would be maintained in the short and long-term. Treatments would reduce noxious and invasive plants in and adjacent to occupied RCAs and benefit bull trout critical habitat in the long-term. PBF 6 would be maintained or improved in the long-term.
7	A natural hydrograph, including peak, high, low, and base flows within historic and seasonal ranges or, if flows are controlled, minimal flow departure from a natural hydrograph.	Treatments would have no direct or indirect effects to the natural hydrograph in the short and long-term. PBF 7 would be maintained or improved in the short-term and long-term.
8	Sufficient water quality and quantity such that normal reproduction, growth, and survival are not inhibited.	Treatments in occupied RCAs would not result in consumptive water uses and would maintain water quantity in the short and long-term. Treatments may have localized, short-term direct or indirect effects to water quality due to sediment or accidental chemical exposure that are insignificant but may or may not be discountable. Normal reproduction, growth, and survival would be maintained in the short and long-term. Treatments would reduce noxious and invasive plants in and adjacent to occupied

PBF #	PBFs	Direct and Indirect Effects to PBFs (Maintain, Improve, or Degrade)
		RCAs and benefit bull trout critical habitat in the long-term. PBF 8 would be maintained or improved in the long-term.
9	Sufficiently low levels of occurrence of non-native predatory (e.g., lake trout, walleye, northern pike, smallmouth bass); interbreeding (e.g., brook trout); or competing (e.g., brown trout) species that, if present, are adequately temporally and spatially isolated from bull trout.	Treatments would have no short- or long-term direct or indirect effects to fish assemblages in streams with bull trout critical habitat. PBF 9 would be maintained in the short-term and long-term.

Interrelated and Interdependent Effects

Interrelated and interdependent actions include those activities that would not occur if not for the proposed action. No interrelated or interdependent effects to bull trout or bull trout critical habitat have been identified for the proposed action.

Cumulative Effects

The implementing regulations for Section 7 of the ESA define cumulative effects to include those effects of future state, tribal, local, or private actions that are reasonably certain to occur in the action area. The cumulative effects assessment considered the potential for effects to bull trout and bull trout critical habitat from on-going and predicted future uses and activities on state and private lands within the Jarbidge and Bruneau river watersheds.

The state and private land uses in watersheds containing bull trout and bull trout critical habitat include livestock grazing and associated infrastructure, diversion or impoundment of surface water for livestock or cropland production, consumptive and non-consumptive water uses, the use and storage of chemicals (e.g., herbicides, pesticides, petroleum based products), wildfire suppression, maintenance and use of private land infrastructure (e.g., fences, roads, diversions for irrigation and related equipment), motorized use on roads, energy development projects (i.e., geothermal, wind and associated infrastructure), and various other human related uses and activities. Other on-going actions on non-federal land that may affect the species or its habitat include hydroelectric development where the Bruneau River historically flowed into the Snake River. All of these activities have influenced water quality and riparian condition within the Bruneau and Jarbidge River watersheds and are expected to continue to do so into the future.

The analysis of direct or indirect effects discloses the potential effects of noxious weed and invasive plant treatments on bull trout and bull trout critical habitat incorporates design features, conservation measures, and SOPs to reduce the potential for effects. These measures are not likely to be applied on private land and therefore may have a greater effect to the listed species and its habitat than would occur on the Federal land. In addition, herbicide treatments on private lands are not limited to 20 herbicides that can be used on the Federal land. A lack of noxious weed and invasive plant treatments on state and private lands would increase the influx of these plants on Federal lands, increasing the necessity and frequency of treatments on the Federal land.

Bruneau Hot Springsnail

Direct and Indirect Effects

This effects analysis focuses on noxious weed and invasive plant treatments within the Bruneau hot springsnail Recovery Area. Treatments that occur outside of the Recovery Area would have no direct or indirect effects to Bruneau hot springsnail or its habitat. The use of design features and conservation measures were fully considered when determining if an action may affect or would have no effect on Bruneau hot springsnail or its habitat.

Actions Determined to Have No Effect

Several noxious weed and invasive plant treatment methods were determined to have no potential for short- or long-term, direct or indirect effects to Bruneau hot springsnail and its habitat. The no effect determination was reached because the treatment method would not be applied in occupied RCAs or the distance between the treatment and the occupied RCA was sufficient to avoid any potential for direct or indirect effects. The treatments determined to have no effect to Bruneau hot springsnail or its habitat and the rational for the no effect determination is provided in Appendix M.

Actions That May Affect Bruneau Hot Springsnail and Its Habitat

This analysis identifies the potential for on-going (small-scale) and larger-scale noxious weed and invasive plant treatments to have short- or long-term, direct or indirect effects to Bruneau hot springsnail and its habitat. In general, the may affect determinations were made because the treatment methods had the potential for effects to Bruneau hot springsnail individuals or to water quality or hydric vegetation in occupied RCAs. All noxious weed and invasive plant treatments within the Bruneau hot springsnail Recovery Area would be designed using the INFISH RCA widths as described above in the effects analysis for *Bull Trout and Bull Trout Critical Habitat*.

The potential direct and indirect effects for “may affect” treatment methods and the rationale for those determinations are discussed below and summarized in Appendix M.

Effects of Manual Treatments

Treatments using manual methods would have a similar potential for direct and indirect effects to Bruneau hot springsnail and its habitat as described for *Bull Trout and Bull Trout Critical Habitat*. Where these treatments are applied, the potential direct and indirect effects would be to water quality due to sediment or to hydric vegetation due to work crews being present in the RCA. Direct effects to Bruneau hot springsnail individuals would not occur because work crews would not be walking in occupied geothermal springs. Treatments to physically remove invasive hydric vegetation within the stream channel are beyond the scope of the proposed action and would not be conducted in Bruneau hot springsnail habitat.

Manual treatments within 15 feet of geothermal springs pose the greatest risk for sediment related effects to water quality. However, using manual methods allows for refinement of how treatments are applied so the potential for direct and indirect effects to water quality in geothermal springs can be avoided or reduced to effects that are insignificant and discountable. Due to the potential for localized, short-term effects to water quality that are insignificant and discountable, manual treatments may affect but are not likely to adversely affect Bruneau hot springsnail and its habitat. Manual treatments would reduce the occurrence of noxious weeds and invasive plants in and adjacent to occupied geothermal springs which would benefit Bruneau hot springsnail and its habitat in the long-term.

Determination – Effects of Manual Treatments

Treatments using manual methods to remove noxious weeds and invasive plants from RCAs containing occupied geothermal springs *may affect, but are not likely to adversely affect Bruneau hot springsnail and its habitat*. This determination is based on the potential for localized, short-term direct or indirect effects to water quality due to sediment from treatments within 15 feet of occupied geothermal springs. Potential effects would be insignificant and discountable. Treatments using manual methods would have a *beneficial effect to Bruneau hot springsnail and its habitat* in the long-term by removing noxious weeds and invasive plants from occupied RCAs. Manual treatments would reduce the potential for noxious weeds and invasive plants to invade RCAs with occupied geothermal springs and alter habitat conditions that meet the habitat requirements of Bruneau hot springsnail.

Effects of Biological Control Treatments

The potential direct, indirect, and beneficial effects to Bruneau hot springsnail and its habitat from using biological controls are similar to those described above for *Bull Trout and Bull Trout Critical Habitat*. Use of biological controls would result in a gradual loss of noxious weeds and invasive plants and therefore is not likely to have a measureable decrease in vegetative cover within occupied RCAs. Soil disturbance from workers releasing biological controls is not expected. The release of biological controls would not have measurable short-term direct or indirect effect to water quality or hydric vegetation in occupied RCAs and therefore are insignificant. In the long-term, beneficial effects to Bruneau hot springsnail and its habitat are expected as noxious weeds and invasive plants are reduced in and adjacent to occupied RCAs over time.

There are four biological controls that could be used in the Bruneau hot springsnail Recovery Area that are proven to be effective in controlling hydrilla (*Hydrilla verticillata*) (Table 2). This highly invasive aquatic plant is known to be present in the Bruneau River near the lower boundary of the Bruneau hot springsnail Recovery Area. Hydrilla forms dense mats of vegetation that would pose a risk to Bruneau hot springsnail if it were to invade occupied geothermal springs. The use of biological controls targeting hydrilla, as well as other invasive plants (e.g., saltcedar Russian olive), would reduce the potential for these species to invade occupied geothermal springs or alter the existing suitable habitat conditions for Bruneau hot springsnail. This would have a beneficial effect to Bruneau hot springsnail and its habitat in the long-term.

Determination – Effects of Biological Control Treatments

Treatments using biological controls to reduce or eliminate noxious weeds and invasive plants in and adjacent to occupied RCAs *may affect, but are not likely to adversely affect Bruneau hot springsnail and its habitat*. Short-term direct or indirect effects to hydric vegetation or water quality due to sediment are not expected from these treatments. Any potential effects related to treatments using biological controls would be insignificant. These treatments would have a *long-term beneficial effect* to Bruneau hot springsnail and its habitat because they would reduce the potential for noxious weed and invasive plants to invade occupied geothermal springs and alter habitat conditions for Bruneau hot springsnail.

<u>*Effects of Herbicide Treatments*</u>

Herbicide treatments within the Bruneau hot springsnail Recovery Area would use the same herbicides and similar treatment methods as described for *Bull Trout and Bull Trout Critical Habitat.* Conservation measures specific to Bruneau hot springsnail would be applied to herbicide treatments within the Bruneau hot springsnail Recovery Area (e.g., no spraying of herbicides within 15 feet of geothermal springs (manual treatment methods and aquatic approved herbicides only); aerial herbicide treatments would not occur within 0.5 mile of the Bruneau River within the Recovery Area). Additional conservation measures are identified in the proposed action (Chapter 2).

The proposed action does not allow for broadcast spraying of terrestrial herbicide formulations (i.e., *aminopyralid, bromacil, chlorsulfuron, clopyralid, dicamba, diflufenzopyr+dicamba (Overdrive®), diuron* (with additional use restrictions), *fluroxypyr, hexazinone, imazapic, metsulfuron methyl, picloram, rimsulfuron, tebuthiuron*) within RCAs containing Bruneau hot springsnail. These upland herbicides can be used for spot treatments (manual methods) in upland vegetation types within RCAs, but cannot be used within 15 feet of areas with hydric vegetation (example provided in *Bull Trout and Bull Trout Critical Habitat).*

The herbicides that could be used in occupied RCAs in areas with riparian vegetation include the aquatic formulations of *2,4-D, diquat, fluridone, glyphosate, imazapyr,* and *triclopyr*. Additional information on the herbicides approved for riparian use can be found in Appendix D. *Diquat and fluridone* would only be used in closed water systems not connected to RCAs containing Bruneau hot springsnail. Because these herbicides would not be used in or adjacent to occupied waters, no potential for direct effects to Bruneau hot springsnail or their habitat are identified. No spraying of upland or riparian herbicides would occur within 15 feet of geothermal springs within the Bruneau hot springsnail Recovery Area. Manual treatments with aquatic-approved herbicides applied by wicking, wiping, dipping, painting, or injecting are the only treatment methods allowed in these habitats.

The effects analysis below focuses on the potential direct and indirect effects from ground-based herbicide treatments in or adjacent to RCAs in the Bruneau hot springsnail Recovery Area. Aerial herbicide treatments would not occur within 0.5 mile of the Bruneau hot springsnail Recovery Area and therefore would have no direct or indirect effects to Bruneau hot springsnail or its habitat. Herbicide treatments in upland vegetation types that are outside of (not adjacent to) occupied RCAs would have no direct or indirect effects to Bruneau hot springsnail or its habitat.

Effects Common to all Ground-based Herbicide Treatments

Ground-based herbicide treatments would occur in and adjacent to occupied RCAs within the Bruneau hot springsnail Recovery Area and would include measures to improve riparian conditions to meet the recovery objectives for ESA-listed aquatic species. Design features and conservation measures (e.g., no mixing of herbicides or fueling in occupied RCAs, limitations on herbicide use and treatment methods in RCAs) would be applied to all on-going (small-scale) and larger-scale herbicide treatments. These measures would reduce the potential for direct or indirect effects to Bruneau hot springsnail and its habitat to the extent possible. However, the potential exists for some treatments to result in localized, short-term direct or indirect effects to Bruneau hot springsnail or its habitat where treatments occur in or adjacent to occupied RCAs.

Ground-based herbicide treatments consistent with the design features and conservation measures would be effective in reducing or removing noxious weeds and invasive plants from areas in and adjacent to RCAs with geothermal springs containing Bruneau hot springsnail. Actions to control or eliminate noxious weeds and invasive plants from adjacent upland areas would reduce the risk for noxious and invasive plants to invade occupied RCAs and alter habitat conditions suitable for Bruneau hot springsnail. This would have a beneficial effect to Bruneau hot springsnail and its habitat in the long-term.

Herbicide treatments adjacent to occupied geothermal springs could potentially result in direct adverse effects to listed Bruneau hot springsnail individuals if they were to come into contact with herbicide contaminated water. The mechanisms by which herbicides could enter geothermal springs and the effects to Bruneau hot springsnail individuals are the same as those described for *Effects to Bull Trout and Bull Trout Critical Habitat*. With the inclusion of the design features and conservation measures (Chapter 2), prevention measures (Appendix B), herbicide application criteria (Appendix D), and SOPs (Appendix E), the on-going (small-scale) and larger-scale noxious weed and invasive plant treatments adjacent to occupied geothermal springs would have a low potential for direct effects to individual Bruneau hot springsnail. Direct or indirect effects to Bruneau hot springsnail individuals from herbicide treatments using a low boom sprayer method are expected to be insignificant and discountable because treatments would not occur within 50 feet of occupied geothermal springs. Herbicide treatments using hand methods have would pose the greatest risk for direct effects to Bruneau hot springsnail individuals because treatments could within 15 feet of occupied waters. However, with the limitations on treatment method (i.e., spot treatments, hand methods, no spraying of herbicides within 15 feet of occupied geothermal springs), the potential for direct herbicide contact to individual snails would be insignificant and extremely unlikely to occur (discountable).

Herbicides that unintentionally come into contact with hydric vegetation may indirectly affect Bruneau hot springsnail habitat by reducing or removing woody or herbaceous hydric plants in occupied RCAs. The potential short and long-term effects of removing hydric vegetation from these habitats include a localized loss of overhead cover, streamside shading, and a source of nutrients that supports the food base. These effects are likely to be localized in scale, but could be short- or long-term depending on the type and quantity of herbicide coming into contact with hydric vegetation (USDI BLM, 2007a; pg. 5-58, 5-64). However, the limitations on treatment method (i.e., spot treatments, hand methods, no spraying of herbicides within 15 feet of occupied geothermal springs) and herbicide use (aquatic approved herbicides only) would reduce the potential for effects to hydric vegetation to the extent possible. Potential effects to Bruneau hot springsnail due to accidental herbicide effects to hydric vegetation are likely to be insignificant but not completely discountable because treatments could occur in areas with hydric vegetation and within 15 feet of occupied geothermal springs.

The proposed action allows the use of terrestrial (upland) herbicide formulations in upland vegetation types in RCAs within the Bruneau hot springsnail Recovery Area. These herbicides can be applied as spot treatments using hand methods and direct application only (no broadcast spraying) but cannot be used within 15 feet of hydric vegetation. With the design features and conservation measures for RCAs, the potential indirect effects to hydric vegetation from these on-going spot treatments would occur at the transition zone between upland and hydric vegetation. Potential effects would be due to herbicide drift and are likely to be insignificant and discountable. Therefore, treatments using upland herbicides in and adjacent to occupied RCAs may affect, but are not likely to adversely affect Bruneau hot springsnail and its habitat. No direct or indirect effects to Bruneau hot springsnail or its habitat would occur from applying these herbicides in upland vegetation types outside of (not adjacent to) occupied RCAs.

Effects of Herbicide Treatments using Low Boom Methods

Riparian herbicides could be applied using a low boom sprayer mounted on an ATV or UTV in upland vegetation types 100 to 50 feet from hydric vegetation in occupied RCAs. Treatments using a low boom sprayer have a low potential for herbicide drift onto hydric vegetation because of the low boom height on the sprayer (20 inches and below). Applying the conservation measures (i.e., weather conditions, herbicide use and handling) would reduce the potential for short-term direct and indirect effects to hydric vegetation and surface water in the Bruneau hot springsnail Recovery Area to the extent possible. Because treatments may occur up to 50 feet from occupied waters, the potential for localized, short-term direct or indirect effects to hydric vegetation and water quality cannot be completely discounted, but will likely be insignificant. Therefore, treatments using low boom methods from 100 to 50 feet from hydric vegetation for occupied geothermal springs may affect, but are not likely to adversely affect Bruneau hot springsnail and its habitat.

Effects of Herbicide Treatments using Hand Methods

Riparian herbicides could be applied in occupied RCAs using hand methods which include spot spraying of individual plants using a backpack sprayer or ATV/UTV mounted spray equipment 50 to 15 feet of occupied waters. These treatments pose an increased risk for direct or indirect effects to Bruneau hot springsnail and its habitat due to accidental direct chemical exposure or due to herbicide drift. Because hand methods are highly controllable, the potential for herbicides to come in direct contact with surface water in occupied geothermal springs is low. Applying the conservation measures (i.e., wind velocity, herbicide use and handling) would reduce the potential for short-term direct and indirect effects to hydric vegetation and surface water in the Bruneau hot springsnail Recovery Area to the extent possible and will likely be insignificant. Because localized, short-term direct or indirect effects to hydric vegetation and water quality cannot be completely discounted, treatments using hand methods from 50 to 15 feet from occupied waters may affect, but are not likely to adversely affect Bruneau hot springsnail and its habitat.

Treatments using riparian herbicides from 15 feet up to the water's edge would pose the most risk for direct exposure of herbicides to Bruneau hot springsnail and its habitat. To reduce the potential for adverse effects due to accidental direct spray or off-site drift, treatments would be limited to spot treatments using hand methods only (i.e., wicking, wiping, dipping, painting, or injecting) of only riparian herbicides with no adjuvants or surfactants. These conservation measures would avoid the potential for direct effects to Bruneau hot springsnail and its habitat due to accidental spray or herbicide drift. The "no spray" design feature, combined with the methods for wicking, wiping, dipping, painting, or injecting, would reduce the potential for herbicides to accidentally enter occupied geothermal springs to the extent possible. Because herbicide treatments may occur up to the water's edge, the potential for localized, short-term direct or indirect effects to hydric vegetation and water quality due to accidental direct exposure would be insignificant but not completely discountable. Therefore, treatments using hand methods within 15 feet of occupied geothermal springs may affect, but are not likely to adversely affect Bruneau hot springsnail and its habitat.

Herbicide treatments using hand methods (i.e., spot spray, wicking, wiping, dipping, painting, or injecting) in upland vegetation types more than 50 feet from hydric vegetation in occupied RCAs would have no direct or indirect effects to Bruneau hot springsnail or its habitat. This distance is sufficient to prevent direct or indirect herbicide exposure to surface waters or hydric vegetation in occupied RCAs.

Determination – Effects of Ground-based Herbicide Treatments

Ground-based herbicide treatments to reduce or eliminate noxious weeds and invasive plants in and adjacent to occupied RCAs *may affect, but are not likely to adversely affect Bruneau hot springsnail and its habitat*. Herbicide treatments have the potential for localized, short-term direct and indirect effects to Bruneau hot springsnail or its habitat from direct accidental exposure or due to herbicide drift into areas with hydric vegetation or surface water. The design features and conservation measures reduce the potential for effects to insignificant, but all potential effects may not be discountable. Ground-based herbicide treatments would have a *long-term beneficial effect* to Bruneau hot springsnail and its habitat by reducing the potential for noxious weeds and invasive plants to invade occupied geothermal springs and alter suitable habitat conditions for Bruneau hot springsnail.

Effects of Re-Vegetation Treatments

Re-vegetation treatments would include seedings or seedling plantings and would be focused on the Bruneau River reaches within the Bruneau hot springsnail Recovery Area where hydric vegetation is not sufficient to maintain streambank stability or other channel characteristics for bull trout or bull trout critical habitat. Re-vegetation treatments would not occur in or adjacent to geothermal springs or upwelling areas within the Bruneau hot springsnail Recovery Area.

The hydric vegetation along the geothermal springs occupied by Bruneau hot springsnail varies from relatively open to densely vegetated with numerous native species such as cattails, willow, poison ivy, hackberry, juniper, and various forbs or grasses (Hopper et al., 2014). Because these areas already contain hydric vegetation that is appropriate for the site, re-vegetation treatments would avoid areas with geothermal springs that may contain Bruneau hot springsnail. This would ensure the overhead cover and streamside shading in occupied geothermal springs is not altered in a manner that would harm Bruneau hot springsnail or its habitat.

Where re-vegetation treatments occur along the Bruneau River, they would include conservation measures for avoiding direct and indirect effects to geothermal springs or areas with geothermal upwelling within the Bruneau River. The use of manual methods allows for refinement of treatments to ensure potential direct and indirect effects to geothermal springs containing Bruneau hot springsnail can be avoided. However, because re-vegetation treatments may occur along the Bruneau River where occupied geothermal springs are present, there is the potential for direct or indirect effects to Bruneau hot springsnail and its habitat due to unintended changes in hydric vegetation along occupied geothermal springs due to seedling plantings or disturbance of occupied habitats during actual treatments. Due to the avoidance measures for geothermal springs and upwelling areas, the potential for effects to Bruneau hot springsnails or their habitat from re-vegetation treatments would be insignificant and discountable. Re-vegetation treatments along the Bruneau River within the Bruneau hot springsnail Recovery Area would have beneficial effects to Bruneau hot springsnail and its habitat by restoring and improving stream channel stability and dissipation of energy during high flow events within the Bruneau hot springsnail Recovery Area.

Determination – Effects of Re-Vegetation Treatments

Re-vegetation treatments (seedings and plantings) using manual methods within the Bruneau hot springsnail Recovery Area *may affect, but are not likely to adversely affect Bruneau hot springsnail and its habitat in the short-term*. Potential short-term effects to Bruneau hot springsnail and its habitat due to physical disturbance during treatments along the Bruneau River would be insignificant and discountable. Re-vegetation treatments along the lower Bruneau River would have a *beneficial effect to Bruneau hot springsnail and its habitat in the long-term* by restoring and improving stream channel stability and dissipation of energy during high flow events within the Bruneau hot springsnail Recovery Area.

Interrelated and Interdependent Effects

Interrelated and interdependent actions include those activities that would not occur if not for the proposed action. No interrelated or interdependent effects to Bruneau hot springsnail and its habitat have been identified for the proposed action.

Cumulative Effects

The implementing regulations for Section 7 of the ESA define cumulative effects to include those effects of future state, tribal, local, or private actions that are reasonably certain to occur in the action area. The cumulative effect assessment considered the potential for effects to Bruneau hot springsnail and its habitat from on-going and predicted future uses and activities on private lands in and adjacent to the Bruneau hot springsnail Recovery Area. There are no state lands in or adjacent to the Bruneau hot springsnail Recovery Area.

The primary private land uses within or adjacent to the Bruneau hot springsnail Recovery Area include but may not be limited to cropland irrigation and associated diversion of surface water, livestock grazing, noxious weed treatments or a lack thereof, road use and maintenance,

maintenance of private land infrastructure (e.g., fences, roads, diversions or irrigation equipment), and operation and maintenance of geothermal developments. Private land uses also include a boat ramp and access road that is used as a take-out by both commercial and private whitewater rafters. All of these activities and uses have resulted in direct or indirect adverse effects to Bruneau hot springsnail and its habitat in the past and is expected to continue to have similar levels of impact into the future.

The cumulative effects to Bruneau hot springsnail and its habitat from private land uses and activities would include impacts to water quality due to sediment, nutrients, or chemical contamination. There also is the potential for adverse effects to the quantity of water within the geothermal seeps and springs from geothermal development on private land. Geothermal development is considered the primary threat to Bruneau hot springsnail and its habitat (USDI USFWS, 2002b). There are more than 50 wells on private lands within 7.5 miles of the Indian Bathtub site that use geothermal water to irrigate private land that have contributed to the reduction or elimination of geothermal spring habitat. These developments are expected to continue to reduce geothermal flows and result in a potential loss of habitat available or suitable for Bruneau hot springsnail in the future. The potential for impacts to Bruneau hot springsnail and its habitat from private land activities are expected to continue to have cumulative effects to Bruneau hot springsnail habitat on private land and indirectly on the adjacent Federal lands in the future.

Another threat to Bruneau hot springsnail and its habitat includes competition with aquatic nuisance species (IISC, 2007). For Bruneau hot springsnail, the current greatest threat due to invasive aquatic plants species is due to hydrilla which is known to be present in the lower Bruneau River. Idaho Department of Agriculture is working to prevent the spread of this invasive plant using hand-pulling methods. Other invasive plants known to be present in or adjacent to the Bruneau hot springsnail Recovery Area include saltcedar and purple loosestrife (*Lythrum salicaria*). Non-native fish, such as guppies (*Poecilia reticulate*) and tilapia (*Oreochromis niloticus*) are also known to be present in geothermal spring habitat of the lower Bruneau River (USDI USFWS, 2002b). Aquatic invasive mollusks within the TFD include Asian clam (*Corbicula fluminea*) and New Zealand mudsnail *(Potamopyrgus antipodarum*), both of which occur in the Snake River. Zebra mussels (*Dreissena polymorpha*) and Quagga mussel (*D. bugensis*) are not yet in Idaho, but the potential exists for these species to accidentally be introduced waters within the TFD in the future through recreational activities such as boating or whitewater rafting. The risk for any of these invasive aquatic species to be introduced into the Bruneau hot springsnail Recovery Area, either accidentally or deliberately, poses an increasing risk to Bruneau hot springsnail and its habitat in the future.

The analysis of direct or indirect effects discloses the potential effects of noxious weed and invasive plant treatments on Bruneau hot springsnail and its habitat incorporates design features, conservation measures, and SOPs to reduce the potential for effects. These measures are not likely to be applied on private land and therefore similar actions may have a greater effect to the listed species and its habitat than would occur on the Federal land. In addition, herbicide treatments on private lands are not limited to 20 herbicides that can be used on the Federal land. A lack of noxious weed and invasive plant treatments on State and private lands would increase the influx of these plants on Federal lands, increasing the necessity and frequency of treatments on the Federal land.

Listed Snake River Snails

There are three species of ESA-listed aquatic mollusk which occur within the TFD (Figure 6 and Figure 7). These species are the Bliss Rapids snail, Snake River physa, and the Banbury Springs lanx. In this assessment, these species are collectively referred to as listed Snake River snails. The Bliss Rapids snail and Snake River physa are present in the Snake River and its associated coldwater springs, while the Banbury Springs lanx only occurs in four of the coldwater springs that drain into the Snake River. Although these aquatic snails occupy slightly different habitats, they all have similar habitat requirements of cold, clean water with low amounts of fine sediment. Therefore, the analysis of potential direct and indirect effects of treatments to control noxious weed and invasive plants is combined for all three species.

Direct and Indirect Effects

This effects analysis focuses on noxious weed and invasive plant treatments that could occur on the approximately 15,400 acres of BLM-managed lands within 0.5 miles of the Snake River. With full consideration of the topography, slope, proximity to state and private lands, and practicality of applying various noxious weed and invasive plant treatments, the approximate acreage of treatable BLM acres within 0.5 miles of the Snake River would be considerably less than 15,400 acres. Noxious weed and invasive plant treatments that are more than 0.5 mile from the Snake River would have no direct or indirect effects to listed Snake River snails or their habitat. The use of design features and conservation measures were fully considered when determining if an action may affect or would have no effect on listed Snake River snails or their habitat.

Actions Determined to Have No Effect

Several noxious weed and invasive plant treatment methods were determined to have no potential for short- or long-term, direct or indirect effects to listed Snake River snails or their habitat. The no effect determination was reached because the treatment method would not be applied in occupied RCAs or the distance between the treatment and the occupied RCA was sufficient to avoid any potential for direct or indirect effects. The treatments determined to have no effect on listed Snake River snails or their habitat and the rationale for the no effect determinations are provided in Appendix M.

Actions that May Affect Listed Snake River Snails or Their Habitat

This analysis identifies the potential for on-going (small-scale) and larger-scale noxious weed and invasive plant treatments to have short- or long-term, direct or indirect effects to listed Snake River snails or their habitat. In general, the may affect determinations were made because the treatment methods had the potential for effects to listed Snake River snail individuals or to water quality or hydric vegetation in occupied RCAs. All noxious weed and invasive plant treatments would be designed using the INFISH RCA widths as described above in the effects analysis for *Bull Trout and Bull Trout Critical Habitat*.

The potential direct and indirect effects for the "may affect" treatment methods and the rationale for the determination are discussed below and summarized in Appendix M.

Effects of Manual Treatments

Treatments using manual methods can be applied in a manner that avoids actions that could result in direct or indirect effects to listed Snake River snails and their habitat. Manual methods are the preferred treatment method in sensitive habitats such as riparian areas because they are not ground disturbing and the type and amount of vegetation removed is completely controllable. Manual treatments in mixed upland and riparian vegetation types within 300 feet of occupied streams but away from the waters' edge can be applied in a manner that results in no direct or indirect effects to water quality (i.e., sediment, water temperature) or hydric vegetation due to work crews being present within occupied RCAs. Treatments to remove invasive hydric vegetation within the stream channel are beyond the scope of the proposed action and would not be conducted in listed Snake River snail habitat.

Manual treatments within 15 feet of occupied streams pose the greatest risk for sediment related effects to water quality. However, using manual methods allows for refinement of how treatments are applied so the potential for direct and indirect effects to water quality can be avoided or reduced to effects that are insignificant (not meaningfully measured, detected, or evaluated) and discountable (extremely unlikely to occur). Due to the potential for localized, short-term effects to water quality that are insignificant and discountable, manual treatments may affect but are not likely to adversely affect listed Snake River snails or their habitat in the Snake River and its associated coldwater springs. Manual treatments would reduce the occurrence of noxious weeds and invasive plants in and adjacent to occupied RCAs which would benefit listed Snake River snails and their habitat in the long-term.

Determination – Effects of Manual Treatments

Treatments using manual methods to remove noxious weeds and invasive plants from occupied RCAs *may affect, but are not likely to adversely affect, listed Snake River snails and their habitat*. This determination is based on the potential for localized, short-term direct or indirect effects to water quality due to sediment from treatments within 15 feet of occupied habitats. Potential effects would be insignificant and discountable. Treatments using manual methods would have a *beneficial effect to listed Snake River snails and their habitat* in the long-term by removing noxious weed and invasive plants from occupied RCAs. Manual treatments would also reduce the potential for noxious weeds and invasive plants to invade RCAs with occupied coldwater springs and alter habitat conditions that meet the habitat requirements of listed Snake River snails.

Effects of Mechanical Treatments

Mechanical methods would be used for larger-scale treatments to remove noxious weeds and invasive plants from upland and riparian areas. Mechanical treatment methods may be used in upland vegetation types in and adjacent to the RCA for the Snake River, but would not be used in or adjacent to the RCAs for Box Canyon Springs or Briggs Creek due to steep, rocky topography. Therefore, Bliss Rapids snail and Snake River physa or their habitat may be affected by treatments using mechanical methods, but Banbury Springs lanx and its habitat would not be affected. Where these treatments occur in upland areas outside of (not adjacent to) the Snake River RCA, they would have no potential for direct or indirect effects to listed Snake River snails or their habitat.

A limited use of mechanical treatment methods may be used in occupied RCAs along the Snake River in areas with upland vegetation and slopes less than 20 percent to restore site-appropriate upland vegetation. Conservation measures for occupied RCAs limit seeding methods to those that minimize soil disturbance and include broadcast seeding with a light weight smooth or tined harrow, smooth chain, or no-till drill. The potential effects from these treatments would be an increased risk for short-term, indirect effects to water quality from sediment entering an occupied stream (i.e., Snake River). Direct effects to individual snails or their habitat due to sediment would likely be insignificant and discountable because treatments would not occur in areas with hydric vegetation. This would provide a buffer between the treatment area and the occupied habitat. In addition, Bliss Rapid snail and Snake River physa occur in mid-channel, deep water habitats and habitat greater than 0.5 meter deep, respectively, where deposition of fine sediments are less likely to occur. Because these treatments would reduce or eliminate noxious weeds and invasive plants within RCAs, the need for using herbicides in RCAs would likely be less in mechanically treated areas. Due to the potential for effects to water quality that are insignificant and discountable, mechanical treatments may affect but are not likely to adversely affect Bliss Rapids snail and Snake River physa or their habitat in the Snake River. Mechanical treatments would reduce the occurrence of noxious weeds and invasive plants in and adjacent to the Snake River which would benefit Bliss Rapid snail and Snake River physa and their habitat in the long-term.

Determination – Effects of Mechanical Treatments

Treatments using mechanical methods to restore site-appropriate upland vegetation in and adjacent the Snake River RCA *may affect, but are not likely to adversely affect listed Snake River snails (Bliss Rapids snail and Snake River Physa Snail) and their habitat*. The potential for direct or indirect effects to listed Snake River snail habitat due to sediment would be insignificant and discountable. Mechanical seeding treatments using methods that minimize soil surface disturbance would reduce the potential for surface erosion to enter the Snake River. Mechanical treatments would have a *long-term beneficial effect to listed Snake River snails (Bliss Rapids snail and Snake River Physa Snail) and their habitat* because they would reduce or eliminate noxious weeds and invasive plants in and adjacent to the Snake River RCA.

Effects of Biological Control Treatments

The potential direct, indirect and beneficial effects to listed Snake River snails and their habitats from using biological controls are the same as those described above for *Bull Trout and Bull Trout Critical Habitat*. No additional effects to listed Snake River snails are identified for treatments using biological controls. Use of biological control agents would result in a gradual loss of noxious weeds and invasive plants, and therefore is not likely to have a measureable decrease in vegetative cover within occupied RCAs. Soil disturbance from workers releasing biological controls is not expected. The release of biological controls would not have measurable short-term direct or indirect effect to water quality or hydric vegetation in occupied RCAs and therefore are insignificant and discountable. In the long-term, beneficial effects to listed Snake River snails and their habitat are expected as noxious weeds and invasive plants are reduced in and adjacent to occupied RCAs over time.

Determination – Effects of Biological Control Treatments

Treatments using biological controls to reduce or eliminate noxious weed and invasive plants in and adjacent to occupied RCAs *may affect, but are not likely to adversely affect listed Snake River snails and their habitat*. Short-term direct or indirect effects to hydric vegetation or water quality due to sediment are not expected from these treatments. Any potential affects related to treatments using biological controls would be insignificant and discountable. These treatments would have a *long-term beneficial effect* to listed Snake River snails and their habitat since they would reduce the potential for noxious weed and invasive plants to invade occupied RCAs and alter habitat conditions for listed Snake River snails.

Effects of Herbicide Treatments

Herbicide treatments would use the same herbicides and treatment methods as described for *Bull Trout and Bull Trout Critical Habitat.* Conservation measures specific to listed Snake River snails would be applied to herbicide treatments within the Snake River canyon (e.g., no spraying of herbicides within 15 feet of the water in Box Canyon Springs and Briggs Creek (manual treatment methods and aquatic approved herbicides only); aerial herbicide treatments would not occur within 0.5 mile of the Snake River). Additional conservation measures are identified in the proposed action (Chapter 2).

The proposed action does not allow for broadcast spraying of terrestrial herbicide formulations (i.e., *aminopyralid, bromacil, chlorsulfuron, clopyralid, dicamba, diflufenzopyr+dicamba (Overdrive®), diuron* (with additional restrictions), *fluroxypyr, hexazinone, imazapic, metsulfuron methyl, picloram, rimsulfuron, tebuthiuron)* within RCAs containing listed Snake River snails. These upland herbicides can be used for spot treatments (manual methods) in upland vegetation types within RCAs, but cannot be used within 15 feet of areas with hydric vegetation (example provided in *Bull Trout and Bull Trout Critical Habitat).*

The herbicides that could be used in occupied RCAs in areas with riparian vegetation include the aquatic formulations of *2,4-D, diquat, fluridone, glyphosate, imazapyr,* and *triclopyr*. Additional information on these herbicides approved for use in riparian areas can be found in Appendix D. *Diquat and fluridone* would only be used in closed water systems not connected to RCAs containing listed Snake River snails. Because these herbicides would not be used in or adjacent to occupied waters, no potential for direct effects to listed Snake River snails or their habitat are identified. No spraying of upland or riparian herbicides would occur within 15 feet of the water in Box Canyon Springs or Briggs Creek to protect Banbury Springs lanx (Figure 3). Manual treatments using aquatic-approved herbicide applied by wicking, wiping, dipping, painting, or injecting are the only treatment methods allowed in these habitats.

The effects analysis below focuses on the potential direct and indirect effects from ground-based herbicide treatments within or adjacent to RCAs within the Snake River canyon. Aerial herbicide treatments would not occur within 0.5 mile of the Snake River and therefore would have no direct or indirect effects to listed Snake River snails or their habitat. Herbicide treatments in upland vegetation types outside of (not adjacent to) occupied RCAs would have no direct or indirect effects to listed Snake River snails or their habitat.

Effects Common to all Ground-based Herbicide Treatments:

Ground-based herbicide treatments would occur in and adjacent to RCAs containing listed Snake River snails and would include measures to improve riparian conditions to meet the recovery objectives for ESA-listed aquatic species. Design features and conservation measures (e.g., no mixing of herbicides or fueling in occupied RCAs, limitations on herbicide use and treatment methods in RCAs would be applied to all on-going (small-scale) and larger-scale herbicide treatments. This would minimize the potential for direct or indirect effects to listed Snake River snails and their habitat to the extent possible. However, the potential exists for some treatments to result in localized, short-term direct or indirect effects to listed Snake River snails or their habitat where treatments occur in occupied RCAs.

Ground-based herbicide treatments consistent with the identified design features and conservation measures would be effective in removing noxious weeds and invasive plants from areas in and adjacent to occupied RCAs. Actions to control or eliminate noxious weeds and invasive plants from adjacent upland areas would reduce the risk for the noxious and invasive plants to invade occupied RCAs and alter habitat conditions suitable for listed Snake River snails. This would have a beneficial effect to listed Snake River snails and their habitat in the long-term.

Herbicide treatments in or adjacent to occupied RCAs could potentially result in direct adverse effects to listed Snake River snail individuals if they were to come into contact with herbicide contaminated water. The mechanisms by which herbicides could enter occupied habitats and the effects to listed Snake River snails individuals are the same as those described for *Bull Trout and Bull Trout Critical Habitat*. With the inclusion of the design features and conservation measures (Chapter 2), prevention measures (Appendix B), herbicide application criteria (Appendix D), and SOPs (Appendix E), the on-going (small-scale) and larger-scale noxious weed and invasive plant treatments in occupied RCAs would have a low potential for direct effects to individual listed Snake River snails. Direct or indirect effects to individual snails from herbicide treatments using a high or low boom sprayer method are expected to be insignificant and discountable because treatments would not occur within 100 feet or 50 feet of occupied habitats, respectively. Herbicide treatments using hand methods have would pose the greatest risk for direct effects to individual listed Snake River snail because treatments could occur within 15 feet of occupied waters. However, with the limitations on treatment method (i.e., spot treatments, hand methods, and aquatic approved herbicides only), the potential for direct herbicide contact to individual listed snails is extremely unlikely to occur (discountable). The potential for direct contact with individual snails that occur in the Snake River (Bliss Rapids snail, Snake River physa snail) is further reduced considering the volume of water in the Snake River and the location of the snails within the Snake River (i.e., mid-channel, deep water habitats; and habitat greater than 0.5 meter deep). Therefore, the potential for direct effects to individual listed snails in the Snake River are insignificant and discountable.

For the Banbury Springs lanx, the potential for direct effects to individual snails from herbicide treatments is greater than for listed snails in the Snake River because the occupied habitat is relatively shallow and narrow (compared to the Snake River) and individual snails can be distributed throughout the stream channel. However, the identified conservation measures (i.e., no spraying of herbicides within 15 feet of occupied waters; hand methods and aquatic approved herbicides only) would reduce the potential for herbicides to come into direct contact with individual lanx. Therefore, the potential for direct effects to Banbury Springs lanx individuals are insignificant and discountable.

Herbicides that unintentionally come into contact with hydric vegetation may indirectly affect listed Snake River snail habitat by reducing or removing woody or herbaceous hydric plants in occupied RCAs. The potential short- and long-term effects of removing hydric vegetation from these habitats, some of which may provide necessary habitat components for aquatic species, include loss of overhead cover, streamside shading, and a source of nutrients that supports the food base. These effects are likely to be localized in scale, but could be short- or long-term depending on the type and quantity of herbicide coming into contact with hydric vegetation (USDI BLM, 2007a; pg. 5-58, 5-64). However, the limitations on treatment method (i.e., spot treatments, hand methods, no spraying of herbicides within 15 feet of occupied coldwater springs) and herbicide use (i.e., aquatic approved herbicides only) would reduce the potential for effects to hydric vegetation to the extent possible. Potential effects to listed Snake River snails due to accidental herbicide effects to hydric vegetation are likely to be insignificant, but not completely discountable because treatments could occur in areas with hydric vegetation and within 15 feet of occupied habitats.

The proposed action allows the use of terrestrial (upland) herbicide formulations in upland vegetation types in RCAs containing listed Snake River snails. These herbicides can be applied as spot treatments using hand methods and direct application only (no broadcast spraying) and not in areas with hydric vegetation. With the design features and conservation measures for RCAs, the potential indirect effects to hydric vegetation from these on-going spot treatments would occur at the transition zone between upland and hydric vegetation. Potential effects would be due to herbicide drift and are likely to be insignificant and discountable. Therefore, treatments using upland herbicides in and adjacent to occupied RCAs may affect, but are not likely to adversely affect listed Snake River snails and their habitat. No direct or indirect effects to listed Snake River snails or their habitat would occur from applying these herbicides in upland vegetation types outside of (not adjacent to) occupied RCAs.

Effects of Herbicide Treatments using High Boom Methods

Riparian herbicides could be applied within the Snake River canyon using a truck or tractor mounted high boom sprayer in upland vegetation types within the RCA. This treatment method would not be used within 100 feet of hydric vegetation in occupied RCAs. Herbicide treatments using a high boom sprayer have the potential for localized, short-term indirect effects to hydric vegetation due to herbicide drift along the outer edge of the riparian area where vegetation changes from hydric to upland vegetation (Figure 3). The conservation measure for wind velocity (i.e., no broadcast spray when wind exceeds10 mph), weather conditions (i.e., no spray if precipitation is imminent), herbicide use (i.e., no broadcast spray of *diuron, glysophate, picloram, or triclopyr BEE* adjacent to aquatic habitats), and handling of herbicides in occupied RCAs (i.e., no storage or mixing herbicides, maintenance of equipment in a leak proof condition) would minimize the potential for herbicides to come into contact with hydric vegetation or surface water to the extent possible. The potential for localized, short-term indirect effects to hydric vegetation and water quality for this treatment method cannot be completely discounted, but will likely be insignificant. Therefore, treatments using high boom methods up to 100 feet of occupied streams may affect, but are not likely to adversely affect listed Snake River snail habitat.

Herbicide treatments using high boom methods would not be used in or adjacent to the RCAs for Box Canyon Springs or Briggs Creek. Therefore, this treatment method would have no effect to Banbury Spring lanx or its habitat.

Effects of Herbicide Treatments using Low Boom Methods

Riparian herbicides could be applied in occupied RCAs using a low boom sprayer mounted on an ATV or UTV in upland vegetation types from 100 to 50 feet from hydric vegetation in occupied RCAs. Treatments using a boom sprayer have a similar but lower potential for herbicide drift onto hydric vegetation because the boom height on the low boom sprayer (20 inches and below) is less than half the height of the high boom sprayer (50 inches and above). Applying the conservation measures (i.e., weather conditions, herbicide use and handling) would reduce the potential for short-term direct and indirect effects to hydric vegetation and surface water in RCAs containing listed Snake River snails to the extent possible. Because treatments may occur up to 50 feet from occupied waters, the potential for localized, short-term direct or indirect effects to hydric vegetation and water quality cannot be completely discounted, but will likely be insignificant. Therefore, treatments using low boom methods from 100 to 50 feet from occupied waters may affect, but are not likely to adversely affect listed Snake River snails and their habitat.

Effects of Herbicide Treatments using Hand Methods

Riparian herbicides could be applied in occupied RCAs (i.e., Snake River, Box Canyon Springs, or Briggs Creek) using the hand methods which include spot spraying of individual plants using a backpack sprayer or ATV/UTV mounted spray equipment 50 to 15 feet of occupied waters. These treatments pose an increased risk for direct or indirect effects to listed Snake River snails and their habitat due to accidental direct chemical exposure or due to herbicide drift. Because hand methods are highly controllable, the potential for herbicides to come in direct contact with occupied water is low. Applying the conservation measures (i.e., wind velocity, herbicide use and handling) would reduce the potential for short-term direct and indirect effects to hydric vegetation and surface water in the Snake River and its tributaries to the extent possible and will likely be insignificant. Because localized, short-term direct or indirect effects to hydric vegetation and water quality cannot be completely discounted, treatments using hand methods from 50 to 15 feet from occupied waters may affect, but are not likely to adversely affect listed Snake River snails and their habitat.

Treatments using riparian herbicides from 15 feet up to the water's edge would pose the most risk to for direct exposure of herbicides to listed Snake River snails and their habitat. To reduce the potential for adverse effects due to accidental direct spray or off-site drift, treatments would be limited to spot treatments using hand methods only (i.e., spot spray, wicking, wiping, dipping, painting, or injecting) of only riparian herbicides with no adjuvants or surfactants. These conservation measures would avoid the potential for direct effects to listed Snake River snails and their habitat due to accidental spray or herbicide drift. The "no spray" design feature, combined with methods for wicking, wiping, dipping, painting, or injecting, would reduce the potential for herbicides to accidentally enter occupied coldwater springs or the Snake River to the extent possible. Because herbicide treatments may occur up to the water's edge, the potential for localized, short-term direct or indirect effects to hydric vegetation and water quality due to accidental direct exposure would be insignificant but not completely discountable. Therefore, treatments using hand methods within 15 feet of occupied coldwater springs or the Snake River may affect, but are not likely to adversely affect listed Snake River snails and their habitat.

Herbicide treatments using hand methods (i.e., wicking, wiping, dipping, painting, or injecting) in upland vegetation types more than 50 feet from hydric vegetation in occupied RCAs would have no direct or indirect effects to listed Snake River snails or their habitat. This distance is sufficient to prevent direct or indirect herbicide exposure to surface waters or hydric vegetation in occupied RCAs.

Determination – Effects of Ground-based Herbicide Treatments

Ground-based herbicide treatments to reduce or eliminate noxious weeds and invasive plants in and adjacent to occupied RCAs *may affect, but are not likely to adversely affect listed Snake River snails and their habitat*. Herbicide treatments have the potential for localized, short-term direct and indirect effects to listed Snake River snails or their habitat from direct accidental exposure or due to herbicide drift into areas with hydric vegetation or surface water. The design features and conservation measures reduce the potential for effects to insignificant but all potential effects may not be discountable. Ground-based herbicide treatments would have a *long-term beneficial effect* to listed Snake River snails and their habitat by reducing the potential for noxious weeds and invasive plants to invade occupied RCAs and alter habitat conditions suitable for listed Snake River snails.

Effects of Re-Vegetation Treatments

Re-vegetation treatments would include seedings or seedling plantings and would be focused on the Snake River where hydric vegetation is not sufficient to maintain streambank stability or other channel characteristics along the Snake River or its tributaries. Because streamside vegetation currently meets the habitat requirements for Banbury Springs lanx, re-vegetation treatments would not occur in Box Canyon Springs or Banbury Springs.

Re-vegetation treatments would focus on areas with hydric vegetation (subsurface water) within 300 feet of occupied streams (i.e., Snake River). In areas more than 15 feet from the streambank, manual treatments (seedings and planting) would be applied in a manner that results in no short-term direct or indirect effects to water quality due to sediment entering an occupied stream. Manual treatments (seedling plantings) within 15 feet from the waters' edge (along the streambank) would pose the greatest risk for impacts to water quality due to sediment. The risk for impacts would be short-term and limited to the time during actual plantings. The use of manual methods would allow for refinement of how re-vegetation actions are applied and would reduce the potential for short-term direct and indirect effects to insignificant and discountable. Therefore revegetation treatments within occupied RCAs may affect, but are not likely to adversely affect listed Snake River snails and their habitat in the Snake River.

Re-vegetation treatments in occupied RCAs along the Snake River would have beneficial effects to listed Snake River snails and their habitat as woody and herbaceous hydric vegetation is restored over time. The benefits for planting of woody species would be related to increases in streamside shading (thermal insulation), reduced water temperatures, and restoring woody debris and nutrient contributions to the stream channel. The benefits from seedings or plantings of herbaceous hydric species would be related to streambank stabilization and floodplain function (i.e., dissipate energy and fine deposition during high flow events), and narrowing of the stream channel, which improves conditions in occupied RCAs.

Determination – Effects of Re-Vegetation Treatments

Re-vegetation treatments (seedings and plantings) using manual methods in occupied RCAs *may affect, but are not likely to adversely affect listed Snake River snails and their habitat* in the short-term. Seedings of hydric plants can be implemented in a manner that results in no short-term direct or indirect effects to water quality of hydric vegetation occupied RCAs. Seedling plantings within 15 feet of the stream channel (along the streambank) would have some potential for impacts to water quality due to sediment that are insignificant and discountable. Re-vegetation treatments in the Snake River RCA would restore native hydric vegetation and have a *long-term beneficial effect to listed Snake River snails and their habitat.*

Interrelated and Interdependent Effects

Interrelated and interdependent actions include those activities that would not occur if not for the proposed action. No interrelated or interdependent effects to listed Snake River snails and their habitat have been identified for the proposed action.

Cumulative Effects

The implementing regulations for Section 7 of the ESA define cumulative effects to include those effects of future state, tribal, local, or private actions that are reasonably certain to occur in the action area. The cumulative effect assessment considered the potential for effects to listed Snake River snails and their habitat from on-going and predicted future uses and activities on state and private lands within the Snake River canyon and its tributaries.

The free-flowing, cold-water environments that sustain listed Snake River snails have been affected by, and are vulnerable to, continued adverse habitat modification and deteriorating water quality from one or more of the following actions on non-federal land: hydroelectric development, load-following (the practice of artificially raising and lowering river levels to meet short-term electrical needs at local run-of-the-river hydroelectric projects), water pollution, inadequate regulatory mechanisms which have failed to provide protection to the habitat used by the listed species, and possible adverse effects from exotic species (USDI USFWS, 1995). Factors that further degrade water quality include reduced stream flow as a result of water withdrawals for agriculture; warming due to impoundment; and increases in the concentration of nutrients, sediments, and other pollutants reaching the river. The Snake River is affected by runoff from feedlots and dairies, hatcheries, municipal sewage effluent sources, and other point and nonpoint discharges. These factors coupled with periodic, drought-induced low flows, have contributed to reduced dissolved oxygen levels, increased plant growth, and a general decline of cold-water, free-flowing river habitats in the Snake River. On-going activities on State and private land are expected to continue into the future and have the potential for cumulative effects to listed Snake River snails and their habitat where these activities occur within or adjacent to the Snake River or its tributaries.

Water quality in the alcove springs and tributary spring streams in the Hagerman Valley area have also been affected, though not as severely as the Snake River. The unique hydrogeology of the Hagerman area provides conditions for massive cold-water recharge from the Snake River Plain aquifer. However, several of these springs and spring tributaries have been diverted for hatchery use, which reduces or eliminates clean water recharge and contributes flows enriched with nutrients to the Snake River. Demands on these unique and limited water resources are expected to increase in the future.

An increasing threat to listed Snake River snails includes competition with aquatic nuisance species (IISC, 2007). The Asian clam and New Zealand mudsnail both occur in the Snake River within the TFD. Based on recent surveys, the New Zealand mudsnail is not abundant in habitats used by the Banbury Springs lanx. However, the species directly competes for resources with the Snake River physa and the Bliss Rapids snail in the Snake River. Zebra mussels and Quagga mussel are not yet in Idaho, but the potential exists for these species to be introduced into the Snake River in the future through recreational activities. Aquatic invasive plants within the TFD and include hydrilla, Eurasian watermilfoil, saltcedar, purple loosestrife, and others. All of these plants can form dense vegetative mats that can out-compete native hydric vegetation and reduce the suitability of habitat conditions for listed Snake River snails.

The analysis of direct or indirect effects discloses the potential effects of noxious weed and invasive plant treatments on listed Snake River snails and their habitat incorporates design features, conservation measures, and SOPs to reduce the potential for effects. These measures are not likely to be applied on State or private land and therefore similar actions may have a greater effect to the listed species and its habitat than would occur on the Federal land. In addition, herbicide treatments on private lands are not limited to 20 herbicides that can be used on the Federal land. A lack of noxious weed and invasive plant treatments on State and private lands would increase the influx of these plants on Federal lands, increasing the necessity and frequency of treatments on the Federal land.

Western Yellow-billed Cuckoo

The western yellow-billed cuckoo nests almost exclusively in low- to mid-elevation riparian woodlands. Preferred habitats for yellow-billed cuckoo are large stands of multi-layered woody deciduous shrubs and trees normally dominated by a cottonwood overstory. Conditions necessary to support suitable nesting habitat for yellow-billed cuckoo in the TFD are woody riparian habitats adjacent to perennial water. The length, width, and continuity of these habitats vary across its range. Western yellow-billed cuckoo will use islands of habitat as small as 2.5 acres (Laymon & Halterman, 1989), but seldom use patches less than 50 acres in size. Optimal habitat patch size is 200 acres or more (Laymon, 1998; Laymon & Halterman, 1989). These patches of suitable nesting habitat have been found to range from 330 feet to 1980 feet in width across the range of western yellow-billed cuckoo (Laymon 1998; Laymon & Halterman, 1989). Woody riparian plant communities which presently do not support the minimum patch size or dimensions may currently be used by cuckoos for feeding, exploratory movement or migration.

The yellow-billed cuckoo analysis area was created to define habitat on public lands managed by BLM in the TFD that may be affected by on-going or larger-scale noxious weed and invasive plant treatments. The yellow-billed cuckoo analysis area was developed by identifying patches of multi-layered woody deciduous cover on larger riverine systems. This was done using ArcGIS and the 2015 National Agriculture Imagery Program (NAIP) imagery. These analysis areas contain all potentially suitable habitat patches for yellow-billed cuckoo breeding and foraging. The Jarbidge FO does not contain yellow-billed cuckoo habitat (USDI USFWS, 2015a). Based on the findings in the Jarbidge RMP Biological Opinion, areas containing woody deciduous riparian habitat along the segment of the Snake River that forms the common border between the Jarbidge and Shoshone FOs were dropped from consideration as potential yellow-billed cuckoo breeding habitat. In addition, no habitat patches of suitable composition and size occur in the Burley FO. Therefore, the yellow-billed cuckoo analysis area occurs only in the Shoshone FO.

The following criteria were considered in further refining the area of consideration: total patch size; land ownership; topographic setting; anthropogenic development; and presence, location and extent of public land. Habitat patches were buffered by 0.6 miles (Saab, 1999); to include riparian areas and adjacent uplands used as foraging habitat by cuckoo when they first arrive in breeding areas. A total of four areas were identified and are addressed in this analysis (Figure 8). The aerial extent and ownership within the four analysis areas is shown in Table 16.

One of the four analysis areas contains yellow-billed cuckoo proposed critical habitat. Proposed critical habitat Unit ID-3 (Big Wood River) consists of 88 acres of BLM-managed land, 80 acres managed by IDFG, five acres managed by IDL, and 956 acres in private ownership. The proposed critical habitat unit occurs along seven miles of the Big Wood River in Blaine County, Idaho.

Table 16 - Ownership and Acreage of Yellow-billed Cuckoo Analysis Areas

Ownership	Big Wood River (proposed critical habitat)	Lower Big Wood River	Little Wood River #1	Little Wood River #2	Total
BLM					
Riparian	88	16	259	14	**377**
Upland	1,467	655	1,131	528	**3,781**
IDFG					
Riparian	80	0	0	0	**80**
Upland	52	0	0	0	**52**
IDL					
Riparian	5	0	71	0	**76**
Upland	404	0	152	0	**556**
Private					
Riparian	956	73	12	114	**1,155**
Upland	4,333	336	261	442	**5,372**
Total	**7,385**	**1,080**	**1,886**	**1,098**	**11,449**

Proposed critical habitat PBFs were developed by the Service to define environmental attributes that are essential to the conservation of the species. Three PBFs were defined for yellow-billed cuckoo proposed critical habitat (see 79 FR 48554) and are defined in Table 17 at the end of this analysis section. Direct and indirect effects to PBFs are discussed for each treatment type and are also summarized in Table 17.

This effects analysis considered the potential for short- and long-term direct, indirect, and cumulative effects to yellow-billed cuckoo and its habitat for applicable noxious weed and invasive plant treatments identified in the proposed action. The analysis assumes implementation of all applicable design features and conservation measures, including those not specific to yellow-billed cuckoo. The potential for treatments to result in negative or beneficial effects to the species or their habitat are also identified. The analysis focuses on treatments within or adjacent to areas containing suitable habitat for yellow-billed cuckoo or their principal prey species. Noxious weed and invasive plant treatments outside of the four suitable yellow-billed cuckoo habitat areas would result in no direct or indirect effects to yellow-billed cuckoo or their habitat.

Actions Determined to Have No Effect

Several noxious weed and invasive plant treatment methods were identified as having no potential for short- or long-term direct or indirect effects to yellow-billed cuckoo or their proposed critical habitat. The no effect determination was reached based on one of the following reasons: 1) the proposed treatment method would not be applied within a suitable yellow-billed cuckoo habitat area; or 2) the distance between the proposed treatment and any suitable yellow-billed cuckoo habitat area was sufficient to preclude any potential direct or indirect effects. No effect actions and rationale for determinations are listed in Appendix M.

Actions That May Affect Yellow-billed Cuckoo

The analysis focuses on treatments that would occur within or adjacent to the yellow-billed cuckoo analysis areas. Due to the location and vegetation in these analysis areas, only small-scale, on-going noxious weed and invasive plant treatments would occur. The use of larger-scale treatments is not anticipated. Treatment methods were assessed based on activities that could disturb yellow-billed cuckoo breeding, nesting, or foraging activities; modify vegetation composition or structure important to prey for food or cover; or expose yellow-billed cuckoo or prey to herbicides, either through consumption or dermal contact. Effects were considered for riparian and upland habitats used by yellow-billed cuckoo for nesting, foraging, dispersal and exploratory movements. Effects specific to habitat type will be characterized for each treatment method. Unless stated otherwise, effects are characterized for all habitat categories. Effects of treatment methods are discussed in detail below and are summarized in Appendix M.

Surveys for noxious weeds and invasive plants could occur prior to or concurrent with treatments and therefore are considered part of treatment implementation. In addition, post-treatment monitoring, which would typically occur in subsequent years, would occur. These activities would be subject to conservation measures, including temporal constraints.

Effects of Manual Treatments

Manual treatments would be used for on-going noxious weed and invasive plant control. Manual treatment involves the use of hand tools and hand-operated power tools to cut, clear, or prune herbaceous and woody species. Treatments include cutting undesired plants above the ground level; pulling, grubbing, or digging out root systems of undesired plants that re-sprout; and removing competing plants around desired species. Hand tools used in manual treatments include the handsaw, axe, shovel, grubbing hoe, mattock, Pulaski, and hand clippers. Power tools such as chain saws and power brush saws could also be used, particularly for thick-stemmed plants.

Conservation measures for yellow-billed cuckoo direct that all treatments occurring in occupied or suitable habitat be subject to seasonal constraints to protect nesting birds and fledging broods. Any variation from the May 1 through August 31 exclusion period would require evaluation by a biologist and additional conservation measures for the protection of nesting birds and their broods.

If manual methods applied between May 1 and August 31 are essential to noxious weed and invasive plant control, the following impacts could occur. Human intrusion could result in yellow-billed cuckoo nest abandonment, resulting in reduced reproductive success. During this period, birds would be displaying, nesting, brood-rearing, or fledging. Nesting cuckoos can be disturbed by visits to the nest site and will not return to the nest when humans are nearer than 150 feet (50 meters) (Laymon, 1998). Field observations of nesting yellow-billed cuckoos in southeast Arizona revealed that nests were never left unattended for more than 10 minutes during incubation (Halterman, 2009). Data from a study in Arizona found yellow-billed cuckoo nest sites had six to 13 percent greater daytime humidity and one to two degrees Celsius lower daytime temperatures than average forested sites (McNeil, Tracy, Stanek & Stanek, 2013). Flushing a yellow-billed cuckoo from its nest site during incubation exposes the eggs to alteration of optimal incubation temperature. Causing a yellow-billed cuckoo to leave their nest while brooding may also increase vulnerability to nest parasitism and predation. These human-related disturbance factors, singly or in combination, could result in the loss of yellow-billed cuckoo eggs or young.

Manual treatments to remove noxious weeds or invasive plants can have direct and indirect impacts to cuckoo prey. The diet of yellow-billed cuckoo while in their breeding areas is comprised of caterpillar and adult stage moths and butterflies, nymph and adult stages of katydids and grasshoppers, and tree frogs. Hughes (2015) noted that prior to nesting, cuckoos often forage in upland areas away from riparian woodlands. Laymon (1998) found that during wet years cuckoo are found foraging more often in upland sites early in the season in response to increased survival of larvae from preferred prey (katydids and sphinx moth). During dry years cuckoos' early foraging efforts tends to shift to the riparian floodplain in response to increased survival of katydid and sphinx moth larvae in the riparian zone.

Manual weed control methods would result in some physical disturbance of habitat occupied by invertebrates and amphibians utilized as prey by cuckoos. Trampling by field crews performing manual control could result in injury to or mortality of less mobile prey. Eggs and larvae of butterflies or moths are easily damaged or destroyed by physical disturbance. Manual treatments could also result in localized short-term impacts to the aquatic lifestage of invertebrates and amphibians utilized as prey by yellow-billed cuckoo. The closer these manual treatments occur to riparian habitat, the greater their potential effect on some invertebrates that provide a significant portion of the yellow-billed cuckoos' diet. The localized loss of the larval, pupa, or adult stages of moth or butterfly and the winged adult stage of aquatic invertebrates such as dragon flies and damsel flies would cause a reduction in the availability of insects on which yellow-billed cuckoo feed. However, due to the small scale and short duration of manual treatments, a cuckoo individual would not likely notice a change in prey availability and the effect would be insignificant.

Manual weed treatment methods are normally precise, focused efforts that target undesirable species and field crews would be able to avoid damage to native insect host plants. Treatment impacts would be small in scale relative to general prey diversity and abundance. The short-term loss of some members of local prey populations is not expected to have a biological effect to yellow-billed cuckoo and treatment impacts would be insignificant.

Noxious weeds and invasive plants can outcompete native vegetation, reducing diversity and displacing host plants for insects that comprise part of the cuckoos' prey base. Using manual methods to treat small infestations where native vegetation will replace noxious weeds and invasive plants would result in a beneficial change in habitat quality for cuckoo prey.

Determination – Effects of Manual Treatments

Performing manual treatments to remove noxious weeds and invasive plants from and adjacent to yellow-billed cuckoo habitats *may affect, and are likely to adversely affect* yellow-billed cuckoo in the short-term due to human presence that could disturb or disrupt breeding, nesting, and brood rearing activities. Conservation measures would reduce the potential for adverse effects. Treatments that remove noxious and invasive plants from yellow-billed cuckoo occupied and suitable habitat would have a *beneficial effect* to yellow-billed cuckoo and its habitat in the long-term by reducing the potential for noxious weeds and invasive plants to outcompete the native vegetation that provides cuckoo nesting and prey habitats.

Manual treatments *may affect, but are not likely to adversely affect* yellow-billed cuckoo proposed critical habitat. Treatments would maintain or restore proposed critical habitat PBFs 1 through 3 by avoiding impacts that disturb the physical structure of riparian woodlands (PBF1), removing noxious weeds in and adjacent to riparian habitat (PBFs 1 and 3), and reducing competition with native vegetation, which may indirectly enhance recruitment and establishment of native woody riparian species (PBFs 1through 3).

Effects of Mechanical Treatments

Mechanical treatments would be used on larger infestations where manual noxious weed and invasive plant treatments would be impractical or too expensive. Mechanical treatment involves the use of vehicles such as wheeled tractors, crawler-type tractors, or specially designed vehicles with attached implements designed to cut, mow or mulch existing vegetation. Mowing would be the only mechanical treatment used near suitable yellow-billed cuckoo habitats, and would likely occur along major roads such as U.S. Highway 20. Mowing would only be used to reduce noxious weeds and invasive plants along roads and would typically occur toward the end of the growing season, but prior to seed set to avoid vegetation regrowth or spreading of seed. Mowing would also occur prior to vegetation curing and hot weather to avoid inadvertent fire starts.

Mowing would not be used in areas with riparian vegetation. Conservation measures direct that mechanical methods used by the BLM occur at least 200 feet from riparian habitat. Therefore, any mowing would occur no closer than 200 feet from a cuckoo nest. This is more than the 150 feet distance that was identified by Laymon (1998) as potentially disturbing to nesting cuckoos.

Early in the breeding season prior to nesting, yellow-billed cuckoo forage in upland areas adjacent to riparian woodlands. The use of heavy equipment and machinery to carry out mowing treatments could potentially kill or injure insects utilized as food source by yellow-billed cuckoo, especially if equipment was used adjacent to nesting habitat. Equipment associated with mowing treatments can crush or injure adult insects, their larvae, and eggs dwelling in or on the soil or vegetation. Mowing would remove noxious and invasive vegetation, but also could result in removal of some non-target vegetation. Cutting above-ground portions of nectar plants during the growing season could cause some important species to fail to flower during a butterfly's flight season, reducing the availability of food for yellow-billed cuckoo prey. These potential effects could result in a slight localized reduction in prey availability for yellow-billed cuckoo, but these effects are expected to be insignificant.

Members of the native frog population may be found outside of riparian corridors during the spring when high soil moisture conditions exist. Equipment used during mowing treatments can directly affect herpetofauna in upland habitats by killing or injuring individuals when they are using these areas for foraging or cover. Mechanical mowing treatments would be expected to reduce shading and humidity at the microsite level reducing the suitability and period of use of the treated area by herpetofauna. In addition, mechanical mowing treatments may also crush or reduce suitability of the habitat for invertebrates upon which many native frog species feed. The localized loss of winged invertebrates would reduce the hatch of insects on which the herpetofauna feed. The closer these mowing treatments occur to riparian habitat, the greater their potential effect on invertebrates and amphibians that are in the diet of yellow-billed cuckoo. These potential effects could result in a slight localized reduction in prey availability for yellow-billed cuckoo, but these effects are expected to be insignificant.

The noise and human presence associated with mowing treatments could disturb yellow-billed cuckoo courtship, breeding or nesting activities, depending on the timing of the treatment. Prolonged disturbances during the nesting period could cause yellow-billed cuckoo to abandon nests, thus impacting their reproductive success. Effects of mowing treatments due to human presence are expected to be similar to those described above for manual treatments. Treatments would be 200 feet or more from nesting habitat; however noise generated by mowing could disturb nesting birds at this distance. Treatments would occur prior to May 1 or after August 31 unless resource objectives cannot be met with these timing constraints. Treatments may need to occur during the months of May and June due to plant phenology and optimum treatment time. Treatments implemented during the breeding period would require oversight by a wildlife biologist and may include additional conservation measures to avoid adverse impacts to breeding cuckoos.

Determination – Effects of Mechanical Treatments

Mowing treatments *may affect, and are likely to adversely affect*, yellow-billed cuckoo or their habitat. Mechanical mowing treatments would cause a short-term, localized reduction in abundance and availability of prey for yellow-billed cuckoo and potential nest abandonment due to noise from equipment. These effects would occur during yellow-billed cuckoo breeding and nesting activities if vegetation treatment objectives cannot be met with the May 1 to August 31 constraint. Mowing treatments that protect native plant communities within or adjacent to suitable yellow-billed cuckoo habitat would likely result in *beneficial effects* to yellow-billed cuckoo and their habitat in the long-term.

Mechanical mowing treatments *may affect, but are not likely to adversely affect* yellow-billed cuckoo proposed critical habitat. Treatments would maintain or improve proposed critical habitat by protecting native plant communities from fire and suppressing movement of noxious weeds and invasive plants into adjacent woody riparian habitat (PBF 1). Mowing could result in short-term, insignificant effects to PBF 2. PBF 3 would not be affected by mowing due to stipulated riparian no-treatment buffer distances.

<u>*Effects of Treatments using Biological Controls*</u>

Approved biological control agents would be used for on-going noxious weed and invasive plant treatments. These treatments could be applied in uplands and riparian areas containing yellow-billed cuckoo and suitable or occupied habitat. Domestic goats or sheep would not be used in suitable or occupied yellow-billed cuckoo habitat, as these habitats occur in undeveloped RCAs. Yellow-billed cuckoos are not expected to occur in the high-use areas where domestic goats or sheep would be used as a biological control method.

Effects of biological control treatment implementation due to human presence on yellow-billed cuckoo are the same as described above for manual treatments. In addition, impacts to prey from trampling by implementation crews would be the same as described for manual treatments. Effects would be less due to shorter treatment duration, i.e. the time needed to release biological controls would typically be less than for pulling or cutting plants. In addition, manual treatments could occur at repeated intervals; biological control release would likely occur in a single event.

Biological control agents, even those that have been tested and approved for release, could cause future unanticipated impacts to yellow-billed cuckoo or their habitat. The use of biological control agents in riparian habitats would result in the loss of target and some non-target vegetation used by insects that comprise part of the cuckoo’s prey base. The type and abundance of insect prey available to yellow-billed cuckoo may experience a slight reduction resulting from direct competition for forage or space following release of one or more biological control agents. This loss would likely be small relative to the overall amount of prey available and would also be gradual, resulting in insignificant impacts to the local insect population used by yellow-billed cuckoo.

Changes to local insect populations can also affect other cuckoo prey. Release of biological control agents in riparian habitat could potentially alter or reduce the availability of aquatic and terrestrial insects that frogs use as prey during their different life stages. This could result in a slight reduction in the type and abundance of frogs occurring in suitable yellow-billed cuckoo habitat. The potential reduction in the number of frogs within the breeding and foraging territory of yellow-billed cuckoo from the release of biological control agents is not expected to result in any measureable reduction in the health or fecundity of yellow-billed cuckoo that use habitat in the TFD, and is therefore insignificant.

Biological control treatments would likely result in long-term beneficial effects to cuckoo habitats. Reduction in competition from noxious weeds and invasive plants could result in natural re-establishment of native plant species. Native plants would then be attended by the native suite of insects. Therefore, biological control treatments could in the long-term support greater prey abundance and diversity.

Determination – Effects of Biological Control Treatments

Biological control treatments *may affect, and are likely to adversely affect* yellow-billed cuckoo in the short-term due to human presence that could disturb or disrupt breeding, nesting, and brood rearing activities. Conservation measures that impose temporal constraints on treatments would reduce the potential for adverse effects. Treatments that remove noxious and invasive plants from yellow-billed cuckoo occupied and suitable habitat would have a *beneficial effect* to yellow-billed cuckoo and its habitat in the long-term by reducing the potential for noxious and invasive plants to out-compete native vegetation that provides cuckoo nesting and prey habitats.

Biological control treatments *may affect, but are not likely to adversely affect* yellow-billed cuckoo proposed critical habitat. Treatments would maintain or restore proposed critical habitat PBFs 1 through 3 by avoiding impacts that disturb the physical structure of riparian woodlands (PBF1), suppressing the presence of noxious weeds in and adjacent to the riparian habitat (PBF 1 and 3), and reducing competition with native vegetation, which may indirectly enhance recruitment and establishment of native woody riparian species (PBFs 1through 3).

Effects of Herbicide Treatments

On-going spot herbicide treatments could occur within riparian plant communities containing proposed critical habitat, suitable or occupied yellow-billed cuckoo habitat, as well as adjacent upland habitats used for foraging, dispersal, and exploratory movements. Herbicide treatments would consist of spot application using direct spray, wicking, wiping, dipping, painting, or injection. Where off-road vehicle use is not limited by travel restrictions, slope, or vegetation density, ATVs/UTVs could be used for treatment access.

Impacts resulting from human presence, changes in plant community structure, and beneficial effects to yellow-billed cuckoo, prey, and prey habitats would be similar to those described for manual and biological control treatments. The analysis for herbicide treatments will focus on the potential for impacts due to herbicide use including direct spray of prey, dermal contact by yellow-billed cuckoo or prey with treated vegetation, consumption of treated vegetation by prey, and consumption of contaminated prey by yellow-billed cuckoo. Impacts may vary by habitat type due to conservation measures that restrict use or timing of some chemicals in yellow-billed cuckoo habitat and riparian areas.

Treatments involve the spot application of herbicides at certain plant growth stages to kill noxious weeds and invasive plants. Depending on the type of herbicide selected, they can be used for control or complete eradication and may be used in combination with manual or biological control treatments. Selection of a herbicide and timing of application would depend on its chemical effectiveness on a particular weed species, habitat types present, proximity to water, and presence or absence of sensitive plant, wildlife, fish or other aquatic species. Conservation measures identify that the terrestrial formulations of the following herbicides may be used to spot treat noxious weed and invasive plants greater than 15 feet from areas containing hydric vegetation:

aminopyralid, bromacil, chlorsultfuron, clopyralid, dicamba, diflufenzopyr, diflufenzopyr+dicamba (Overdrive®), diuron (with additional restrictions for listed species), *fluroxypyr, hexazinone, imazapic, metsulfuron methyl, picloram, rimsulfuron, and tebuthiuron*. The herbicides that could be used in riparian habitat in RCAs are limited to aquatic formulations of *2,4-D, diquat, fluridone, glyphosate, imazapyr, and triclopyr.*

Spot herbicide treatments in suitable or occupied yellow-billed cuckoo habitat would cause disturbances associated with the temporary presence of humans in the area. Per conservation measures, spot herbicide treatments would typically not occur during the period when cuckoos are nesting and brood rearing. Treatments between May 1 and August 31 would occur only if treatments outside of this period have not or cannot meet vegetation management objectives. Treatments would occur in coordination with a wildlife biologist and with additional conservation measures to reduce or eliminate disturbance to cuckoos. This could include diurnal timing of treatment or crew size.

If treatments occur between May 1 and August 31, impacts due to human disturbance would be similar to, but slightly greater than those anticipated for manual and biological control treatments and would result in short-term adverse effects to yellow-billed cuckoo.

The greatest concern regarding human presence during the nesting season is risk of temporary or permanent nest abandonment. This is discussed in detail in the analysis for manual treatments above. An individual spot herbicide treatment for noxious weeds takes a maximum of one to two minutes to perform and crews could treat and leave the area without disturbance to birds. However, scattered or dense weed populations with multiple plants could take longer to treat, resulting in longer presence of weed treatment crews. This could be long enough to result in adults leaving their nest for greater than 10 minutes which could result in nest failure. In addition, adults being away from the nest leaving behind young which have yet to fledge increases their risk to exposure and predation. Either situation could result in loss of a years breeding efforts.

The severity of these human-related effects would depend on the duration of the disturbance and the proximity of disturbance to nesting habitat. Although adult birds would be able to fly away from temporary human incursions caused while performing spot herbicide treatments, returning to the treated area would expose them to the possibility of direct contact with vegetation treated with herbicide. The elevated level of humidity commonly found in multi-layered woody, deciduous riparian habitats would increase the period of time that spot herbicide applications would remain in a liquid state as compared to upland locations which exposes returning cuckoos to a slightly longer period for dermal exposure. There is also the possibility, considered remote, that herbicide would be transported by wind currents to the adjacent riparian area exposing yellow-billed cuckoo nest, eggs and young to the herbicide. Through this exposure pathway, short-term negative health effects to birds could occur if *2,4-D*, *glyphosate*, *hexazinone*, or *triclopyr* were used. However, due to conservation measures, SOPs, and label restrictions for application conditions including chemical type and wind speed, this effect is expected to be discountable. No herbicides proposed for use are expected to result in harm to yellow-billed cuckoos due to dermal contact.

Indirect effects could result from yellow-billed cuckoo consumption of prey that have been subject to herbicide exposure through direct spray or contact with treated vegetation. Indirect effects could also occur through bioaccumulation, where prey has consumed food items including vegetation or insects that have been subject to direct spray. Adult frogs and their young metamorphs consume insects and other invertebrates. The larval and adult stage of moths, beetles, grasshoppers, dragonflies or other insects could accumulate herbicides by direct spray or ingestion of treated vegetation and subsequently be consumed by yellow-billed cuckoo. Young prey are believed to be more vulnerable to both contamination and predation due to limited mobility.

Exposure of prey to herbicides could occur when implementing treatments prior to the nesting season. Yellow-billed cuckoos use upland sites adjacent to riparian areas for foraging in the beginning of the breeding season when these upland areas are drier and warmer than adjacent riparian areas. Conditions in uplands result in an abundance of early emerging insects. These areas may also support frogs and toads that occur in moist uplands adjacent to streams, springs, or wetlands. The boreal chorus frog, pacific tree frog, and western toad may travel outside of riparian corridors during the spring when high moisture conditions exist.

Yellow-billed cuckoo prey species including butterfly, moth, grasshopper, katydid, dragonfly and other insect species could be injured or killed by herbicide treatments affecting both target and non-target host and nectar plants. There could also be some trampling of larvae, eggs, and adults by workers performing spot treatments. Adult amphibians could ingest contaminated prey or come in contact with treated vegetation. Spot herbicide treatments in upland and riparian habitats could potentially alter or reduce the availability of aquatic and terrestrial insects that frogs use as prey. Therefore, treatments could eventually result in a slight reduction in the type and abundance of all prey occurring in yellow-billed cuckoo habitat. Anticipated changes in prey populations would not likely occur to the extent that they would be reasonably measured, detected, or evaluated, as treatments would be small in scale and would not affect all prey in the yellow-billed cuckoos' foraging area. Therefore, effects would be insignificant.

The potential for yellow-billed cuckoo consuming contaminated prey is relatively small. Although spot herbicide treatments would affect prey for a short period of time and typically outside of the nesting season, the potential for short-term, localized effects cannot be completely discounted.

While impacts to non-target vegetation are possible, spot treatment methods are highly controllable (spray by hand) and reduce the potential for non-target species mortality. Herbicide treatments in yellow-billed cuckoo occupied and suitable habitat would reduce competition to native riparian and upland vegetation used by cuckoos and their prey. In the long-term, spot herbicide treatments performed in riparian areas and adjacent upland sites would result in the maintenance or restoration of habitat conditions suitable for yellow-billed cuckoo.

Determination – Effects of Herbicide Treatments

Spot herbicide treatments to control noxious weeds and invasive plants *may affect, and are likely to adversely affect*, yellow-billed cuckoo. Human presence in occupied and suitable yellow-billed cuckoo nesting habitat while performing chemical noxious weed control treatments could alter courtship, breeding, nesting and foraging activities of yellow-billed cuckoo, potentially resulting in abandonment of the nest. Spot herbicide treatments could also result in a short-term, localized reduction in the insect and herpetofauna population used by yellow-billed cuckoo as prey. Treatments that remove noxious weeds and invasive plants from riparian areas and adjacent upland habitats are likely to *beneficially effect* yellow-billed cuckoo in the long-term by creating conditions where native vegetation, with its attendant diverse assemblage of insects and herpetofauna, can establish and reassert dominance in the riparian plant community.

Spot herbicide treatments *may affect, but are not likely to adversely affect* yellow-billed cuckoo proposed critical habitat. Treatments would maintain or restore proposed critical habitat PBFs 1 through 3 by avoiding impacts that disturb the physical structure of riparian woodlands (PBF1), suppressing the presence of noxious weeds in and adjacent to the riparian habitat (PBF 1, 3), and reducing competition with native vegetation, which may indirectly enhance recruitment and establishment of native woody riparian species (PBFs 1-3).

Proposed Yellow-billed Cuckoo Critical Habitat

The assessment of potential effects to yellow-billed cuckoo proposed critical habitat includes an evaluation of the three PBFs identified by the Service (79 FR 48550) as important components of yellow-billed cuckoo proposed critical habitat (Table 17). A description of the PBFs and the potential for short-term direct or indirect effects from noxious weed and invasive plant treatments are summarized below. The potential for treatments to maintain, improve, or degrade PBFs is also identified. Overall, on-going and proposed noxious weed and invasive plant treatments would maintain or improve all PBFs for yellow-billed cuckoo proposed critical habitat in the long-term.

Table 17 – Effects to Yellow-billed Cuckoo Proposed Critical Habitat PBFs Resulting from Noxious Weed and Invasive Plant Treatments

PBF #	PBFs	Direct and Indirect Effects to PBFs (Maintain, Improve, or Degrade)
1	Riparian woodlands. Riparian woodlands with mixed willow-cottonwood vegetation, mesquite-thorn-forest vegetation, or a combination of these that contain habitat for nesting and foraging in contiguous or nearly contiguous patches that are greater than 325 ft (100 m) in width and 200 ac (81 ha) or more in extent. These habitat patches contain one or more nesting groves, which are generally willow-dominated, have above average canopy closure (greater than 70 percent), and have a cooler, more humid environment than the surrounding riparian and upland habitats.	Manual, mechanical, biological control and spot herbicide treatments, in combination with conservation measures and SOP, would result in insignificant or discountable short-term adverse effects to PBF-1. Adverse effects would result from small, localized changes in plant foliar cover from using manual, mechanical or biological control methods; or come in the form of chemical exposure (inadvertent herbicide application or drift) of woody, deciduous members of the riparian woodlands. PBF-1 would be maintained in the short-term. The habitat characteristics for suitable yellow-billed cuckoo nesting or foraging provided by the riparian woodlands would be maintained or improved through the use of design features and conservation measures tailored to the specific treatment method. PBF-1 would be maintained or improved in the long-term.

PBF #	PBFs	Direct and Indirect Effects to PBFs (Maintain, Improve, or Degrade)
2	Adequate prey base. Presence of a prey base consisting of large insect fauna (e.g., cicadas, caterpillars, katydids, grasshoppers, large beetles, dragonflies) and tree frogs for adults and young in breeding areas during the nesting season and in post-breeding dispersal areas.	Manual, mechanical, biological control and spot herbicide treatments, in combination with conservation measures, including no-treatment buffers for mechanical mowing methods and SOP, would result in insignificant or discountable short-term adverse effects to PBF-2. Potential localized, short-term effects to prey would be due to direct herbicide application, consumption, or contact with contaminated plants, reduction of herbaceous habitat conditions from mowing, or injury or mortality due to trampling by weed treatment crews. An adequate prey base for yellow-billed cuckoo adjacent to the treatment area would be maintained following treatment. Conditions that support PBF-2 would be maintained in the short-term. Reduction or elimination of noxious weeds and invasive plants in riparian and adjacent upland habitats would maintain or improve habitat conditions for the prey base withinin the proposed critical habitat. PBF-2 would be maintained or improved in the long-term.
3	Dynamic riverine processes. River systems that are dynamic and provide hydrologic processes that encourage sediment movement and deposits that allow seedling germination and promote plant growth, maintenance, health, and vigor (e.g. lower gradient streams and broad floodplains, elevated subsurface groundwater table, and perennial rivers and streams). This allows habitat to regenerate at regular intervals, leading to riparian vegetation with variously aged patches from young to old.	Manual, biological control and spot herbicide treatments, in combination with conservation measures and SOP, would result in insignificant and discountable short-term adverse effects to PBF-3. Reducing or eliminating noxious weeds and invasive plants would reduce competition to hydric vegetation which is important in maintaining fluvial processes. Conditions that support PBF 3 would be maintained in the short-term. Manual, biological control and spot herbicide treatments would create site characteristics that support and encourage establishment of native riparian species. The reduction or elimination of noxious weeds and invasive plants in segments of low-gradient riverine systems that support active, localized movement and deposition of river channel bedload would provide habitat conditions conducive to staggered occupancy by members of the native riparian plant community. PBF 3 would be maintained or improved in the long-term.

Interrelated and Interdependent Effects

Interrelated and interdependent actions include those activities that would not occur if not for the proposed action. No interrelated or interdependent effects to yellow-billed cuckoo and yellow-billed cuckoo proposed critical habitat have been identified for the proposed action.

Cumulative Effects

The implementing regulations for Section 7 of the ESA define cumulative effects to include those effects of future state, tribal, local, or private actions that are reasonably certain to occur in the action area. The cumulative effect assessment considered the potential for effects to yellow-billed cuckoo and yellow-billed cuckoo proposed critical habitat from on-going and predicted future uses and activities on state and private lands within the previously defined analysis area for yellow-billed cuckoo.

The multi-layered woody deciduous riparian plant communities located adjacent to perennial or intermittent streams provide environmental conditions that sustain yellow-billed cuckoo. These communities may have been affected by, and are vulnerable to, habitat loss that alters natural watercourse hydrology. Threats include livestock overgrazing and encroachment by agriculture (79 FR 59992).

State and private land uses within and immediately adjacent to the four suitable yellow-billed cuckoo habitat areas in the TFD include but may not be limited to municipal and agricultural water diversions, commercial and residential developments, transportation infrastructure, noxious weed or invasive plant treatments implemented during the breeding season or not at all, hydroelectric development and infrastructure, water pollution, agricultural encroachment, and livestock grazing. The Big Wood River within the proposed critical habitat unit is a popular fly fishing area. This area has a fishing closure from April 1 to the Friday before Memorial Day weekend and is otherwise open the remainder of the year, including during the cuckoo breeding season. All of these uses have the potential to result in adverse cumulative impacts to cuckoos and their habitat both within and adjacent to the four suitable yellow-billed cuckoo breeding areas.

Cumulative effects could result from habitat degradation on State and private lands due to development, modified hydrology, and land uses coupled with lack of control for noxious weeds and invasive plants. This habitat degradation would compress and fragment available habitat for cuckoos and their prey and increase the importance of maintaining good habitat conditions on Federal lands. Implementation of the proposed action, including protective measures, could maintain or improve these habitat islands, if performed with no or little disturbance to nesting birds and their prey.

Disturbance due to human or animal presence on State and private lands is not subject to time constraints included as design features in the proposed action. The analysis of direct and indirect effects discloses the potential effects of treatments implemented during the avoidance period of May 1 through August 31. This is to ensure full understanding of potential effects if treatments are necessary during the avoidance period to meet vegetation management objectives. Therefore, activities that occur during the breeding season on State and private lands may have a greater cumulative effect if noxious weed and invasive plant treatments are being implemented on

Federal lands at the same time. In addition, application of herbicides on State and private lands are not subject to the design features, conservation measures, and SOPs that are part of the proposed action and are not limited to 20 herbicides. While noxious weed and invasive plant control or removal treatments under the proposed action are anticipated to have some short-term adverse effects to breeding birds and prey if treatments are implemented during the nesting season, these effects could be cumulatively greater if treatments are also implemented on State or private lands with no controls other than label restrictions. Lack of noxious weed and invasive plant treatments on State and private lands would increase the influx of these plants on Federal lands, increasing the necessity for treatment.

Canada Lynx

Lynx occurring in the TFD may be affected by management activities that reduce or degrade essential habitat elements used for denning, foraging, and recruitment, or that increase habitat fragmentation or mortality.

The analysis area for Canada lynx includes the lands within the boundaries of the eight LAUs containing public land in the TFD. Land ownership within the eight LAUs is as follows: USFS, 404,003 acres (60 percent); BLM, 89,178 acres (13 percent); State of Idaho, 1,023 acres (one percent); private 174,627 (26 percent). A total of 879 acres of suitable Canada lynx habitat occurs on public lands managed by BLM in the TFD within LAUs. Suitable Canada lynx habitat has not been mapped or identified on State or private lands. There are 15 element occurrences of Canada lynx in the TFD, two of which occur in LAUs. The two element occurrences of Canada lynx in LAUs are located on USFS land. Canada lynx is expected to be a rare visitor to the action area.

Non-native invasive plant species were not identified in the 2013 LCAS plan as being a risk factor to lynx or lynx habitat. Lynx habitat in the TFD occurs at elevations > 5,000 feet and in vegetation types that are not prone to invasion and dominance by noxious weeds and invasive plants. These species tend to occur only in disturbed areas, such as road sides. Therefore, vegetation treatments on BLM lands in the LAUs would likely be limited to small scale on-going manual, biological control, and spot herbicide treatments in these disturbed areas.

Actions Determined to Have No Effect

Several noxious and invasive plant treatment methods were identified as having no potential for short or long-term direct or indirect effects to Canada lynx or occupied habitat. The no effect determination was reached based on one of the following reasons: 1) The treatment method would not be applied within LAUs, or 2) the distance between areas where the treatment method would be used and the LAU was sufficient to avoid any potential direct or indirect effects. The no effect actions and rationale for determination are listed in Appendix M.

Actions That May Affect Canada Lynx

The analysis focuses on treatments methods that are within or adjacent to areas containing habitat conditions that are suitable for lynx or their principal prey species within LAU boundaries. These treatment methods were determined to have potential short-term and small-scale effects resulting from human presence that could disturb lynx or prey, modification of vegetation composition or structure important to prey for food or cover, or exposure of lynx or prey to herbicides, either through consumption or dermal contact. Effects were considered for boreal, riparian, and upland habitats used by lynx for foraging, dispersal, exploratory movements, and potential denning. Effects distinct to habitat type will be characterized for each treatment method. Unless stated otherwise, effects are characterized for all habitat categories. While there is no known denning habitat on BLM land in the LAUs, the potential exists and is addressed by the analysis. These treatment methods are discussed in detail below and are summarized in Appendix M.

Effects of Manual Treatments

Human presence during implementation of manual treatments could result in disturbance of Canada lynx during reproduction periods and foraging, dispersal, and exploratory activities. Manual treatments would occur during the time of the year (May 1 through July 31, see Appendix G) when Canada lynx would be expected to be raising kittens at or near den sites. Den sites are typically located in hollow logs or rootwads within boreal habitats containing mesic, mature or old growth coniferous forest (Koehler & Brittell, 1990). Manual treatments would also occur during the time of the year that Canada lynx are raising young in preparation for release into the population. Manual treatments in upland sites would occur at the edge of foraging habitat or near travel corridors used to access patches of boreal forest. Human disruption of breeding or other activities could result in a slight decrease in fitness of individual Canada lynx. Manual treatments would tend to occur in disturbed areas, such as near roads, and would be implemented by approximately one to six people over periods lasting a few hours to a few days. Treatments are not expected to occur near denning habitats, but could occur where kittens or foraging adults are present. However, effects would be insignificant due to the small scale and short duration of treatments, which would be unlikely to result in disturbance to reproductive activities, or harm, or mortality of lynx individuals. In addition, improvement of habitats used by lynx in the LAUs due to removal of noxious weeds and invasive plants would support naturally occurring vegetation landscape patterns conducive to Canada lynx habitat needs.

Manual treatments in boreal, riparian, and upland habitats could result in changes in the type, abundance and availability of Canada lynx prey items. The diet of Canada lynx is primarily comprised of snowshoe hare and lynx foraging habitat closely corresponds with snowshoe hare habitat. In the southern border areas of Canada lynx habitat, snowshoe hare are most abundant in boreal habitats containing seedling/sapling lodgepole pine, subalpine fir, and Engelmann spruce forest stands. Other prey species occurring in boreal, riparian, and upland habitats include red squirrels, grouse, flying squirrels, ground squirrels, mice and voles (Brand & Keith, 1979; Brand et al., 1976; Koehler, 1990; Nellis et al., 1972; O'Donoghue et al., 1998; Saunders, 1963; van Zyll de Jong, 1966). Human presence during manual treatments could result in prey abandonment of the treatment area or harm or mortality of small prey due to trampling. Manual treatments would result in some vegetation removal, potentially resulting in changes to cover and food sources that are important to prey species. However, as stated above, manual treatments are normally performed on small noxious weed infestations for short time periods. Disturbance would be temporary and the potential for complete abandonment of the treatment area or harm or mortality of prey would be low. Use of manual treatments to treat small infestations should be beneficial to the native avian and small mammal population by increasing the native vegetation component of boreal, riparian and upland plant communities. This would, in the long-term, maintain or improve prey habitats.

Determination – Effects of Manual Treatments

Manual treatments to remove noxious weeds and invasive plants from boreal, riparian, and upland habitats within LAUs *may affect, but are not likely to adversely affect*, Canada lynx in the short term. This would be due to short-term disturbance to lynx and prey from human disturbance and removal of noxious weeds and invasive plants that could provide cover or food for prey species. However, due to the small scale and short duration of the treatments, these effects would be insignificant and discountable. In addition, removal of noxious weeds and invasive plants would reduce competition to native plants that could provide food and cover for lynx prey. This would result in long-term *beneficial effects* to Canada lynx.

Effects of Biological Control Treatments

Approved biological control agents would be used as on-going treatments to reduce noxious weeds such as spotted knapweed, leafy spurge, dalmation toadflax, rush skeletonweed, and diffuse knapweed. These treatments could be applied in LAUs containing boreal, riparian, and upland communities that provide suitable lynx habitat.

Biological controls would include insects, nematodes, mites, or pathogens. Human presence during release and monitoring of biological control treatment could result in disturbance of Canada lynx during reproduction periods and foraging, dispersal, and exploratory activities and prey species in all habitat types. These impacts are described above for manual treatments. However, impacts are expected to be shorter in duration for biological control release. Neither biological control release nor monitoring would result in the vegetation disturbance that occurs with manual removal.

Biological control treatments could result in modification of vegetation composition and structure and could affect food or habitat availability for lynx prey. As with manual treatments, removal of noxious weeds and invasive plants from boreal, riparian, and upland habitats could result in long-term beneficial effects to prey due to reduced competition with native vegetation.

Domestic goats or sheep could be used in limited areas with larger, concentrated noxious weed populations or areas with high human use where herbicides would not be a desirable treatment method. Domestic goats or sheep would not be used in riparian areas lacking human developments. Treatments would generally occur from late spring through early fall. Presence of goats or sheep, with humans and possibly dogs needed to herd the animals could result in disturbance of lynx and prey as described for manual treatments. This disturbance would be short in duration (a few hours to a few days, depending on the size and continuity of the weed infestation), but would be greater than described for manual treatments due to the number of animals. However, goats or sheep would typically be used in areas where human disturbance is common and use of these areas by lynx or their primary prey beyond transitory movement is unlikely. Two developed recreation sites where goats or sheep could be used to control noxious weeds and invasive plants occur on BLM land in the LAUs. These are the Lake Creek and Sun Peak recreation sites north of Ketchum, Idaho. Both of these recreation sites are heavily used year round by recreationists. The high degree of human development and presence in and near these recreation sites results in an extremely low probability that Canada lynx would make incidental use of the habitat during exploratory movement.

Treatment in upland sites could occur at the edge of Canada lynx foraging habitat or near travel corridors used to access patches of boreal forest. Goats or sheep would reduce vegetation cover, focusing on target vegetation, but could include some non-target plants. Snowshoe hare require dense horizontal cover to reduce exposure to predators and as a food source (Hodges, 2000; Murray, 2003). Diet of the hare is primarily comprised of forbs and deciduous shrubs from spring through fall and switch to woody browse during the winter (Wirsing & Murray, 2002). Using goats or sheep to consume noxious weeds and invasive plants could result in modification of cover and food availability for lynx prey including snowshoe hare, dusky grouse and various small mammals. Prey habitat modification by goats or sheep would be small in scale and limited to treatment areas, which typically are dominated by the target noxious weeds or invasive plants.

Removal of noxious weeds and invasive plants would reduce competition with native plants and potential for dispersal to higher quality prey habitats. This could have long-term positive effects by increasing the suitability of habitats to support a more diverse assemblage of prey species.

Determination – Effects of Biological Control Treatments

Biological control treatments *may affect, but are not likely to adversely affect*, Canada lynx. This would be due to short-term disturbance to lynx and prey from human and animal disturbance and removal of noxious weeds and invasive plants that could provide cover or food for prey species. However, due to the small scale and short duration of the treatments, these effects would be insignificant and discountable. In addition, use of goats or sheep would be limited to areas that would not typically be used by lynx. Removal of noxious weeds and invasive plants would reduce competition to native plants that could provide food and cover for lynx prey. This would result in long-term *beneficial effects* to Canada lynx.

Effects of Herbicide Treatments

Under the proposed action, herbicide applications could occur within boreal communities containing suitable Canada lynx habitat for denning and foraging, as well as riparian and upland habitats used for foraging, dispersal, and exploratory movements in the LAUs. Because noxious weeds and invasive plants are not dominant in the boreal, riparian, and upland communities that occur in LAUs, herbicide treatments would consist of on-going spot application using direct spray, wicking, wiping, dipping, painting, or injection. Where off-road vehicle use is not limited by travel restrictions, slope, or vegetation density, ATVs/UTVs could be used for treatment access. However, vegetation in boreal, riparian, and upland habitats in the LAUs tend to have vegetation that occurs at a density that would impede off-road travel, so this use is unlikely.

Impacts of human presence, changes in plant community structure, and beneficial effects to lynx, prey, and prey habitats would be the same as those described for manual and biological control treatments. The analysis for herbicide treatments will focus on the potential for impacts due to consumption of treated vegetation by prey, direct spray of prey, and dermal contact by lynx or prey with treated vegetation. Impacts may vary by habitat type due to conservation measures that restrict use of some chemicals in lynx habitat and riparian areas.

Treatments involve the spot application of herbicides at certain plant growth stages to kill noxious weeds and invasive plants. Depending on the type of herbicide selected, they can be used for control or complete eradication and may be used in combination with manual or biological control treatments. Selection of an herbicide and timing of application would depend on its chemical effectiveness on a particular weed species, habitat types present, proximity to water, and presence or absence of sensitive plant, wildlife, fish or other aquatic species. Conservation measures preclude the use of *2,4-D* in Canada lynx (boreal) habitat. Use of *bromacil, clopyralid, diquat, diuron, glyphosate, hexazinone, imazapyr, metsulfuron methyl, picloram,* and *triclopyr* is discouraged in lynx habitat. In addition, use of *aminopyralid, bromacil, chlorsultfuron, clopyralid, dicamba, diflufenzopyr, diflufenzopyr+dicamba (Overdrive®), diuron, fluroxypyr, hexazinone, imazapic, metsulfuron methyl, picloram, rimsulfuron, and tebuthiuron* is limited in RCAs. If *glyphosate, hexazinone,* or *triclopyr* are used in lynx habitat, typical, rather than the maximum application rate would be used.

Boreal habitats within the LAUs comprise lynx potential denning and primary foraging habitats. Riparian and upland habitats are used to a lesser extent than boreal for foraging, dispersal, and exploratory movements. Noxious weeds and invasive plants in the higher elevations used by lynx tend to be concentrated in disturbed locations such as roadsides or other areas with concentrated human activities, such as recreation, mining, or livestock grazing. Therefore spot herbicide treatments would likely be limited to these locations.

Canada lynx could be directly affected by dermal contact with treated vegetation. Ingestion of herbicides could result from grooming activities. Dermal contact would most likely to occur immediately after treatment before the herbicide dries on the vegetation. Lynx presence is expected to occur to a greater extent in boreal habitat compared to riparian and upland habitats. This is due to the increased probability of denning and foraging for snowshoe hare in boreal habitat. Dermal contact by lynx with *2,4-D* could occur in riparian or upland habitats; however, these habitats are typically used to a lesser extent, so the potential for exposure is likely to be very small.

Lynx would likely disperse away from the treatment area and remain absent as long as humans are present. Depending on atmospheric conditions, chemicals would dry within 30 minutes following spraying and vegetation would be dry prior to or shortly after humans leave the treatment area. Therefore, direct effects to lynx due to dermal contact from spot herbicide treatments would be discountable.

Indirect effects could result from consumption of prey that have been subject to dermal contact through direct spray or contact with treated vegetation. Indirect effects could also occur through bioaccumulation, where prey has consumed food items including vegetation or insects that have been subject to direct spray. Grouse, mice, and voles consume insects seasonally and/or opportunistically. The primary period of the year that insects are contained in the diet of grouse, mice, and voles would be in the late spring and summer when herbicides would be typically applied in boreal habitats. The larval and adult stage of moths, beetles, grasshoppers, or other insects could accumulate herbicides by direct spray or ingestion of treated vegetation and subsequently be consumed by lynx prey. Canada lynx could consume prey that have been contaminated by direct spray or ingested herbicides.

Direct spray of terrestrial invertebrates or dermal contact with herbicides could result in mortality, reduced reproductive output, behavioral modification, and/or increased susceptibility to environmental stresses. These toxicological effects could lead to a decrease in the size and viability of the affected population of invertebrates in and immediately adjacent to the treatment area and impact food availability for lynx prey.

Snowshoe hare, ground squirrel, mice, and voles and grouse could ingest vegetation or invertebrate prey that was sprayed during herbicide treatments. The snowshoe hare is herbivorous while ground squirrels, mice, and voles are expected to eat some insects, but primarily feed on vegetation. Possible effects to individual prey include death, damage to vital organs, change in body weight, decrease in healthy offspring and increased susceptibility to predation. Young prey would be more vulnerable to both contamination and predation due to limited mobility. Lynx could consume these prey items, resulting in potential herbicide-related effects.

As described for direct effect to Canada lynx, dermal contact would occur when vegetation is wet with herbicide and drying typically occurs within 30 minutes of spray. Mobile prey would likely flee from the treatment area while humans are present; however, less mobile prey could be subject to direct spray or dermal contact.

Treatments would occur as spot applications and infrequently within boreal plant communities as noxious weeds and invasive plants are not expected to be common at these higher elevations. Treatments could be more frequent in riparian or upland habitats; however, these habitats are less frequently used by lynx. The potential for dermal contact is limited by the time that herbicides are wet on the vegetation and the absence of humans during this time. The potential for lynx consuming contaminated prey is very small. In addition, changes in prey populations would not likely occur to the extent that they would be reasonable measured, detected, or evaluated compared to the home range of lynx. Therefore, indirect effects of herbicide treatments would be insignificant and discountable.

Determination – Effects of Herbicide Treatments

Spot herbicide treatments to control noxious weeds and invasive plants *may affect, but are not likely to adversely affect* Canada lynx. The likelihood of direct effects due to dermal contact is discountable due to infrequency of spot treatments in habitats used by lynx and low potential for contact with recently treated vegetation. Treatments could result in indirect effects consisting of slight short-term reductions in the small mammal and grouse populations utilized as prey by Canada lynx. This effect is not expected to result in a measureable reduction in the health or fitness of Canada lynx and therefore would be insignificant. Over the long term, habitat condition would improve due to the reduction in noxious weeds and invasive plants that compete with native vegetation. Containment of weeds in and adjacent to lynx habitat could have long-term *beneficial effects* by increasing the suitability of the habitat to support a more diverse assemblage of native small mammal prey species.

Interrelated and Interdependent Effects

Interrelated and interdependent actions include those activities that would not occur if not for the proposed action. No interrelated or interdependent effects to Canada lynx or their habitat have been identified for the proposed action.

Cumulative Effects

The implementing regulations for Section 7 of the ESA define cumulative effects to include those effects of future state, tribal, local, or private actions that are reasonably certain to occur in the action area. The cumulative effect assessment considered the potential for effects to Canada lynx and their habitat from on-going and predicted future uses and activities on state and private lands within the previously defined area of analysis for Canada lynx.

Sustaining the habitat characteristics across the landscape within the LAUs that provide lynx with secure corridors for travel and access to patches of boreal forest is important in maintaining or improving habitat suitability for lynx. These patches of habitat also need to contain suitable lynx foraging habitat provided by dense understories of trees and shrubs.

Actions by the State of Idaho on state-managed lands that may affect Canada lynx or its habitat would constitute cumulative effects. These actions would include failure to treat noxious weed and invasive plant infestations; treatment of noxious weeds and invasive plants without conservation measures to preserve Canada lynx suitable habitat; biological control using goats or other domestic livestock; timber harvest and associated road development; livestock grazing and trampling; utility development; communication facility development. The actions on private lands would be very similar to those on State land but with fewer design features or conservation measures. Canada lynx cumulative impacts on non-Federal lands may also include the lack of management actions to maintain suitable habitat conditions for lynx. Non-Federal actions may be less likely to incorporate re-vegetation or weed control efforts. On-going activities on State and private land are expected to continue into the future and have the potential for cumulative effects to Canada lynx and their habitat where these activities occur within boreal spruce/fir timber communities or riparian areas in LAUs.

Cumulative effects could result from habitat degradation on State and private lands due to development, and land uses coupled with lack of control for noxious weeds and invasive plants. This habitat degradation would fragment available habitat for lynx and their prey and increase the importance of maintaining good habitat conditions on Federal lands. Implementation of the proposed action, including protective measures, could maintain or improve habitat quality, if performed with no or little disturbance to lynx while engaged in denning, rearing young, foraging, or dispersal activities.

Disturbance due to human or animal presence on State and private lands could occur during sensitive periods of lynx life cycle activities. The analysis of direct and indirect effects discloses the potential effects of treatments implemented during rearing of young kittens, which occurs from May 1 through July 31. This is to ensure complete discussion and analysis of potential effects given that noxious and invasive weed treatments would be implemented during this period. Activities that occur while lynx are denning or raising young on State and private lands may have a greater cumulative effect if noxious weed and invasive plant treatments need to be implemented at that time to increase control on Federal lands. In addition, application of herbicides on State and private lands are not subject to the design features, conservation measures, and SOPs that are part of the proposed action and are not limited to 20 herbicides. While noxious weed and invasive plant control or removal treatments under the proposed action are anticipated to have some short-term adverse effects to young-of-the-year and prey, treatments implemented while raising kittens could be cumulatively greater if treatments are also implemented on State or private lands with no controls other than label restrictions. Lack of noxious weed and invasive plant treatments on State and private lands would increase the influx of these plants on Federal lands, increasing the necessity for treatment.

North American Wolverine

The high elevation habitats preferred by wolverines are not typically a focus for noxious weed and invasive plant treatments, as target species are rare in these areas. A snow-persistence model developed by Copeland et al. (2010) has been used to form the basis of the likely areas that may contain conditions suitable for wolverine denning activities. In an effort to capture the most likely areas containing suitable wolverine denning habitat, areas predicted by the model to contain persistent snow for the greatest length of time were selected. Wolverine research in central Idaho by Copeland (1996) reveals the average home ranges of resident adult females were 148 square miles, and average home ranges of resident adult males were 588 square miles. To arrive at a buffer distance that would encompass the average home range sizes of male and female wolverine a circular-shaped home range was used. This results in a buffer distance of seven miles for female wolverine and 13.5 miles for males. This buffer distance was applied to the border of the selected snow persistence polygon to establish a boundary of the area where noxious weed control actions may possibly affect wolverine. The 13.5 mile buffer distance was used to help assure that the greatest consideration was provided toward the conservation of wolverine, especially denning females. Refer to Figure 11 for the location of the buffered wolverine analysis area.

The analysis area for wolverine includes lands within the boundaries of the buffered wolverine analysis area that contain public land in the TFD. Land ownership within the analysis area is as follows: USFS, 803,247 acres (66 percent); BLM, 138,348 acres (11 percent); National Park Service, 262 acres (less than one percent); State of Idaho, 31,849 acres (three percent); private 250,050 acres (20 percent). A total of 4,753 acres of BLM-managed land in the analysis area occurs above 8,200 feet in elevation. Suitable wolverine habitat has not been mapped or identified on State or private lands. The IDFG’s Natural Heritage Program identifies 72 sightings for wolverine in the TFD boundary between 1891 and 2015. Sixty-three sightings occurred in the buffered wolverine analysis area (IDFG, 2015). A total of 59 wolverine sightings in the analysis area were located on USFS-managed lands, one was on BLM-managed lands, and three sightings were on private land. Therefore, wolverine is expected to be a rare visitor within the boundaries of the analysis area.

This effects analysis considered the potential for short- and long-term direct, indirect, and cumulative effects to wolverine and its habitat for all the on-going and proposed noxious weed and invasive plant treatments identified in Chapter 2 of this BA. The potential for treatments to result in negative or beneficial effects to the species or their habitat are also identified. The analysis focuses on treatments that are within or adjacent to areas containing habitat conditions that provide suitable habitat for wolverine or their principal prey species within the analysis area. Noxious and invasive plant treatments that are outside of the analysis area would result in no direct or indirect effects to wolverine or their habitat.

Actions Determined to Have No Effect

Several noxious and invasive plant treatment methods were identified as having no potential for short or long-term direct or indirect effects to wolverine or their habitat. The no effect determination was reached based on one of the following reasons: 1) The proposed treatment method would not be applied within the analysis area; or 2) The distance between the proposed treatment and the analysis area was sufficient to avoid any potential direct or indirect effects. The no effect actions and rationale for determination are listed in Appendix M.

Actions That May Affect Wolverine

The analysis focuses on treatments that would occur within or adjacent to areas containing habitat conditions that are suitable for wolverine or their principal prey species in the analysis area. Due to location, elevation, and vegetation conditions in the analysis area, only small-scale on-going noxious weed and invasive plant treatments would occur. The use of larger-scale treatments is not anticipated. The small-scale on-going treatments were determined to have potential short-term and small-scale effects resulting from human presence that could disturb wolverine or prey, modify vegetation composition or structure important to prey for food or cover, or exposure of wolverine or prey to herbicides, either through consumption or dermal contact. Effects were considered for boreal/upland and mid-elevation riparian and upland habitats used by wolverine for foraging, dispersal, exploratory movements, and potential denning. Effects distinct to habitat type were characterized for each treatment method. Unless stated otherwise, effects are characterized for all habitat categories. While there is no known wolverine denning habitat on BLM-managed lands in the TFD, the potential exists for a denning female or a male wolverine to use BLM land during treatment implementation; therefore this possibility is addressed by the analysis. These treatment methods are discussed in detail below and are summarized in Appendix M.

Effects of Manual Treatments

Human presence during implementation of manual treatments could result in disturbance of wolverine during reproduction periods and foraging, dispersal, and exploratory activities. Manual treatments would occur during the time of the year (May 1 through July 15, see Appendix G) when wolverine would be expected to be raising kits at or near den sites. In Idaho, natal den sites occur above 8,200 feet on rocky sites, such as north-facing boulder talus or subalpine cirques in forest openings (Magoun & Copeland, 1998). Females may move kits to multiple secondary (maternal) dens as they grow during the month of May (Copeland, 1996). Manual treatments would also occur during the time of the year that wolverine raise young in preparation for dispersal into the population. Manual treatments in boreal/upland sites would occur at the edge of foraging habitat or near travel corridors used to access patches of boreal forest. Human disruption of breeding or other activities could result in a slight decrease in fitness of individual wolverine. Manual treatments would tend to occur in disturbed areas, such as near roads, and would be implemented by approximately one to six people over periods lasting a few hours to a few days. Treatments are not expected to occur near denning habitats due to high elevation, but could occur where kits or foraging adults are present. However, effects would be insignificant due to the small scale and short duration of treatments, which would be unlikely to result in disturbance to reproductive activities, or harm or mortality of wolverine individuals. In addition, improvement of habitats used by wolverine due to removal of noxious weeds and invasive plants would support naturally occurring vegetation landscape patterns conducive to wolverine habitat needs.

Manual treatments in boreal/upland and mid-elevation riparian and upland habitats areas would possibly result in a small reduction in the type, abundance and availability of potential wolverine prey items in wolverine foraging habitat. Wolverine primarily scavenge carrion, but also prey on small animals and birds, and eat fruits, berries, and insects (Banci, 1994; Hash, 1987; Hornocker & Hash, 1981).

There would likely be some effects to the amount of cover and food source for avian and mammalian prey species from trampling by field crews performing manual control. However, as stated above, manual treatments are normally performed on small noxious weed infestations for short time periods. Disturbance would be temporary and the potential for complete abandonment of the treatment area or harm or mortality of prey would be low. Utilizing manual methods to treat small infestations should be beneficial to the native avian and small mammal population in the long-term by providing conditions where native vegetation will replace the noxious plants.

Wolverines have reproductive rates that are among the lowest known for mammals (Persson, 2005). This is primarily due to resource limitations and is detailed in Chapter 3. Manual treatments would not occur during pregnancy, as this occurs during winter. Manual methods would occur during the time of the year female wolverine are raising young in preparation for eventual dispersal into the population. Human presence during project implementation in spring or summer could result in alteration of foraging activities by a female wolverine with kits. This could have an effect on survival of the young. While this could be important due to small population size and limited reproductive success, the potential for weed treatment staff encountering a female wolverine with kits is considered remote due the types of habitats used by the species, low population density, and large home range. Therefore, this effect would be discountable.

Determination – Effects of Manual Treatments

Manual treatments to remove noxious weeds and invasive plants *may affect, but are not likely to adversely affect*, wolverine in the short term. Conducting manual treatments could result in slight disturbance to wolverine adults, young, or prey due to human presence. These potential effects would be insignificant and discountable, as wolverines have a large home range, diverse diet, and typically avoid humans. Denning occurs in high elevation, remote locations where noxious weed and invasive weed control is not likely to occur. Manual treatments would reduce the potential for noxious weeds and invasive plants to outcompete the native vegetation that is essential habitat for wolverine prey. The resulting vegetation conditions would support wolverine habitat needs. This would result in long-term *beneficial effects* to wolverine.

<u>Effects of Biological Control Treatments</u>

The impacts of biological control treatments, including insects, pathogens, and domestic goats or sheep, on wolverines, their prey, and prey habitats would be similar to those described for

Canada lynx. The potential for human presence for biological control release affecting female wolverines with kits would be similar to that described for manual treatments.

Goats or sheep would typically be used in areas where human disturbance is common and use of these areas by wolverine or their primary prey beyond transitory movement is unlikely. Likely locations for use of goats or sheep are the Lake Creek and Sun Peak recreation sites north of Ketchum, Idaho. Both of these recreation sites are heavily used year round by recreationists. The high degree of human development and presence in and near these recreation sites results in an extremely low probability that wolverine would make incidental use of the habitat during exploratory movement.

Biological control treatments would reduce the potential for noxious weeds and invasive plants to gain a pathway to infest native plant communities. Containment of weeds could have long-term beneficial effects by increasing the habitat suitability for a more diverse assemblage of native birds and mammals used as prey by wolverine.

Determination – Biological Control Treatments

Biological control treatments *may affect, but are not likely to adversely affect*, wolverine. This would be due to short-term disturbance to wolverine and prey from human and animal disturbance and removal of noxious weeds and invasive plants that could provide cover or food for prey species. However, due to the small scale and short duration of the treatments, these effects would be insignificant and discountable. In addition, use of goats or sheep would be limited to areas that would not typically be used by wolverine. Removal of noxious weeds and invasive plants would reduce competition to native plants that could provide food and cover for wolverine prey. This would result in long-term *beneficial effects* to wolverine.

Effects of Herbicide Treatments

Under the proposed action, herbicide applications could occur within boreal/upland communities potentially containing suitable wolverine habitat conditions for denning and foraging, as well as mid-elevation riparian and upland habitats used for foraging, dispersal, and exploratory movements. Because noxious weeds and invasive plants are not dominant in these plant communities occurring in the wolverine analysis area, herbicide treatments would consist of on-going spot application using direct spray, wicking, wiping, dipping, painting, or injection. Where off-road vehicle use is not limited by travel restrictions, slope, or vegetation density, ATVs/UTVs could be used for treatment access. However, vegetation in boreal/upland and mid-elevation riparian and upland habitats in the wolverine assessment area tend to have vegetation that occurs at a density that would impede off-road travel, so this use is unlikely.

Impacts of human presence, changes in plant community structure, and beneficial effects to wolverine, prey, and prey habitats would be the same as those described for manual and biological control treatments. The analysis for herbicide treatments will focus on the potential for impacts due to consumption of treated vegetation by prey, direct spray of prey, and dermal contact by wolverine or prey with treated vegetation. Impacts may vary by habitat type due to conservation measures that restrict use of some chemicals in riparian areas.

Treatments involve the spot application of herbicides at certain plant growth stages to kill noxious weeds and invasive plants. Depending on the type of herbicide selected, they can be used for control or complete eradication and may be used in combination with manual or biological control treatments. Selection of an herbicide and timing of application would depend on its chemical effectiveness on a particular weed species, habitat types present, proximity to water, and presence or absence of sensitive plant, wildlife, fish or other aquatic species. Use of *aminopyralid, bromacil, chlorsultfuron, clopyralid, dicamba, diflufenzopyr, diflufenzopyr+dicamba (Overdrive®), diuron, fluroxypyr, hexazinone, imazapic, metsulfuron methyl, picloram, rimsulfuron, and tebuthiuron* is limited in RCAs.

High elevation boreal/upland habitats within the wolverine assessment area comprise wolverine potential denning and primary foraging habitats. Riparian and lower elevation upland habitats are used to a lesser extent than boreal/upland habitat for foraging, dispersal, and exploratory movements. Noxious weeds and invasive plants in the higher elevations used by wolverine tend to be concentrated in disturbed locations such as roadsides or other areas with concentrated human activities, such as recreation, mining, or livestock grazing. Therefore spot herbicide treatments would likely be limited to these locations.

Wolverine could be directly affected by dermal contact with treated vegetation. Ingestion of herbicides could result from grooming activities. Dermal contact would most likely to occur immediately after treatment before the herbicide dries on the vegetation. Wolverine presence is expected to occur to a greater extent in high elevation boreal/upland habitat compared to mid-elevation riparian and upland habitats. This is due to the increased probability of denning and foraging near the den site for small mammals such as marmots and ground squirrels in boreal habitat. Dermal contact by wolverine with *2,4-D* could occur in boreal/upland or riparian habitats; however, noxious weed and invasive plant infestations in these habitats are typically small and widely dispersed, so the potential for exposure is likely to be very small.

Wolverine would likely disperse away from the treatment area and remain absent as long as humans are present. Depending on atmospheric conditions, chemicals would dry within 30 minutes following spraying and vegetation would be dry prior to or shortly after humans leave the treatment area. Therefore, direct effects to wolverine due to dermal contact from spot herbicide treatments would be discountable.

Indirect effects could result from consumption of prey that have been subject to dermal contact through direct spray or contact with treated vegetation. Indirect effects could also occur through bioaccumulation, where prey has consumed food items including vegetation or insects that have been subject to direct spray. Grouse, mice, and voles consume insects seasonally and/or opportunistically. The primary period of the year that insects are contained in the diet of grouse, mice, and voles would be in the late spring and summer when herbicides would be typically applied in boreal habitats. The larval and adult stage of moths, beetles, grasshoppers, or other insects could accumulate herbicides by direct spray or ingestion of treated vegetation and subsequently be consumed by wolverine prey. Wolverine could consume prey that have been contaminated by direct spray or ingested herbicides.

Direct spray of terrestrial invertebrates or dermal contact with herbicides could result in mortality, reduced reproductive output, behavioral modification, and/or increased susceptibility to environmental stresses. These toxicological effects could lead to a decrease in the size and viability of the affected population of invertebrates in and immediately adjacent to the treatment area and impact food availability for wolverine prey.

Marmot, ground squirrel, mice, voles and grouse could ingest vegetation or invertebrate prey that was sprayed during herbicide treatments. The hoary marmot is herbivorous while ground squirrels, mice, and voles are expected to eat some insects, but primarily feed on vegetation. Possible effects to individual prey include death, damage to vital organs, change in body weight, decrease in healthy offspring and increased susceptibility to predation. Young prey would be more vulnerable to both contamination and predation due to limited mobility. Wolverine could consume these prey items, resulting in potential herbicide-related effects.

As described for direct effect to wolverine, dermal contact would occur when vegetation is wet with herbicide and drying typically occurs within 30 minutes of spray. Mobile prey would likely flee from the treatment area while humans are present; however, less mobile prey could be subject to direct spray or dermal contact.

Treatments would occur as spot applications and infrequently within boreal/upland plant communities as noxious weeds and invasive plants are not expected to be common at these higher elevations. Treatments could be more frequent in riparian or mid-elevation upland habitats; however, these habitats are less frequently used by wolverine. The potential for dermal contact is limited by the time that herbicides are wet on the vegetation and the absence of humans during this time. The potential for wolverine consuming contaminated prey is very small. In addition, changes in prey populations would not likely occur to the extent that they would be reasonable measured, detected, or evaluated compared to the home range of wolverine. Therefore, indirect effects of herbicide treatments would be insignificant and discountable.

Determination – Effects of Herbicide Treatments

Spot herbicide treatments to control noxious weeds and invasive plants *may affect, but are not likely to adversely affect* wolverine. The likelihood of direct effects due to dermal contact is discountable due to infrequency of spot treatments in habitats used by wolverine and low potential for contact with recently treated vegetation. Treatments could result in indirect effects consisting of slight short-term reductions in the small mammal and grouse populations utilized as prey by wolverine. This effect is not expected to result in a measureable reduction in the health or fitness of wolverine and therefore would be insignificant. Over the long term, habitat condition would improve due to the reduction in noxious weeds and invasive plants that compete with native vegetation. Containment of weeds in and adjacent to wolverine habitat would have long-term *beneficial effects* by increasing the suitability of the habitat to support a more diverse assemblage of native birds and small mammal prey species.

Interrelated and Interdependent Effects

Interrelated and interdependent actions include those activities that would not occur if not for the proposed action. No interrelated or interdependent effects to wolverine or their habitat have been identified for the proposed action.

Cumulative Effects

The implementing regulations for Section 7 of the ESA define cumulative effects to include those effects of future state, tribal, local, or private actions that are reasonably certain to occur in the action area. The cumulative effect assessment considered the potential for effects to wolverine and their habitat from on-going and predicted future uses and activities on 348,677 acres of state and private lands occurring within 13.5 miles of suitable wolverine denning habitat located along the northern boundary of the TFD.

Sustaining the habitat characteristics across the landscape within the wolverine assessment area that provides wolverine with secure corridors for travel, access and use of patches of boreal, upland, and high elevation riparian habitat is important in maintaining or improving habitat suitability for wolverine. These patches of habitat also need to contain suitable wolverine foraging habitat provided by a diverse, high condition habitat matrix containing dense understories of trees and shrubs.

Actions by the State of Idaho on state-managed lands that may affect wolverine or its habitat would constitute cumulative effects. These actions would include: failure to treat noxious weed and invasive plant infestations; treatment of noxious weeds and invasive plants without conservation measures to preserve wolverine suitable habitat; biological control using goats or other domestic livestock; livestock grazing and trampling; utility development; communication facility development. The actions on private lands would be very similar to those on State land but with fewer design features or conservation measures. Wolverine cumulative impacts on non-federal lands may also include the lack of management actions to maintain suitable habitat conditions for wolverine. Non-federal actions may be less likely to incorporate re-vegetation or weed control efforts. On-going activities on State and private land are expected to continue into the future and have the potential for cumulative effects to wolverine and their habitat where these activities occur within boreal/upland or riparian areas in suitable wolverine habitat in the TFD.

Cumulative effects could result from habitat degradation on State and private lands due to development, and land uses coupled with lack of control for noxious weeds and invasive plants. This habitat degradation would fragment available habitat for wolverine and their prey and increase the importance of maintaining good habitat conditions on Federal lands. Implementation of the proposed action, including protective measures, could maintain or improve habitat quality, if performed with no or little disturbance to wolverine while engaged in denning, rearing young, foraging, or dispersal activities.

Disturbance due to human or animal presence on State and private lands could occur during sensitive periods of wolverine life cycle activities. The analysis of direct and indirect effects discloses the potential effects of treatments implemented during rearing of young kits, which occurs from May 1 through July 15. This is to ensure complete discussion and analysis of potential effects given that noxious and invasive weed treatments would be implemented during this period. Denning occurs primarily during the spring at elevations typically not accessible during that season; therefore activities on State and private lands that would disturb denning are not anticipated. Activities that occur while wolverine are raising young on State and private lands may have a greater cumulative effect if noxious weed and invasive plant treatments need to be implemented at that time to increase control on Federal lands. In addition, application of herbicides on State and private lands are not subject to the design features, conservation measures, and SOPs that are part of the proposed action and are not limited to 20 herbicides. While noxious weed and invasive plant control or removal treatments under the proposed action are anticipated to have some short-term adverse effects to young-of-the-year and prey, treatments implemented while raising kits could be cumulatively greater if treatments are also implemented on State or private lands with no controls other than label restrictions. Lack of noxious weed and invasive plant treatments on State and private lands would increase the influx of these plants on Federal lands, increasing the necessity for treatment.

Slickspot Peppergrass

Key threats to slickspot peppergrass are habitat modification resulting from wildfire and subsequent invasion of noxious weeds and non-native invasive plants (81 FR 55062-55066). Control or elimination of noxious weeds and invasive plants and vegetation community restoration in slickspot peppergrass habitats could enhance the potential for population persistence by reducing competition and improving habitat quality. However, there are risks of direct and indirect effects resulting from proposed vegetation treatments.

Conservation measures derived from the consultations for the 2015 Jarbidge RMP and the 2007 and 2016 PEISs are incorporated into the proposed action to reduce or eliminate potential direct and indirect adverse effects to slickspot peppergrass and proposed critical habitat due to on-going actions and larger-scale project implementation. In addition, Herbicide Application Criteria (Appendix D) and SOP (Appendix E), which are incorporated from the RODs for the PEISs, are also a component of the proposed action and reduce the potential for adverse effects.

Direct and Indirect Effects – General

This effects analysis considers the potential for short- and long-term direct, indirect, and cumulative effects to slickspot peppergrass and its proposed critical habitat from on-going and larger-scale noxious weed and invasive plant treatments identified in Chapter 2. The potential for treatments to result in adverse or beneficial effects is also identified. This analysis focuses on treatments in areas containing occupied, proposed critical, and unsurveyed potential habitats (Figure 12). Unsurveyed potential habitat is assumed to be occupied until inventories result in re-classification as occupied, unoccupied, or non-habitat (USDI BLM, 2010; USDI BLM, 2015a). The application of conservation measures was fully considered in determining effects for all treatment methods. Summaries of treatment method effects, including determinations and rationale, are provided in Appendix M.

Re-classification of potential habitat into occupied, unoccupied (slickspots present but no slickspot peppergrass), or non-habitat (no slickspots or slickspots do not have the proper soil characteristics to support slickspot peppergrass) requires inventory using standardized methods (USDI BLM, 2010). Pre-treatment inventory will be required for larger-scale projects. The majority of slickspot peppergrass individuals occur in the seed bank and plants do not reliably appear in occupied slickspots ever year (Mancuso et al., 1998; Meyer et al., 2005). About six percent of seeds germinate annually (Meyer et al., 2005); therefore populations could go undetected for several years. However, results of repeated inventory assume that slickspot peppergrass plants would be visible in at least one of three years with 60 percent or greater average annual precipitation. The likelihood of plants and seed banks occurring in unoccupied habitats is discountable due to repeated inventory without detection of slickspot peppergrass. Indirect beneficial effects to slickspot peppergrass may occur as the result of treatments in unoccupied habitats adjacent to occupied or unsurveyed potential habitats. These beneficial effects are described for each treatment method below.

In unsurveyed slickspot peppergrass potential habitat, larger-scale treatments would most likely be proposed in the approximately 200,000 acres of habitat with low potential for slickspot peppergrass to occur (Figure 12; BLM GIS data, 2016), as these areas have the highest cover and density of noxious weeds and invasive plants. Larger-scale projects in these areas would typically require multiple treatment methods, including mechanical, prescribed fire, aerial or ground broadcast herbicide, and re-vegetation to meet noxious weed and invasive plant control and habitat restoration objectives. Larger-scale projects in habitats with medium (about 69,000 acres) or high potential (about 152,000 acres) for slickspot peppergrass to occur (Figure 12) would require fewer treatments to achieve habitat restoration, as noxious weeds and invasive plants are less common. For example, in habitat with medium potential for slickspot peppergrass to occur, vegetation may have been affected by past fire, but includes native species that either recovered or were seeded post-fire. Cheatgrass and noxious weeds may be present, but not dominant. In this case, a combination of spot and broadcast herbicide treatments could be used to control noxious weeds and invasive plants and release existing native vegetation. This could be followed by shrub re-establishment by seeding or planting. In habitat with high potential for slickspot peppergrass to occur, native vegetation is likely dominant. Noxious weeds and invasive plants may be present but scattered. The most likely treatments in this case would be small-scale manual removal, biological control, and spot herbicide treatments. Prescribed fire would not be used in habitat with high potential for slickspot peppergrass to occur due to good existing vegetation condition. Broadcast herbicide or mechanical re-vegetation treatments would be unlikely, but could be used, if necessary, to control noxious weeds and invasive plants and improve native plant diversity.

Treatments can occur singly or in combination. Small-scale, on-going treatments tend to occur singly, although multiple methods could be combined to control or eradicate noxious weeds or invasive plants using an integrated approach. For example, herbicide spot treatment could be combined with manual pulling or biological control release. Larger-scale treatments typically occur in combination to remove noxious weeds and invasive plants and re-vegetate the treatment area with desired vegetation. Potential impacts to slickspot peppergrass are described for single, discrete treatments. The potential for damage to or mortality of slickspot peppergrass and/or slickspot microsites could increase if multiple types of treatments are used for noxious weed and/or invasive plant control, seedbed preparation, and re-vegetation in the same location. However, long-term beneficial effects could also increase with integrated treatment.

Because larger-scale treatments are not yet planned, locations and combinations of treatments are unknown. However, it is estimated that up to 20,000 acres of slickspot peppergrass occupied and/or potential habitat would be treated annually. Treatments could be overlapping, including prescribed fire, chemical herbicide, and re-vegetation treatments. These 20,000 acres represent about four percent of the combined total occupied and potential habitat and would be applied primarily to occupied habitat in poor condition (EO ranks of C or lower) or areas with low potential for slickspot peppergrass to occur. As discussed above, better condition habitats would require fewer treatment types. Per conservation measures, only 10 percent of the occupied habitat could be treated until treatment effectiveness and impacts to slickspot peppergrass habitat have been determined through monitoring.

Proposed Critical Habitat

As described in Chapter 3, the action area includes proposed critical habitat Unit 4 which consists of 27,709 acres of BLM-managed land and 1,482 acres of land managed by the State of Idaho. This acreage is a subset of the total occupied habitat in the action area.

Physical or biological features (PBFs, formerly referred to as primary constituent elements or PCEs; 81 FR 7414-7440) define attributes of proposed critical habitat that are essential to the conservation of the species. Four PBFs were defined for slickspot peppergrass proposed critical habitat (see 76 FR 27190-27191) and are defined in Table 19 at the end of this analysis section. Effects to PBFs are discussed with the direct and indirect effects of each treatment type. Determinations for treatment effects for each PBF are summarized in Table 19.

Actions Determined to Have No Effect on Slickspot Peppergrass

Actions occurring outside occupied, unsurveyed potential, and proposed critical habitats with appropriate no-treatment buffers around these habitats would have no effect on slickspot peppergrass.

Actions that May Affect Slickspot Peppergrass

Effects of Manual Treatments

Manual treatments would primarily be implemented as on-going actions for noxious weed and invasive plant removal and could occur in occupied, proposed critical, unoccupied, and unsurveyed potential habitats. Conservation measures encourage the use of non-chemical methods in and adjacent to occupied habitat, when appropriate, for control of noxious weeds and invasive plants. Manual treatments involving pulling, cutting, grubbing, and digging vegetation with non-motorized hand equipment would have the localized effect of removing all or part of targeted plants, resulting in decreased competition to slickspot peppergrass and other native vegetation. Hand pulling around slickspot peppergrass plants or in areas with seed banks could dislodge stems or seeds, resulting in mortality of individuals or failure of seeds to germinate. The potential for impacts to seed banks resulting from manual treatments, such as burial too deep for germination, would be insignificant due to limited and localized soil surface disturbance.

Some disturbance to slickspot peppergrass and its habitat could result from foot or vehicle traffic during access of treatment locations. This could result in damage to or mortality of slickspot peppergrass plants due to crushing. Treatment-related disturbance could also create conditions favorable to re-invasion by the same or other weeds, resulting in increased competition to slickspot peppergrass and other native vegetation. Conservation measures limit the use of full-size vehicles to existing roads for treatment site access and equipment staging in slickspot peppergrass habitats. In addition, slickspots are visible features within a plant community (Fisher et al., 1996) and can be avoided during activities that would result in soil surface disturbance. Therefore, impacts to slickspots and slickspot peppergrass would be discountable.

Slickspot peppergrass would benefit both directly and indirectly from manual treatments. Manual weed removal treatments would reduce competing vegetation in and around slickspots. Removal of live target plants would reduce future contributions to noxious and invasive weed seed banks and thus could gradually reduce the potential for competition to slickspot peppergrass and other native vegetation, including forbs important to pollinator species. Removal of noxious weeds and invasive plants from and around slickspots would also reduce vegetation density and the potential for silt entrapment (Meyer & Allen, 2005). This would maintain slickspot structure and the potential for slickspot peppergrass seed germination and plant establishment.

Determination – Effects of Manual Treatments

Manual treatments *may affect, but are not likely to adversely affect slickspot peppergrass*. Direct and indirect adverse effects would be insignificant and discountable due to the small treatment scale, focus on target vegetation, and the ability to avoid disturbance to slickspot peppergrass plants and slickspots. Manual treatments would have small scale beneficial effects by reducing the number of noxious weeds and invasive plants that compete with slickspot peppergrass and other native vegetation that supports pollinator insects.

Manual treatments *may affect, but are not likely to adversely affect proposed critical habita*t. Treatments would maintain or restore proposed critical habitat PBFs 1 through 4 by avoiding impacts that disturb the physical structure of slickspots (PBF 1), removing noxious weeds and invasive plants in and around slickspots (PBF 1), and reducing competition with native vegetation, which may indirectly enhance forb diversity and pollinator habitats (PBFs 2-4).

Effects of Mechanical Treatments

Mechanical treatments would be used on areas with larger-scale infestations of noxious weeds and invasive plants and where manual treatments would be impractical or too expensive, or where seedbed preparation or mechanical seeding is required for re-vegetation.

Mechanical treatments require the use of implements such as disks, drills, or harrows pulled by wheeled or tracked vehicles. The size and type of the vehicle needed is dependent on the size and weight of the implement and ranges from ATV/UTVs for light, small harrows or drills to tractors or dozers for pulling large disk plows, drills, harrows, or chains. All vehicles used to pull implements would crush plants, including slickspot peppergrass. Operation of equipment when soils are wet would cause more disturbance due to accumulation of mud on tires or tracks. If slickspot peppergrass seeds are present in the mud, they could be transported out of slickspots or buried too deep for germination.

Mechanical treatments could result in direct effects to slickspot peppergrass plants or seed banks. This is due primarily to soil surface disturbance and is dependent on the method used. Seedbed preparation and seeding methods that will result in deep soil surface disturbance such as tilling, disk plowing, and seeding using a traditional rangeland drill have the greatest impact to slickspot peppergrass plants, seed banks, and slickspots. These methods could result in plant mortality and seed burial too deep for germination. Meyer and Allen (2005) suggested the lowest depth for successful seed germination is 3 cm. Therefore, soil surface disturbance that would bury seed at a depth of greater than 3 cm could reduce recruitment of new individuals. In addition, these methods can result in long-term or permanent disturbance of slickspot structure, which could result in habitat loss (Seronko, 2004). Therefore, these methods would only be used in non-habitat or areas with low potential for slickspot peppergrass to occur, and would not be used in occupied or proposed critical habitats.

Habitats identified as having low potential for slickspot peppergrass to occur are typically a result of past, sometimes repeated, fire and subsequent dominance by noxious weeds and invasive plants which compete with slickspot peppergrass and other native vegetation. High density of invasive plants in slickspots can also result in silt accumulation, creating conditions that are not conducive to slickspot peppergrass establishment and/or persistence (Meyer & Allen, 2005). Treatment of these areas to restore more diverse, perennial vegetation, with mechanical methods being one of a suite of treatments, would indirectly benefit slickspot peppergrass through removal of noxious weed and invasive plant seed sources that could spread to occupied habitat dominated by native vegetation, proposed critical habitat, or potential habitats with medium or high potential for slickspot peppergrass to occur. In addition, restoration of greater vegetation diversity, especially forbs, could result in beneficial indirect effects for slickspot peppergrass through support of pollinator insects. This is consistent with conservation direction for slickspot peppergrass and proposed critical habitat.

Conservation measures for slickspot peppergrass direct the use of seeding techniques that minimize soil surface disturbance. Mechanical methods that are less disruptive to surface soils and residual vegetation, such as minimum till or no-till drills, rangeland drills with depth bands, harrowing, Dixie harrow, Lawson aerator, or chaining could result in slickspot peppergrass damage, but with less mortality, and could leave seed at a depth that does not impede germination. All methods could result in slickspot disturbance, but this would be dependent on the type and weight of equipment and soil moisture conditions during treatment. Slickspots tend to be more vulnerable to disturbance when wet (Seronko, 2004). Local observations during drill seeding treatments using depth bands indicated that damp soils tend to accumulate on equipment (J. Hilty, pers. observation), thus resulting in a greater amount of surface disturbance compared to dry conditions. Soils with higher clay content tend to be “stickier” and accumulate on equipment to a greater degree than coarser-textured soils. Therefore, treatments implemented when soils and slickspots are wet would result in greater disturbance, including mixing slickspot layers.

Minimum- or no-till drills open narrow furrows, leaving the areas between undisturbed. Seeds are deposited into the furrows, which are then closed by a press wheel. Slickspot peppergrass plants that occur directly in the furrow would be damaged or killed. Likewise, seed caught in the furrow would likely be buried too deeply for germination. However, impacts would be reduced compared to a traditional rangeland drill due to the smaller disturbance area. Depth bands on a rangeland drill reduce the depth at which the disks penetrate the soil surface and therefore reduce the amount of tillage and resultant impacts to slickspot peppergrass, its seed banks, and slickspot microsites. Impacts would be similar to those described for minimum- or no-till drills. However, treatment during moist soil surface conditions can result in soil accumulation on the depth bands. This accumulation results in disturbance comparable to that caused by use of drills without depth bands (J. Hilty, pers. observation).

A tined harrow is typically used following aerial or ground broadcast seeding in areas lacking live or dead woody cover. A harrow creates shallow furrows for seed burial and can uproot annual or shallow-rooted perennial plants. Use of a harrow could uproot slickspot peppergrass plants and bury seed too deep for germination, particularly if harrowing occurred during wet conditions. Use of a harrow during dry conditions could reduce the impacts to slickspot peppergrass and slickspots. Slickspots are topographically depressed below the surrounding soil surface. Depending on the weight of the harrow and soil moisture, it may skip over or fail to penetrate the hard surface of slickspots.

The Dixie harrow and Lawson aerator are typically used to enhance existing plant communities and could ultimately result in greater vegetation species diversity (dependent on seed mixes used) and understory cover. While these methods are often used to thin shrub communities and diversify understory vegetation, both methods could be used in previously burned areas with standing shrub skeletons. Conservation measures for slickspot peppergrass and sage-grouse focus on protection of existing shrub stands; good condition sagebrush communities would not be treated under the proposed action.

The Dixie harrow thins existing vegetation by uprooting plants. The degree of thinning depends on the number of passes. The Lawson aerator crushes vegetation resulting in damage, some thinning, and possible mortality of existing plants. Both methods would leave plant debris on site which could function as a mulch to maintain soil moisture and nutrients. If used in dry conditions, these treatments would result in less disturbance to slickspots and slickspot peppergrass seed banks compared to tilling methods. Since seeding typically occurs in fall, potential damage to live slickspot peppergrass plants would be limited to uprooting or crushing of biennial rosettes. This could remove at least a portion of the seed bank contribution the following year. However, due to the depressed topography of slickspots, plants may not be disturbed. Permanent disturbance of slickspots is not expected to occur when using these methods for the same reason, especially in dry conditions. Deposition of plant debris in slickspots could create a barrier to seed emergence. However, this effect is expected to be insignificant, as these methods would not be used in existing sagebrush habitats and plant debris would be limited to herbaceous materials or woody fragments of shrub skeletons and would not be uniformly distributed in slickspots.

Chaining would typically be used for re-vegetation in areas where remnant shrub skeletons from past fire or insect kill would impede the use of drills or where the appearance of drill rows is not desirable. Depending on the size and type of chain used, this method can result in low disturbance to residual vegetation and soils. In general, the amount of disturbance increases with link size and weight. Chaining can result in disturbance to existing vegetation and litter, but can enhance establishment of broadcast seedings. This method can also leave plant debris in place to serve as mulch (Stevens & Monsen, 2004a & 2004b); however, any effect to slickspot peppergrass as a result of this deposition is expected to be insignificant for reasons stated above for the Dixie harrow and Lawson aerator. Impacts to slickspot peppergrass or slickspots would be least when using light, smooth chains and would increase with weight or addition of implements that disturb the soil surface to enhance seed burial.

Mowing would impact vegetation by reducing plant height. Mowing is typically used in spring to reduce vegetation height for fuel breaks or in spring or fall to remove vegetation and litter to enhance the effectiveness of herbicide application. Physical damage to slickspot peppergrass rosettes, seed banks, or slickspot microsites would be discountable as deck height is typically a minimum of six inches off the ground and there would be no contact. However, plants or seeds could be buried under the mowed material, resulting in damage, death, or failure to germinate. Mowing during spring could also crush or remove inflorescences of flowering or fruiting plants resulting in plant damage and failure to reproduce.

Mechanical treatments performed when soils are dry would tend to generate dust, with tilling treatments resulting in the greatest dust generation. Treatments could result in dust accumulation in slickspots or on slickspot peppergrass plants. This type of effect is expected to be temporary, dependent on proximity of treated areas relative to slickspot peppergrass and its habitat, and would not likely result in a uniform deposition of dust over the entire population area. Therefore, effects due to dust generation would be insignificant.

Determination – Effects of Mechanical Treatments

Mechanical treatments *may affect and are likely to adversely affect slickspot peppergrass*. This effect would be long-term for seedbed preparation or seeding methods that involve deep soil surface disturbance that would disrupt slickspot structure, kill undetected plants, and result in seed burial too deep for germination, including tilling, disk plowing, and seeding using a traditional rangeland drill. These methods would only be used in non-habitat or where the potential for slickspot peppergrass to occur is low due to past repeated fire and poor existing vegetation condition.

The effect would be short-term when using methods that result in little or no disturbance to slickspots, including minimum till or no-till drills, rangeland drills with depth bands, harrowing, Dixie harrow, Lawson aerator, chaining, or mowing. These methods could be used in all habitats and could result in some short-term loss of plants or seeds due to crushing or burial, but would not cause larger-scale or long-term population suppression or habitat loss.

All methods would result in long-term direct or indirect long-term beneficial effects to slickspot peppergrass due to control or elimination of noxious weeds and invasive plants and establishment of desirable vegetation, including forbs that would benefit pollinator insects. In addition, control or elimination of invasive plants that create fine fuels in and around slickspot peppergrass habitats would reduce the potential for wildfire ignition and spread and habitat degradation that could occur post-fire.

Mechanical treatments *may affect, and are likely to adversely affect slickspot peppergrass proposed critical habitat*. Treatments that result in deep soil surface disturbance would not be used in proposed critical habitat. All treatment types have potential to disturb slickspots to some degree and therefore PBF 1 could be degraded. Mechanical re-vegetation treatments would maintain or improve PBFs 2 through 4 by reducing risks to relatively intact native Wyoming big sagebrush communities and improving vegetation diversity and habitats of pollinator insects.

Effects of Prescribed Fire Treatments

As with mechanical treatments, larger-scale prescribed fire would be used primarily in non-habitat or areas where the potential for slickspot peppergrass to occur is low and multiple treatments would be needed for vegetation restoration. The prescribed fire treatment is intended to remove litter accumulations from invasive plants that could impede effectiveness of herbicide and seeding treatments. Consistent with conservation measures, prescribed fire will only be used in slickspot peppergrass habitat as a tool for assisting with species conservation, such as to remove cheatgrass litter prior to herbicide application or to clear fence lines of accumulated windblown weeds.

Prescribed fire would remove all or part of the above-ground biomass of slickspot peppergrass plants and other surrounding vegetation. Slickspots naturally have low vegetation cover (Fisher et al., 1996); therefore, vegetation in slickspots would be less likely to burn. Prescribed fire treatments would not be used in good condition plant communities where this is the case, and would be more likely to burn slickspot peppergrass plants if occupied slickspots were filled in with invasive vegetation or litter. Highest germination of slickspot peppergrass seeds occurs close to the soil surface (Meyer & Allen, 2005; Palazzo et al., 2005) and prescribed fire could damage seeds in densely vegetated slickspots, potentially preventing future germination. Prescribed fire could result in a flush of non-native annual invasive plants due to release of minerals such as nitrogen resulting from the combustion of plant material and litter. This could result in additional competition with slickspot peppergrass and other native plants that support slickspot peppergrass pollinators. However, prescribed fire would typically be followed by herbicide and/or seeding treatments to control noxious weeds and invasive plants. This effect would be offset by follow-up treatments and therefore is discountable.

Use of prescribed fire requires development of a site-specific burn plan to address human health and sensitive resource issues. This includes smoke generation and control mechanisms to reduce or eliminate the potential for fire escape. Fire lines for larger-scale prescribed fire are typically implemented using a disk or dozer, with the intent of removing all vegetation from the treatment area perimeter or around sensitive areas inside the perimeter, such as residual sagebrush stands. Impacts of fire line establishment to slickspot peppergrass and its habitat would be the same as for disking treatments described above and would result in long-term or permanent disturbance of slickspot microsites. This effect would be small in scale and would occur only in areas treated with prescribed fire – primarily non-habitat or areas where the potential for slickspot peppergrass to occur is low. Due to the level of soil disturbance, fire line construction in occupied or proposed critical habitat would be inconsistent with conservation measures. Therefore, other methods of containment (such as wetting vegetation with water) would be used.

As with mechanical treatments, prescribed fire could result in airborne dust or ash that could accumulate in slickspots or on slickspot peppergrass plants. This effect is expected to be greater for prescribed fire than for mechanical treatments due to ash production and is dependent on proximity of treated areas relative to slickspot peppergrass and its habitat. However, it would not likely result in a uniform deposition of dust or ash over the entire population area or proposed critical habitat and is expected to be insignificant.

Over the long term, use of prescribed fire in concert with other treatments could have direct and indirect beneficial impacts to slickspot peppergrass. Restored habitat could be available for recruitment of slickspot peppergrass and use by pollinator insects. In addition, treatments would result in reduction or removal of noxious weed and invasive plant seed sources that could spread to occupied habitat dominated by native vegetation, proposed critical habitat, or potential habitats with medium or high potential for slickspot peppergrass to occur.

Determination – Effects of Prescribed Fire

Prescribed fire treatments *may affect and are likely to adversely affect slickspot peppergrass*. This would be due to burning of plants, damage to seeds by fire and heat, and disturbance to slickspot microsites resulting from construction of fire lines. These impacts are more likely to occur in areas dominated by noxious weeds and invasive plants in non-habitat or where the potential for slickspot peppergrass to occur is low. In addition, adverse impacts to slickspot peppergrass are expected to be short-term and habitats restored by prescribed fire in concert with other treatments would be available for future recruitment of the species.

Prescribed fire treatments *may affect, but are not likely to adversely affect slickspot peppergrass proposed critical habitat*. Fire line construction that would result in modification or destruction of slickspots (PBF 1) would not occur in proposed critical habitat. Impacts due to dust or ash accumulation in slickspots would be insignificant as deposition would not likely be uniform or contiguous over the entire area. Prescribed fire would not be used in intact sagebrush communities, but could maintain or improve PBF 2 by removing noxious weed and invasive plant seed sources that could spread to those areas. Prescribed fire in combination with other restoration treatments would maintain or improve habitats of pollinator insects in and adjacent to proposed critical habitat (PBFs 3 and 4).

Effects of Biological Control Treatments

Biological controls would be applied primarily as on-going actions for noxious weed and invasive plant control. Biological control methods include use of insect pests, fungal or bacterial pathogens, or domestic goats or sheep. Protocols and regulations require rigorous testing of biological controls, other than domestic livestock, prior to release to insure that they do not adversely impact non-target plants. In addition, Section 7 consultation occurs for biological controls that could potentially impact species listed as threatened or endangered, or that are proposed for listing under the ESA (USDI USFWS, 2016).

Insect pests can attack non-target species in the same genus as the targeted plant. However, none of the species currently proposed for biological control target either mustards in general or the genus *Lepidium*. In addition, conservation measures require consideration of risk to slickspot peppergrass prior to use of biological control agents that target plants in the mustard family. This would make potential adverse effects discountable. Biological controls can also be so effective as to decimate weed populations. Without careful monitoring and re-vegetation with desired species, the target plants could be replaced by another pest species and continue the downward ecological trend of the plant community (Tu, Hurd, & Randall, 2001). This could impact slickspot peppergrass through increased competition or modification of plant community structure and composition. Insect pests could attack target or non-target species that support slickspot peppergrass pollinators. However, it is unlikely that all species supporting pollinators would be impacted and this effect would be insignificant.

Biological controls are unlikely to completely eliminate all target populations. However, spatial or temporal reductions in noxious weed or invasive plant populations could reduce competition with native species, including slickspot peppergrass. This could result in increased fitness for slickspot peppergrass, including greater numbers of individuals and/or more robust plants and greater reproductive potential.

Use of goats or sheep for noxious weed or invasive plant control in slickspot peppergrass occupied habitat is prohibited. In unsurveyed potential habitat, this method of control could be used in areas where slickspot peppergrass is unlikely to occur (campsites, trailheads, and trails).

Therefore, the potential for adverse effects to slickspot peppergrass resulting from goats or sheep is discountable.

Determination – Effects of Biological Control Treatments

Overall, biological control treatments *may affect, but are not likely to adversely affect slickspot peppergrass*. Regulatory mechanisms and conservation measures would make potential adverse impacts discountable. Indirect impacts resulting from treatment of target or non-target plants that support slickspot peppergrass pollinators would be insignificant. Biological controls could result in beneficial effects due to reduced competition to slickspot peppergrass.

Biological control treatments *may affect, but are not likely to adversely affect slickspot peppergrass proposed critical habitat.* PBFs 1 through 4 would be maintained or improved due to reduction of noxious weeds and invasive plants in and around slickspots and decreased competition to native plants which support slickspot peppergrass pollinators. This could also enhance native plant diversity and, as a result, maintain or improve proposed critical habitat PBFs 2, 3, and 4.

Effects of Herbicide Treatments

Herbicide use to contain or control noxious weeds and invasive plants poses potential risks to slickspot peppergrass and its pollinators. The following management efforts were listed in the 2007 and 2016 PEISs (pp. 4-73 and 4-39 to 4-40, respectively) to help protect rare plants and their pollinators and are addressed by the conservation measures and SOP:

- Designating buffer zones around rare plants.
- Managing herbicide drift, especially to nearby blooming plants.
- Using typical rather than maximum rates of herbicides in areas with rare plants.
- Choosing herbicide formulations that are not easily carried by social insects to hives, hills, nests, and other "homes" in areas with rare plants.
- Choosing herbicides that degrade quickly in the environment when herbicides must be used in rare plant habitat.
- Timing the herbicide applications when pollinators are least active, such as in the evenings or after blooming has occurred in rare plant habitat, and if necessary dividing the habitat into several treatments rather than one large treatment to keep from treating all blooming species at one time.

General Effects – On-going Spot Herbicide Treatments

On-going noxious weed and invasive plant treatments would use small-scale spot application. Damage or death of slickspot peppergrass plants could occur due to accidental direct spray or drift. Conservation measures include education of weed treatment personnel regarding slickspot peppergrass identification and methods that avoid drift. These, in combination with SOP and small treatment scale, are expected to make the potential for accidental direct spray or drift discountable. Over the long-term, control or containment of noxious weeds and invasive plants due to on-going spot treatments in and adjacent to occupied and potential habitats would reduce competition to slickspot peppergrass and other native vegetation, including plants that support pollinator species. Spot treatments could also reduce the density of noxious weeds and/or invasive plants in slickspot microsites and the potential for sediment entrapment that could modify slickspot structure (Meyer & Allen, 2005).

General Effects – Larger-Scale Herbicide Treatments

Larger-scale projects that are not on-going noxious weed and invasive plant treatments pose a greater risk of damage or death to slickspot peppergrass and other non-target vegetation, including native forbs that support pollinator insects. This would occur due to treatment of plants, particularly with non-selective herbicides, or direct or indirect application of pre-emergent herbicides to slickspots with seed banks but no visible plants. As with mechanical and prescribed fire treatments, larger-scale herbicide application would be used primarily in areas dominated by noxious weeds and invasive plants in non-habitat or where the potential for slickspot peppergrass to occur is low.

Off-site movement (drift) is a risk associated with herbicide application and may impact non-target vegetation, including slickspot peppergrass. This could result in inhibition of seed germination, reduced vigor, stunted growth, or plant mortality. Conservation measures, including no-treatment buffers (Table 4), would be applied to larger-scale projects adjacent to occupied or unsurveyed potential habitat if adverse effects to slickspot peppergrass from herbicide application are anticipated. Application of conservation measures in combination with herbicide application criteria (Appendix D) and SOP (Appendix E) would make adverse impacts associated with these projects discountable.

Application of herbicides for control of noxious weeds and invasive plants could, if done in conjunction with treatments to enhance resident native vegetation and/or seeding or planting to re-establish perennial grasses, forbs, and shrubs, have the long-term effect of maintaining or improving slickspot peppergrass habitats. Herbicide application would reduce or eliminate noxious weed and invasive plant seed sources and competition with native plants in and adjacent to slickspot peppergrass habitats. This could, over the long-term, provide more stable and diverse habitat for slickspot peppergrass and its pollinators. In addition, removal of noxious weeds and invasive plants from slickspots would reduce plant densities and resulting sediment entrapment.

Effects of Herbicides by Mechanism of Action (MOA)

Although 20 herbicides are proposed for use under the proposed action, the active ingredients fall into seven different groups determined by the mode or mechanism of action (MOA). Table 18 lists the herbicide active ingredients by MOA (Weed Science Society of America, 2016). The unique properties associated with each MOA lead to different potential impacts to slickspot peppergrass and are described below. No-spray buffers identified in Table 4 would be utilized for projects with broadcast spray applications that would not result in short- or long-term beneficial effects to slickspot peppergrass.

Table 18 - Mechanism of Action for Active Ingredients

Mechanism Of Action	Active Ingredient
ALS or AHAS inhibitors	*Chlorsulfuron, Imazapic, Imazapyr, Metsulfuron-methyl, Rimsulfuron*
Synthetic Auxins (Growth Regulators)	*2,4-D, Aminopyralid, Clopyralid, Dicamba, Fluroxypyr, Picloram, Triclopyr*
Photosystem II Inhibitors	*Bromacil, Hexazione, Diuron, Tebuthiuron*
EPSP Synthase Inhibitors	*Glyphosate*
Carotenoid Biosynthesis Inhibitors	*Fluridone*
Auxin Transport Inhibitors	*Diflufenzopyr*
Photosystem I Inhibitors	*Diquat*

<u>Acetolactate Synthase (ALS) or Acetohydroxy Acid Synthase (AHAS) Inhibitors</u>

ALS or AHAS inhibitors work by inhibiting amino acid production pathways. Herbicides in this group are used for selective weed control and control both broadleaf weeds and invasive annual grasses. *Imazapic* and *rimsulfuron* would typically be applied using larger-scale broadcast methods, primarily for control of cheatgrass and other invasive annual plants, but could also be used for small-scale roadside applications. C*hlorsulfuron, imazapyr,* and *metsulfuron-methyl* would typically be applied using spot treatment methods.

Although these herbicides are typically applied for pre-emergent control, target plants can show reduced symptoms with post-emergent application. This group affects seedling growth, and to a lesser degree can impact mature plant growth and seed production (Whitcomb, 1999). Timing of application can influence the type and degree of effects to both target and non-target vegetation. Fall applications would typically be used; this is to reduce or eliminate both fall and spring germination and growth of invasive annuals such as cheatgrass. These herbicides can also be combined with other herbicides, such as *glyphosate* (see EPSP Synthase Inhibitors below) for less selective control and to target post-emergent vegetation. Broadcast applications of herbicides in this group would be used for both site preparation for re-vegetation, and also to reduce competition of invasive annual plants and noxious weeds in established desirable plant communities. Length of residual activity for this group varies from several months to years, dependent on environmental conditions that may speed or slow the rate of decay. The effects related to this delayed breakdown include a longer control of target plants, as well as delayed germination and establishment of desirable plants.

Application of ALS or AHAS inhibitors could directly affect slickspot peppergrass plants and result in foliage damage, failure to reproduce, or death. Fall treatments could damage or kill biennial rosettes, depending on their herbicide tolerance, and could therefore reduce or eliminate their contribution to the seed bank the following year. Treatments applied for pre-emergent control of target vegetation could terminate germination of slickspot peppergrass seeds. This would reduce or eliminate recruitment of individuals from the seed bank for the period during which the herbicide is active. Meyer et al. (2005) determined that about six percent of slickspot peppergrass seeds germinate annually. If herbicides with short residual time were used, slickspot peppergrass seed banks could ensure persistence of the species, allowing for habitat restoration and increased potential for recruitment in the long-term.

Synthetic Auxins and Auxin Transport Inhibitors

Synthetic auxins and auxin transport inhibitors disrupt growth regulation in broadleaf plants, with trees and shrubs being less susceptible to damage than annuals (University of California, 2016). These groups are effective for post-emergent control, particularly on broadleaf plants. Younger plants are typically more susceptible. However, regrowth can occur at low application levels, which can minimize the impacts to non-target plants, but also reduces effectiveness of control in target species. Synthetic auxins can be combined with other herbicides to improve control of target species. *Diflufenzopyr* is the only auxin transport inhibitor proposed for use (Peachey et al., 2016). It is applied post-emergence to control broadleaf weeds, although it may be weakly effective when used alone. However, when combined with *dicamba*, a synthetic auxin, to create the product trademarked as Overdrive®, *diflufenzopyr* can improve the effectiveness and lower the application rate required to control noxious weeds. Application of these herbicides to slickspot peppergrass plants would result in foliar damage, reproductive suppression, or death.

Synthetic auxins and auxin transport inhibitors are typically applied by spot application; for reasons stated above, effects to slickspot peppergrass would be discountable. Broadcast applications of these herbicides could be used where noxious weeds are too dense and widespread for spot treatments. Under these conditions, treatment in occupied or potential habitat would result in damage or death of both slickspot peppergrass and other non-target species. However, habitat quality in these areas would be low due to noxious weed abundance. Broadcast treatments in low quality habitats would reduce or remove noxious weed and invasive plant seed sources that could spread to higher quality occupied or potential habitats.

Photosystem II Inhibitors

Photosystem II inhibitors control broadleaf weeds, shrubs or trees, and some grasses. These herbicides are non-selective and are typically applied either to the soil or during early post-emergence. Herbicides in these groups would be applied using spot application methods only. *Hexazione* is used to control saltcedar; *tebuthiuron* is used to kill shrubs and Russian olive. Use of either herbicide is not anticipated to occur in slickspot peppergrass habitats.

Photosystem II inhibitors could impact slickspot peppergrass due to non-selectivity and the fact that they act via both pre-emergent and early post-emergent control. However, adverse effects are expected to be discountable due to application of conservation measures for spot application. In addition, slickspot microsites are distinct and inadvertent application that would result in pre-emergent impacts could be avoided.

Enolpyruzyl shikimate-3-Phosphate (EPSP) Synthase Inhibitors

EPSP synthase inhibitors contain non-selective, post-emergent herbicides, and can cause death at high application rates to all plants. *Glyphosate* is the only active ingredient in this group that is proposed for use. *Glyphosate* would be used primarily in broadcast applications alone or in combination with other herbicides.

Typically, rangeland application rates for glyphosate would target invasive annuals (16 ounces of active ingredient per acre or less). However, higher rates (greater than 16 ounces per acre) and timing could be used to kill target perennial vegetation, including non-native perennials such as crested wheatgrass. *Glyphosate* could be combined with other herbicides, such as *imazapic* (trademark Journey®) to provide immediate control of emergent and growing plants, as well as longer residual pre-emergent control. *Glyphosate* has no soil residual activity and is not absorbed by the roots; therefore it has no effect if not applied directly to actively growing vegetation.

Glyphosate application would result in damage or death of slickspot peppergrass plants and other non-target vegetation, if applied directly or by drift during active growing periods. The degree of damage would depend on rate and timing. Since *glyphosate* has no soil residual activity, slickspot peppergrass could persist by recruitment from seed banks. Combination of *glyphosate* with *imazapic* (Journey®) would have both pre- and post-emergent effects, and therefore could result in short-term population suppression due to impacts to both plants and germinating seeds. Over the long-term, use of *glyphosate* could enhance slickspot peppergrass habitat through control of invasive plants, if combined with re-vegetation treatments.

Carotenoid Biosynthesis Inhibitors and Photosystem I Inhibitors

Fluridone (carotenoid biosynthesis inhibitor) and *diquat* (photosystem 1 inhibitor) are used only for control of aquatic weeds. Therefore, use of these two herbicides would not be used in or near slickspot peppergrass habitats and would not affect slickspot peppergrass.

Determination – Impacts of On-going Spot Herbicide Treatments

Spot treatments implemented as on-going actions *may affect, but are not likely to adversely affect slickspot peppergrass*. Implementation of conservation measures and SOP would make adverse impacts due to accidental spray or drift discountable. Reduced competition to slickspot peppergrass and other native plants, including those that support pollinator species, from noxious weeds and invasive plants would result in short- and long-term beneficial effects to slickspot peppergrass.

Spot treatments implemented as on-going actions *may affect, but are not likely to affect adversely slickspot peppergrass proposed critical habitat*. Spot treatments would reduce noxious weeds and invasive plants in and around slickspots. This would maintain sparse vegetative cover in slickspots and reduce competition to native plants that provide habitats for slickspot peppergrass pollinators. PBF 1 through 4 would be maintained or improved as a result of spot herbicide treatments in and adjacent to proposed critical habitat.

Determination – Impacts of Larger-Scale Herbicide Treatments

Larger-scale herbicide treatments *may affect, and are likely to adversely affect slickspot peppergrass*. These treatments would be used in areas where noxious weed and invasive plant density and extent are too great for spot application and slickspot peppergrass habitat quality is low. Larger-scale herbicide treatments could result in damage or death to plants and seed banks. However, implementation of conservation measures, herbicide application criteria (Appendix D) and SOP (Appendix E), including temporal and spatial adjustments, could result in short-term adverse, but long-term beneficial effects. These beneficial effects would include reduced competition to slickspot peppergrass and other native plants from noxious weeds and invasive plants. Implementation of conservation measures, including no-spray buffers for broadcast applications adjacent to occupied and unsurveyed potential habitats, would make the potential for adverse effects to slickspot peppergrass in these areas discountable. In addition, control or elimination of invasive plants that create fine fuels in and around slickspot peppergrass habitats would reduce the potential for wildfire ignition and spread and habitat degradation that could occur post-fire.

Larger-scale herbicide treatments *may affect and are likely to adversely affect slickspot peppergrass proposed critical habitat*. Reduction or removal of noxious weeds and invasive plants from and around slickspots and relatively intact native Wyoming big sagebrush communities would maintain or improve PBFs 1 and 2. Herbicide treatments in or adjacent to proposed critical habitat could result in short-term adverse effects by reducing vegetation diversity and damaging or killing forbs used by pollinator insects. However, larger-scale treatments would occur in degraded habitats and would reduce competition to native species and the potential for spread of noxious weeds and invasive plants. Over the long-term, larger-scale herbicide treatments would maintain or improve PBFs 2 through 4 if used to release native vegetation from noxious weed and invasive plant competition or facilitate follow-up re-vegetation treatments.

<u>Effects of Re-vegetation Treatments</u>

Re-vegetation methods include aerial seeding, hand planting, mechanical shrub planting, and seeding using methods described in the *Mechanical Treatments* section. Impacts of seedbed preparation for re-vegetation treatments are discussed for manual, mechanical, prescribed fire, and herbicide treatments above. Conservation measures dictate the use of minimum-impact seeding or planting methods and plant materials that would not compete with slickspot peppergrass in re-vegetation projects. Therefore, seedbed preparation would occur only in areas dominated by noxious weeds and invasive plants, primarily in non-habitat or areas where the potential for slickspot peppergrass to occur is low. These treatments would not occur in occupied or proposed critical habitats. Re-vegetation treatments would range from seeding or planting shrubs in areas that have desirable understories, but lack shrub cover, to planting seed of native and/or non-native species to re-establish vegetation in areas where noxious weeds and invasive plants have been removed by mechanical, prescribed fire, and/or herbicide means.

Aerial seeding of sagebrush and small-seeded grasses and forbs would not impact slickspot peppergrass and slickspots due to the lack of soil surface disturbance. This treatment would have the beneficial effect of improving plant community structure and increasing species diversity and resilience to disturbance. However, this method may not be effective if there is existing vegetation that would compete with germinating plants or high cover of litter on the soil surface that would impede seed-to-soil contact.

Hand planting native shrubs such as sagebrush typically results in little disturbance to existing vegetation. Disturbance from hand planting methods such as a planting bar, hoedad, or auger is less than six inches in diameter and occurs in interspaces between existing plants. Disturbance to slickspot peppergrass would be primarily due to trampling or crushing plants, or disturbance of seed banks or plants due to digging activities, but would be small in scale. As with manual treatments, some disturbance to slickspot peppergrass and slickspots could result from foot or vehicle traffic during access of treatment locations. This could result in damage to or mortality of slickspot peppergrass plants due to crushing. However, slickspots are easily detected and can be avoided during planting projects and full-sized vehicles used for treatment implementation are limited to existing roads.

Mechanical shrub planting includes the creation of a scalped area about 12 inches wide and planting holes. Mechanical planters are towed or mounted on crawler or rubber tired tractors and four-wheel drive vehicles (Stevens & Monsen, 2004b).This treatment would be used in areas previously treated to control noxious weeds and invasive plants and re-establish perennial vegetation (non-habitat or habitat with low potential for slickspot peppergrass to occur). Mechanical planting could also be used in previously burned areas dominated by native and/or non-native perennial grasses where grass density is so high that scalping is necessary to reduce competition to planted seedlings (non-habitat or habitat with low or medium potential for slickspot peppergrass to occur). Impacts to slickspot peppergrass plants or seed banks would include damage or death to plants due to crushing or scalping and digging activities. This method could also result in long-term disturbance to slickspot structure and seed banks if seed is buried too deep for germination. However, row spacing is wide, typically 15 to 30 feet, leaving undisturbed areas between rows. Mechanical planting covers larger areas in shorter time periods than hand planting and scalping eliminates competing vegetation that could impede shrub establishment. Therefore, adverse impacts would be small in scale relative to occupied or potential habitat. Over the long-term, planting using mechanical methods could have larger-scale beneficial impacts due to shrub establishment as compared to hand planting.

Refer to the *Mechanical Treatments* section for impacts associated with various ground seeding methods. Seed mixes for re-vegetation would be developed based on objectives and resource constraints for individual projects. Conservation measures direct the use of plant materials that would not compete with slickspot peppergrass, with an emphasis on the use of native species. As previously described, planting methods could result in short- and long-term adverse effects.

Over the long term, treatments that would re-establish a more natural plant community structure and reduce or eliminate noxious weeds and invasive plants that compete with slickspot peppergrass would enhance the potential for population persistence. In addition, restoration of greater vegetation diversity, especially forbs, would improve habitats for pollinator insects. Hand or mechanical planting or seeding projects that re-establish sagebrush in slickspot peppergrass habitats may reduce available habitat for Owyhee harvester ants and the potential for slickspot peppergrass fruit and seed predation by that species (Robertson, 2011).

Determination – Effects of Aerial Re-vegetation Treatments

Overall, re-vegetation treatments that utilize aerial methods *may affect but are not likely to adversely affect slickspot peppergrass* due to the lack of soil surface disturbance. Re-establishment of grasses, forbs, and shrubs that do not compete with slickspot peppergrass would result in long-term beneficial effects to the species and its pollinators.

Re-vegetation using aerial re-vegetation treatments *may affect, but would not likely to adversely affect slickspot peppergrass proposed critical habitat*. Re-establishment of native vegetation using aerial methods would maintain or improve proposed critical habitat PBFs 1 through 4.

Determination – Effects of Hand Planting Re-vegetation Treatments

Re-vegetation using manual hand planting methods *may affect, but is not likely to adversely affect slickspot peppergrass*. This is due to the small scale of disturbance, the ease of avoiding slickspots, and conservation measures that limit vehicle use in slickspot peppergrass habitat. In addition, re-establishment of native vegetation, primarily shrubs via hand planting, would result in long-term benefits to slickspot peppergrass and its pollinators.

Re-vegetation using hand planting methods *may affect, but is not likely adversely affect slickspot peppergrass proposed critical habita*t. Re-establishment of shrubs or other native vegetation using hand planting would maintain or improve proposed critical habitat PBFs 1 through 4.

Determination – Effects of Mechanical Re-vegetation Treatments

Mechanical re-vegetation treatments *may affect, and are likely to adversely affect slickspot peppergrass*. Seeding methods resulting in deep soil surface disturbance (including tilling, disk plowing, and seeding using a traditional rangeland drill) would disrupt slickspot structure, kill plants, and bury seed too deep for germination, resulting long-term population suppression and habitat loss. However, these deep soil disturbance seeding methods would most likely be used in non-habitat or where the potential for slickspot peppergrass to occur is low due to past repeated fire and poor existing vegetation condition.

The effect would be short-term when using methods that result in little or no disturbance to slickspots, including minimum till or no-till drills, rangeland drills with depth bands, harrowing, Dixie harrow, Lawson aerator, or chaining. These methods could be used in all habitats and would result in some short-term loss of plants or seeds due to crushing or burial, but would not cause larger-scale or long-term population suppression or habitat loss.

All methods would result in long-term direct or indirect beneficial effects to slickspot peppergrass and establishment of desirable vegetation, including forbs that would benefit pollinator insects.

Mechanical re-vegetation treatments *may affect, and are likely to adversely affect slickspot peppergrass proposed critical habitat* Treatments that result in deep soil surface disturbance would not be used in proposed critical habitat. All treatment types have potential to disturb slickspots to some degree and therefore PBF 1 could be degraded. Mechanical re-vegetation treatments would maintain or improve PBFs 2 through 4 by reducing risks to relatively intact native Wyoming big sagebrush communities and improving vegetation diversity and habitats of pollinator insects.

Determination – Effects of Seed Mixes

Seed mixes *may affect, but are not likely to adversely affect slickspot peppergrass*. This is due to conservation measures that direct the use of vegetation that does not compete with slickspot peppergrass and forbs that would benefit pollinators. Establishment of diverse vegetation communities would result in long-term beneficial effects to slickspot peppergrass. Re-establishment of sagebrush in occupied habitats could decrease the potential for slickspot peppergrass fruit and seed predation by harvester ants over the long-term.

Seed mixes *may affect, but are not likely to adversely affect slickspot peppergrass proposed critical habitat*. PBFs 1 through 4 would be maintained or improved in the long-term by establishment of diverse vegetation communities in and adjacent to proposed critical habitat.

Summary of Impacts to Slickspot Peppergrass Proposed Critical Habitat

Table 19 - Direct and indirect effects to PBFs for slickspot peppergrass proposed critical habitat

PBF #	PBFs	Direct and Indirect Effects to PBFs (Maintain, Improve, or Degrade)
1	Ecologically-functional microsites or ‘‘slickspots’’ that are characterized by: a) A high sodium and clay content, and a three-layer soil horizonation sequence, which allows for successful seed germination, seedling growth, and maintenance of the seed bank. The surface horizon consists of a thin, silty, vesicular, pored (small cavity) layer that forms a physical crust (the silt layer). The subsoil horizon is a restrictive clay layer with an abruptic (referring to an abrupt change in texture) boundary with the surface layer,that is natric or natric-like in properties (a type of argillic (clay-based) horizon with distinct structural and chemical features) (the restrictive layer). The second argillic subsoil layer (that is less distinct than the upper argillic horizon) retains moisture through part of the year (the moist clay layer); and b) Sparse vegetation with low to moderate introduced invasive non-native plant species cover.	Manual, prescribed fire, biological control, spot and broadcast herbicide, and revegetation treatments using aerial or hand planting methods, in combination with conservation measures and SOP, would result in insignificant or discountable adverse effects to PBF 1. Treatments would beneficially affect PBF 1 by reducing or eliminating noxious weeds and invasive plants in and around slickspots. Therefore, PBF 1 would be maintained or improved. Low-impact mechanical re-vegetation methods could disturb the soil layers in slickspots. The level of adverse impact would be dependent on environmental conditions during the seeding process. PBF 1 would be degraded or maintained.
2	Relatively-intact native Wyoming big sagebrush vegetation assemblages, represented by native	Implementation of conservation measures, including no-treatment buffers for destructive

PBF #	PBFs	Direct and Indirect Effects to PBFs (Maintain, Improve, or Degrade)
	bunchgrasses, shrubs, and forbs, within 250 m (820 feet) of slickspot peppergrass element occurrences to protect slickspots and slickspot peppergrass from disturbance from wildfire, slow the invasion of slickspots by non-native species and native harvester ants, and provide the habitats needed by slickspot peppergrass' pollinators.	mechanical methods, prescribed fire, and broadcast herbicide application, would avoid adverse impacts to intact native shrub communities in proposed critical habitat. Manual, biological control, and spot herbicide treatments, in combination with conservation measures and SOP, would result in insignificant and discountable impacts to PBF 2. Treatments would beneficially affect PBF 2 by reducing or eliminating competition to native vegetation. Therefore, PBF 2 would be maintained or improved.
3	A diversity of native plants whose blooming times overlap to provide pollinator species with sufficient flowers for foraging throughout the seasons and to provide nesting and egg-laying sites; appropriate nesting materials; and sheltered, undisturbed places for hibernation and overwintering of pollinator species. In order for genetic exchange of slickspot peppergrass to occur, pollinators must be able to move freely between slickspots. Alternative pollen and nectar sources (other plant species within the surrounding sagebrush vegetation) are needed to support pollinators during times when slickspot peppergrass is not flowering, when distances between slickspots are large, and in years when slickspot peppergrass is not a prolific flowerer.	Implementation of conservation measures, including no-treatment buffers for destructive mechanical methods, and prescribed fire would avoid adverse impacts to native vegetation in proposed critical habitat. Larger-scale broadcast herbicide treatments in or adjacent to proposed critical habitat could result in short-term adverse effects by reducing vegetation diversity and damaging or killing forbs used by pollinator insects. However, larger-scale broadcast herbicide treatments would occur in degraded habitats and would reduce competition to native species and the potential for spread of noxious weeds and invasive plants. Manual, biological control, and spot herbicide treatments in combination with conservation measures and SOP, would result in insignificant or discountable effects to slickspot peppergrass proposed critical habitat PBF3. Re-vegetation using aerial, hand planting, or low-impact mechanical methods and non-competitive species would enhance plant community structure and diversity and pollinator habitats. Treatments would beneficially affect PBF 3 by reducing competition from noxious weeds and invasive plants to native plants. Overall, PBF 3 would be maintained or improved.
4	Sufficient pollinators for successful fruit and seed production, particularly pollinator species of the sphecid and vespid wasp families, species of the bombyliid and tachnid fly families, honeybees, and halictid bee species, most of which are solitary insects that nest outside of slickspots in the surrounding sagebrush-steppe	Implementation of conservation measures, including no-treatment buffers for destructive mechanical methods, and prescribed fire would avoid adverse impacts to native vegetation in proposed critical habitat. Larger-scale broadcast herbicide treatments in or adjacent to proposed critical habitat could result in short-term adverse effects by reducing vegetation diversity and

PBF #	PBFs	Direct and Indirect Effects to PBFs (Maintain, Improve, or Degrade)
	vegetation, both in the ground and within the vegetation.	damaging or killing forbs used by pollinator insects. However, larger-scale broadcast herbicide treatments would occur in degraded habitats and would reduce competition to native species and the potential for spread of noxious weeds and invasive plants. Manual, biological control, and spot herbicide treatments in combination with conservation measures and SOP, would result in insignificant or discountable effects to slickspot peppergrass proposed critical habitat PBF4. Re-vegetation using aerial, hand planting, or low-impact mechanical methods and non-competitive species would enhance plant community structure and diversity and pollinator habitats. In addition, reduction or elimination of noxious weeds and invasive plants and re-vegetation with diverse vegetation communities in areas adjacent to proposed critical habitat would support slickspot peppergrass pollinators on a landscape scale. Therefore, PBF 4 would be maintained or improved.

Interrelated and Interdependent Effects

Interrelated and interdependent actions include those activities that would not occur if not for the proposed action. No interrelated or interdependent effects to slickspot peppergrass or slickspot peppergrass proposed critical habitat have been identified for the proposed action.

Cumulative Effects

The cumulative effects analysis area for slickspot peppergrass is the Jarbidge Field Office, which includes the Northern Basin and Range population of slickspot peppergrass. Approximately 95 percent of the acreage supporting slickspot peppergrass element occurrences within the Jarbidge Field Office area occurs on Federal lands. The remaining five percent occurs on State of Idaho lands. There is no private land occupied by slickspot peppergrass in the Northern Basin and Range physiographic region (Kinter, 2016a). In addition, the Jarbidge Field Office contains about 421, 000 acres of federal land where there is potential for slickspot peppergrass to occur (Table 11). State-managed and private lands are surrounded by and/or adjacent to potential habitat. Since the potential for slickspot peppergrass to occur was only determined for federal lands, it is unknown how much potential habitat exists on State and private lands.

Actions by the State of Idaho on state-managed lands or by private land owners that affect slickspot peppergrass or its habitat would constitute cumulative effects. These actions would include treatment of noxious weeds and invasive plants using methods similar to those described under the proposed action; treatment of noxious weeds and invasive plants using methods not described in the proposed action, including additional herbicides or other methods not authorized by use on public lands, or use of plant materials that compete with slickspot peppergrass; livestock grazing and trampling; OHV use; mineral and utility development; development and operation of renewable energy facilities; and road development.

Slickspot peppergrass cumulative impacts on non-federal lands may also include the lack of management actions to maintain occupied and potential habitat. For example, non-federal lands may be less likely to have habitat restoration and weed control treatments, and habitat burned by wildfire is typically not reseeded. As a result, these areas could be dominated by noxious weeds and invasive plants. In addition, these lands can be seed sources for noxious weed and invasive plant seeds that could spread to adjacent federal lands, increasing the need for continued on-going and larger-scale treatments. Maintenance and installation of fences, pipelines, water developments, and trailing routes on State lands in occupied or potential habitats would not have the same oversight and restriction as on BLM lands and could result in additional cumulative effects to slickspot peppergrass.

Noxious weed and invasive plant control on State and private lands would not be subject to use restrictions, SOPs, design features, and conservation measures that are part of the proposed action. In addition, herbicides used on State and private lands would not be limited to the 20 active ingredients contained in the proposed action. Therefore, damage to or destruction of slickspots, plants, or seedbanks could occur as a result of these actions.

In the long-term, the proposed action provides for conservation and restoration of slickspot peppergrass and its habitat. The proposed action is expected to offset actions occurring on non-federal lands; therefore, the will be no adverse cumulative effect.

Chapter 6 – Literature Referenced

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Appendices

Appendix A - Noxious Weeds and Invasive Plants Known to Occur in the TFD

Noxious Weed Early Detection Rapid Response List

Common Name	Scientific Name	Known Counties of Occurrence in the TFD
Hydrilla	*Hydrilla verticillata*	Owyhee
Purple Starthistle	*Centauria calcitrapa*	Twin Falls
Squarrose Knapweed	*Centaurea trimfettii*	Elko
Sulphur Cinquefoil	*Potentilla recta*	Elko
Syrian Beancaper	*Zygophyllum fabago*	Blaine, Gooding, Minidoka

Noxious Weed Control List

Common Name	Scientific Name	Known Counties of Occurrence in the TFD
Black Henbane	*Hyoscyamus niger*	Blaine, Cassia, Elko, Elmore, Gooding, Minidoka, Owyhee, Twin Falls
Buffalobur	*Solanum rostratum*	Gooding, Minidoka
Common Reed	*Phragmites australis*	Elmore, Owyhee
Dyer's Woad	*Isatis tinctoria*	Blaine, Elko, Elmore, Jerome, Lincoln, Owyhee, Minidoka
Eurasian Watermilfoil	*Myriophyllum spicatum*	Gooding, Owyhee
Johnsongrass	*Sorghum halepense*	Twin Falls
Mediterranean Sage	*Salvia aethiopis*	Elko, Twin Falls, Lincoln, Cassia, Blaine, Owyhee
Musk Thistle	*Carduuss nutans*	Blaine, Cassia, Elko, Gooding, Jerome, Minidoka, Owyhee, Twin Falls
Orange Hawkweed	*Hieracium aurantiacum*	Elmore, Jerome
Parrotfeather Milfoil	*Myriophyllum aquaticum*	Jerome
Perennial Sowthistle	*Sonchus arvensis*	Twin Falls

Common Name	Scientific Name	Known Counties of Occurrence in the TFD
Russian Knapweed	*Acroptilon repens*	Blaine, Cassia, Elko, Elmore, Gooding, Jerome, Lincoln, Minidoka, Owyhee, Twin Falls
Scotch Broom	*Cytisus scoparius*	Gooding, Jerome, Lincoln
Viper's Bugloss	*Echium vulgare*	Blaine

Noxious Weed Containment List

Common Name	Scientific Name	Known Counties of Occurrence in the TFD
Canada Thistle	*Cirsium arvense*	Blaine, Camas, Cassia, Elko, Elmore, Gooding, Jerome, Lincoln, Minidoka, Owyhee, Twin Falls, Power
Curlyleaf Pondweed	*Potamogeton crispus*	Blaine, Cassia, Elmore, Gooding, Jerome, Minidoka, Owyhee, Twin Falls
Dalmatian Toadflax	*Linaria dalmatica ssp. dalmatica*	Blaine, Cassia, Elko, Elmore, Jerome, Owyhee
Diffuse Knapweed	*Centaurea diffusa*	Blaine, Camas, Cassia, Elko, Elmore, Gooding, Jerome, Lincoln, Minidoka, Owyhee, Twin Falls
Field Bindweed	*Convolvulus arvensis*	Blaine, Cassia, Elmore, Gooding, Jerome, Lincoln, Minidoka, Owyhee, Twin Falls
Hoary Alyssum	*Berteroa incana*	Blaine
Houndstongue	*Cynoglossum officinale*	Blaine, Cassia, Elko, Elmore, Twin Falls
Jointed Goatgrass	*Aegilops cylindrica*	Blaine, Cassia, Elko, Elmore
Leafy Spurge	*Euphorbia esula*	Blaine, Camas, Cassia, Elko, Lincoln, Minidoka, Owyhee
Oxeye Daisy	*Leucanthemum vulgare*	Blaine
Perennial Pepperweed	*Lepidium latifolium*	Cassia, Elko, Elmore, Jerome, Minidoka, Owyhee, Twin Falls
Poison Hemlock	*Conium maculatum*	Blaine, Cassia, Elko, Elmore, Gooding, Jerome, Lincoln, Owyhee, Twin Falls

Common Name	Scientific Name	Known Counties of Occurrence in the TFD
Puncturevine	*Tribulus terrestris*	Elko, Elmore, Gooding, Lincoln, Minidoka, Owyhee, Twin Falls
Purple Loosestrife	*Lythrum salicaria*	Elmore, Gooding, Lincoln, Minidoka, Owyhee, Twin Falls
Rush Skeletonweed	*Chondrilla juncea*	Blaine, Cassia, Elko, Elmore, Gooding, Jerome, Lincoln, Minidoka, Owyhee, Twin Falls
Tansy Ragwort	*Jacobaea vulgaris*	Blaine
Saltcedar	*Tamarix* spp.	Blaine, Cassia, Elko, Elmore, Gooding, Minidoka, Owyhee, Twin Falls
Scotch Thistle	*Onopordum acanthium*	Blaine, Cassia, Elko, Elmore, Gooding, Jerome, Lincoln, Minidoka, Owyhee, Twin Falls
Spotted Knapweed	*Centaurea stoebe*	Blaine, Camas, Cassia, Elko, Elmore, Gooding, Jerome, Lincoln, Minidoka, Owyhee, Twin Falls
Waterhemlock	*Cicuta maculata*	Elko
White Bryony	*Bryonia alba*	Cassia, Gooding
Whitetop	*Lepidium draba*	Blaine, Cassia, Elko, Elmore, Gooding, Jerome, Lincoln, Minidoka, Owyhee, Twin Falls
Yellow Flag Iris	*Iris pseudacorus*	Blaine, Owyhee, Twin Falls
Yellow Starthistle	*Centaurea solstitialis*	Elko, Elmore, Jerome, Twin Falls
Yellow Toadflax	*Linaria vulgaris*	Blaine, Elko

Invasive Plants List

Common Name	Scientific Name	Primary Habitat	Range[a]	Dominance[b]
Annual Wheatgrass	*Eremopyrum triticeum*	Upland	Numerous	Locally abundant
Barnyard Grass	*Echinochloa crus-galli*	Riparian	Rare	Uncommon
Bittersweet Nightshade	*Solanum dulcamara*	Riparian	Restricted	Uncommon

Common Name	Scientific Name	Primary Habitat	Range[a]	Dominance[b]
Bulbous Bluegrass	*Poa bulbosa*	Upland	Numerous	Locally abundant
Bull Thistle	*Cirsium vulgare*	Riparian	Numerous	Uncommon
Bur Buttercup	*Ranunculus testiculatus*	Upland	Widespread	Locally abundant
Burdock	*Arctium* spp.	Riparian	Numerous	Uncommon
Cheatgrass	*Bromus tectorum*	Upland	Widespread	Dominant
Clasping Pepperweed	*Lepidium perfoliatum*	Upland	Widespread	Locally abundant
Cocklebur	*Xanthium* spp.	Riparian	Numerous	Uncommon
Common Mullein	*Verbascum thapsus*	Upland	Restricted	Common
Field Pennycress	*Thlaspi arvense*	Upland	Restricted	Locally abundant
Flixweed	*Descurainia sophia*	Upland	Widespread	Common
Halogeton	*Halogeton glomeratus*	Upland	Widespread	Common
Japanese Brome	*Bromus japonicus*	Upland	Restricted	Common
Kentucky Bluegrass	*Poa pratensis*	Upland	Widespread	Locally abundant
Kochia	*Kochia scoparia*	Upland	Numerous	Locally abundant
Littlepod False Flax	*Camelina microcarpa*	Upland	Rare	Uncommon
Meadow Fescue	*Festuca pratensis*	Upland	Restricted	Uncommon
Medusahead (State-listed noxious Category B in Elko County)	*Taeniatherum caput-medusae*	Upland	Restricted	Locally abundant
Missouri Iris	*Iris missouriensis*	Riparian	Restricted	Uncommon
North Africa Grass	*Ventenata dubia*	Upland/Riparian	Numerous	Uncommon
Poverty Weed	*Iva axillaris*	Upland	Restricted	Locally abundant
Prickly Lettuce	*Lactuca serriola*	Upland	Widespread	Uncommon
Prostrate Knotweed	*Polygonum aviculare*	Upland	Widespread	Uncommon
Purple Mustard	*Chorispora tenella*	Upland	Numerous	Dominant

Common Name	Scientific Name	Primary Habitat	Range[a]	Dominance[b]
Rabbitfoot Grass	*Polypogon monspeliensis*	Riparian	Restricted	Locally abundant
Reed Canary Grass	*Phalaris arundinacea*	Riparian	Widespread	Dominant
Russian Olive	*Elaeagnus angustifolia*	Riparian	Widespread	Dominant
Russian Thistle	*Salsola* spp.	Upland	Widespread	Locally abundant
Smooth Brome[C]	*Bromus inermis*	Upland	Restricted	Locally abundant
Soft Brome	*Bromus hordeaceus*	Upland	Rare	Uncommon
Stork's Bill	*Erodium cicutarium*	Upland	Widespread	Locally abundant
Tall Oatgrass	*Arrhenatherum elatius*	Riparian	Rare	Uncommon
Teasel	*Dipsacus sylvestris*	Riparian	Numerous	Locally abundant
Tumble Mustard	*Sisymbrium altissimum*	Upland	Widespread	Locally abundant

[a] Range: Rare – species found only in one or two locations; Restricted – species limited to few areas; Numerous – species found in numerous areas; Wide spread – species found over large areas
[b] Dominance: Dominant – readily dominates sites; Locally abundant – abundant in patches and may dominate small sites; Common – numerous but scattered; Uncommon – present in low amounts.
[c] This species was seeded in the past by BLM in portions of the planning area.
Sources: http://plants.usda.gov/ and https://eplanning.blm.gov/epl-front-office/projects/nepa/39373/48273/52436/Appendix_H_-_Noxious_Weeds_.pdf . The list shown above was compiled by BLM staff based on observations in the field.

Appendix B - Prevention Measures

BLM Activity	Prevention Measure
Project Planning	• Incorporate prevention measures into project layout and design, alternative evaluation, and project decisions to prevent the introduction or spread of weeds. • Determine prevention and maintenance needs, including the use of herbicides, at the onset of project planning. • Before ground-disturbing activities begin, inventory weed infestations and prioritize areas for treatment in project operating areas and along access routes. • Remove sources of weed seed and propagules to prevent the spread of existing weeds and new weed infestations. • Pre-treat high-risk sites for weed establishment and spread before implementing projects. • Post weed awareness messages and prevention practices at strategic locations such as trailheads, roads, boat launches, and public land kiosks. • Coordinate project activities with nearby herbicide applications to maximize the cost effectiveness of weed treatments.
Project Development	• Minimize soil disturbance to the extent practical, consistent with project objectives. • Avoid creating soil conditions that promote weed germination and establishment. • To prevent weed germination and establishment, retain native vegetation in and around project activity areas and keep soil disturbance to a minimum, consistent with project objectives. • Locate and use weed-free project staging areas. Avoid or minimize all types of travel through weed-infested areas, or restrict travel to periods when the spread of seeds or propagules is least likely. • Prevent the introduction and spread of weeds caused by moving weed-infested sand, gravel, borrow, and fill material. • Inspect material sources on site, and ensure that they are weed-free before use and transport. • Treat weed-infested sources to eradicate weed seed and plant parts, and strip and stockpile contaminated material before any use of pit material. • Survey the area where material from treated weed-infested sources is used for at least 3 years after project completion to ensure that any weeds transported to the site are promptly detected and controlled. • Prevent weed establishment by not driving through weed-infested areas. • Inspect and document weed establishment at access roads, cleaning sites, and all disturbed areas; control infestations to prevent weed spread within the project area. • Avoid acquiring water for dust abatement where access to the water is through weed-infested sites. • Identify sites where equipment can be cleaned. Clean equipment before entering public lands.

BLM Activity	Prevention Measure
	• Clean all equipment before leaving the project site if operating in areas infested with weeds. • Inspect and treat weeds that establish at equipment cleaning sites. • Ensure that rental equipment is free of weed seed. • Inspect, remove, and properly dispose of weed seed and plant parts found on workers' clothing and equipment. Proper disposal entails bagging the seeds and plant parts and incinerating them.
Re-vegetation	• Include weed prevention measures, including project inspection and documentation, in operation and reclamation plans. • Retain bonds until reclamation requirements, including weed treatments, are completed, based on inspection and documentation. • To prevent conditions favoring weed establishment, reestablish vegetation on bare ground caused by project disturbance as soon as possible using either natural recovery or artificial techniques. • Maintain stockpiled, uninfested material in a weed-free condition. • Revegetate disturbed soil (except travel ways on surfaced projects) in a manner that optimizes plant establishment for each specific project site. For each project, define what constitutes disturbed soil and objectives for plant cover re-vegetation. Re-vegetation may include topsoil replacement, planting, seeding, fertilization, liming, and weed-free mulching, as necessary. • Where practical, stockpile weed-seed-free topsoil and replace it on disturbed areas (e.g., road embankments or landings). • Assure that all straw mulch to be used for site rehabilitation (wattles, straw bales, dams etc.) is Idaho State Certified Weed-free. The use of certified weed-free seed, forage, and straw for permitted activities are required on all public lands in Idaho. • Inspect and document all limited term ground-disturbing operations in noxious weed infested areas for at least 3 growing seasons following completion of the project. • Use native material where appropriate and feasible. • Provide briefings that identify operational practices to reduce weed spread (e.g., avoiding known weed infestation areas when locating fire lines). • Evaluate options, including closure, to regulate the flow of traffic on sites where desired vegetation needs to be established. Sites could include road and trail rights-of-way (ROW), and other areas of disturbed soils.

Appendix C - Herbicides Approved for Use on BLM Rangelands in Idaho

The table below lists the approved herbicides that may be used on BLM lands in Idaho at this time and their general affects to vegetation. The list includes the four new herbicides approved for use in the 2007 and 2016 PEISs and included in this analysis: *diflufenzopyr plus dicamba, diquat, fluridone, and imazapic.* Under the action alternatives, the BLM would also be able to use *diflufenzopyr* as a stand-alone active ingredient at such time as the ingredient becomes registered for use by the EPA under the Federal Insecticide, Fungicide and Rodenticide Act. The BLM would also be able to use new active ingredients that are developed in the future if: 1) they are registered by the EPA for use on one or more land types (e.g., rangeland, aquatic, etc.) managed by the BLM; 2) the BLM determines that the benefits of use on public lands outweigh the risks to human health and the environment; and 3) they meet evaluation criteria to ensure that the decision to use the active ingredient is supported by scientific evaluation and NEPA documentation. These evaluation criteria are discussed in more detail in the PEIS (Appendix E of USDI BLM, 2007b).

Active Ingredient	Registered Trade Names	General Effects to Vegetation
Aminopyralid	Milestone, Milestone VM	*Aminopyralid is a post emergence, selective herbicide that is used to manage invasive annual, biennial, and perennial species.*
Amoinopyralid + 2,4-D	Grazon Next, ForeFront HL, ForeFront RandP	See *Aminopyralid* and *2,4-D* for effects of these chemicals.
Aminopyralid + Metsulfuron Methyl	Opensight	See *Aminopyralid* and *Metsulfuron Methyl* for effects of these chemicals.
Aminopyralid + Triclopyr	Milestone VM Plus	See *Aminopyralid* and *Triclopyr* for effects of these chemicals.
Bromacil	Hyvar X; Hyvar X-L; Bromacil 80DF; Bromacil 80WG; Ceannard Bromacil 80DF	*Bromacil* is a non-selective, “broad spectrum” systemic herbicide, which is most effective against annual and perennial weeds, brush, woody plants, and vines. Poses high risk to non-target species in the immediate area of treatment.
Bromacil + Diuron	Bromacil/Diuron 40/40; Kroval I DF; Weed Blast 4G; Weed Blast Res. Weed Cont.; DiBro 2+2; DiBro 4+2; DiBro 4+4; Ceannard Bromacil 80DF	See *bromacil* description of effects above for effects of this chemical. *Diuron* is a non-selective, broad-spectrum herbicide, effective as both pre- and post-emergent.

Active Ingredient	Registered Trade Names	General Effects to Vegetation
Chlorsulfuron	Telar DF; Telar XP; Alligare Chlorsulfuron; Nufarm Chlorsulf SPC 75 WDG Herbicide; Chlorsulfuron E-Pro 75 WDG; Chlorsulfuron 75	A selective herbicide used on perennial broadleaf weeds and grasses.
Clopyralid	Reclaim; Stinger; Transline; Spur; Pyramid RandP; Clopyralid 3; Cody Herbicide; CleanSlate	A selective post-emergence herbicide used to control broadleaf weeds.
Clopyralid + 2,4-D	Curtail; Commando; Cutback; Cody Herbicide	See *2,4-D* and *clopyralid* for effects of these chemicals.
2,4-D	Agrisolution 2,4-D LV6; Agrisolution 2,4-D Amine 4; Agrisolution 2,4-D LV4; 2,4-D Amine 4; 2,4-D LV 4; Solve 2,4-D; 2,4-D LV 6; Five Star; D-638; Alliagre 2,4-D Amine; 2,4-D LV6; 2,4-D Amine; 2,4-D Amine 4; Opti-Amine; Barrage HF; HardBall; Unison; Clean Amine; Low Vol 4 Ester Weed Killer; Low Vol 6 Ester Weed Killer; Saber; Salvo; Savage DS; Aqua-Kleen; Esteron 99C; Weedar 64; Weedone LV-4; Weedone LV-4 Solventless; Weedone LV-6; Formula 40; 2,4-D LV 6 Ester; Platoon; WEEDstroy AM-40; Hi-Dep; Barrage LV Ester; Clean Crop Amine 4; Clean Crop Low Vol 6 Ester; Salvo LV Ester; 2,4-D 4# Amine Weed Killer; Clean Crop LV-4 ES; Cornbelt 4 lb. Amine; Cornbelt 4# LoVol Ester; Cornbelt 6# LoVol Ester; Amine 4; Base Camp Amine 4; Broadrange 55; Lo Vol-4; Lo Vol-6 Ester; Alligare 2,4-D LV 6; Base Camp LV6; D-638; De-Amine 4; De-Amine 6; De-Ester LV4; De-Ester LV6; Five Star; Opti-Amine; Phenoxy 088; Rugged; Shredder 2,4-D LV4; Shredder Amine 4; Shredder E-99, Whiteout 2,4-D	*2,4-D* is a plant growth regulator and acts as a synthetic auxin hormone. Broad-leaved plants are more susceptible than narrow-leaved plants like grasses.
Dicamba	Dicamba DMA; Vision; Cruise Control; Banvel; Clarity; Rifle; Diablo; Vanquish Herbicide; Vanquish; Sterling Blue; Kam-Ba	A growth-regulating herbicide readily absorbed and translocated from either roots or foliage. This

Active Ingredient	Registered Trade Names	General Effects to Vegetation
		herbicide produces effects similar to those found with *2,4-D.*
Dicamba + *2,4-D*	Range Star; Weedmaster; Brush-Rhap; Latigo; Rifle-D; KambaMaster; Veteran 720; Brash; Outlaw; Dicamba + 2,4-D DMA	Seed*Dicamba* and *2,4-D* for effects of these chemicals.
Dicamba + *Diflufenzopyr*	Distinct; Overdrive	*Diflufenzopyr*, which is used in combination with *dicamba* for weed control, is a postemergent that inhibits the transport of auxin in the plant resulting in an abnormal accumulation of auxin or auxin-like compounds in the growing points of susceptible plants and an imbalance in growth hormones in the plant. Works well on broadleaf weeds. **Note: In accordance with the Record of Decision for the Vegetation Treatments Using Herbicides on Bureau of Land Management Lands in 17 Western States PEIS, the aerial application of this herbicide is prohibited.**
Diflufenzopyr	This active ingredient is approved as a formulation with dicamba and is labeled as Distinct® and Overdrive®, but cannot be used as a stand-alone active ingredient by the BLM until it is registered with the EPA.	NA
Diquat	Alligare Diquat; NuFarm Diquat SPC 2 L Herbicide; Diquat SPC 2 L Herbicide; Diquat E-Ag 2L; Reward	*Diquat* is a post-emergence, nonselective herbicide that can be applied directly to vegetation or to ponds, lakes, or drainage ditches for the management of aquatic weed species. *Diquat* is a cell membrane disrupter whose mode of action intercepts electrons from photosynthesis and transfers the energy from photosynthesis to various free radicals that damage cell membranes.

Active Ingredient	Registered Trade Names	General Effects to Vegetation
Diuron	Diuron 80 DF; Karmex DF; Karmex XP; Karmex IWC; Direx 4L; Direx 80DF; Diuron 4L; Diuron 80 WDG; Vegetation Man. Diuron 80 DF; Diuron-DF; Direx 4L; Diuron 80WDG; Ceannard Diuron 80DF; Parrot DF; Parrot 4L	*Diuron* is a non-selective, broad-spectrum herbicide, effective both pre- and post-emergence.
Fluridone	Avast!; Sonar AS; Sonar Precision Release; Sonar Q; Sonar SRP; Fluridone 4L	*Fluridone* is a systemic, selective, aquatic herbicide that can be applied to the water surface or subsurface, or as a bottom application just above the floor of the water body. *Fluridone* is absorbed from the water by the plant shoots and taken up from the soil by the roots. In susceptible plants, *fluridone* inhibits the formation of carotene, which is essential in maintaining the integrity of chlorophyll.
Fluroxypyr	Comet, Fluroxypyr Herbicide, Vista, Vista XRT	*Fluroxypyr* is a selective post- emergence herbicide that is used to manage certain annual and perennial weeds.
Fluroxypyr + Clopyralid	Truslate	See *Fluroxypyr* and *Clopyralid* for effects of these chemicals.
Fluroxypyr + Picloram	Surmount, Trooper Pro	See *Fluroxypyr* and *Picloram* for effects of these chemicals.
Fluroxypyr + Triclopyr	PastureGard, PastureGard HL	See *Fluroxypyr* and *Triclopyr* for effects of these chemicals.

Active Ingredient	Registered Trade Names	General Effects to Vegetation
Glyphosate	Aqua Star; Forest Star; Gly Star Gold; Gly Star Original; Gly Star Plus; Gly Star Pro; Glyphosate 4 PLUS; Glyphosate 5.4; Glyfos;Glyfos PRO; Glyfos Aquatic; ClearOut 41 Plus; Accord Concentrate; Accord SP; Accord XRT; Accord XRT II; Glypro; Glypro Plus; Rodeo; Glyphosate 4+; Showdown; Mirage; Mirage Plus; Aquamaster; Roundup Original; Roundup Original II; Roundup Original II CA; Honcho; Honcho Plus; Roundup PRO; Roundup PRO Concentrate; Roundup PRO Dry; Roundup PROMAX; Aqua Neat; Credit Xtreme; Foresters; Razor; Razor Pro; GlyphoMate 41; AquaPro Aquatic Herbicide; Rattler; Buccaneer; Buccaneer Plus; Mirage Herbicide; Mirage Plus Herbicide; Gly-4 Plus; Gly-4; Glyphosate 4; Agrisolutions Cornerstone; Agrisolutions Cornerstone Plus; Agrisolutions Rascal; Agrisolutions Rascal Plus; Conerstone 5 Plus; Four Power Plus; Imitator Aquatic; Imitator 25% Concentration; Imitator DA; Imitator Plus; Imitator RTU; KleenUp Pro; Mad Dog Plus; Makaze; Roundup Custom	A nonselective systemic herbicide that can damage all groups or families of non-target plants to varying degrees.
Glyphosate + 2,4-D	Landmaster BW; Campaign; Imitator Plus D	See *2,4-D* and *glyphosate* for effects of these chemicals.
Hexazinone	Velpar ULW; Velpar L; Velpar DF; Velossa; Pronone MG; Pronone 10G; Pronone 25G; Pronone Power Pellet; Velpar DF VU; Velpar L VU	A foliar-or soil-applied herbicide with soil activity. It is used for broadleaf weed, brush, and grass control in non-cropland and in forest lands.
Imazapic	Plateau; Panoramic 2SL; Nufarm Imazapic 2SL	This is a selective, systemic herbicide that can be applied both pre-emergence and post-emergence for the management of selective broadleaf and grassy

Active Ingredient	**Registered Trade Names**	**General Effects to Vegetation**
		plant species. Its mode of action is associated with the synthesis of branch-chained amino acids.
Imazapic + Glyphosate	Journey	See *imazapic* and *glyphosate* for effects of these chemicals.
Imazapyr	Imazapyr 2 SL; Imazapyr 4SL; Ecomazapyr 2 SL; Arsenal Railroad Herbicide; Chopper; Arsenal Applicators Conc.; Arsenal; Arsenal Technical; Arsenal PowerLine; Stalker; Habitat; Polaris; Polaris AC; Polaris AQ; Polaris RR; Polaris SP; Polaris Herbicide; Habitat Herbicide; SSI Maxim Arsenal 0.5G; SSI Maxim Arsenal 5.0G; Ecomazapyr 2 SL; Polaris AC Complete; Rotary 2 SL	This broad-spectrum herbicide can be applied pre or postemergence to weeds. Stable for at least 18 months. Kills plants within two to four weeks with residual activity. It is currently registered for use in non-crop areas such as industrial sites and rights-of-ways.
Imazapyr + Diuron	Mojave 70 EG; Sahara DG; Imazuron E-Pro; SSI Maxim Topsite 2.5G	See *imazapyr* and *diuron* for effects of these chemicals.
Imazapyr + Metsulfuron methyl	Lineage Clearstand	See *imazapyr* and *metsulfuron methyl* for effects of these chemicals.
Metsulfuron methyl	MSM 60; AmTide MSM 60DF Herbicide; Escort DF; Escort XP; MSM E-Pro 60 EG Herbicide; MSM E-AG 60 EG Herbicide; Patriot; PureStand; Metsulfuron Methyl DF	*Metsulfuron methyl* is a selective herbicide used pre- and post-emergence in the control of many annual and perennial weeds and woody plants.
Metsulfuron methyl + Chlorsulfuron	Cimarron X-tra; Cimarron Plus	See *metsulfuron methyl* and *chlorsulfuron* for effects of these chemicals.
Metsulfuron methyl + Dicamba + 2,4-D	Cimarron MAX	See *metsulfuron methyl*, *dicamba*, and *2,4-D* for effects of these chemicals.
Picloram	Triumph K; Triumph 22K; Picloram K; Picloram 22K; Grazon PC; OutPost 22K; Tordon K; Tordon 22K; Trooper 22K	*Picloram* is more toxic to broadleaf and woody plants than grains or grasses.
Picloram + 2,4-D	Graslan L; GunSlinger; Picloram + D; Tordon 101 M; Tordon 101 R Forestry; Tordon RTU; Grazon	See *Picloram*, and *2,4-D* for effects of these chemicals.

Active Ingredient	Registered Trade Names	General Effects to Vegetation
	P+D; HiredHand P+D; Pathway; Trooper 101; Trooper P + D	
Picloram + 2,4-D +Dicamba	Trooper Extra	See *Picloram*, *2,4-D* and *dicamba* for effects of these chemicals.
Rimsulfuron	Matrix, Matrix SG, Matrix FNV	*Rimsulfuron* is a selective ALS-inhibiting herbicide applied both pre- and post-emergence to target annual species such as cheatgrass and medusahead rye.
Tebuthiuron	Alligare Tebuthiuron 80 WG; Alligare Tebuthiuron 20 P; Spike 20P; Spike 80DF; SpraKil S-5 Granules	A soil-applied herbicide used for control of woody plants and vegetation. *Tebuthiuron* has a two to four rear residual on dry sites depending on application rates.
Tebuthiuron + Diuron	SpraKil SK-13 Granular; SpraKil SK-26 Granular	See *tebuthiuron* and *diuron* for effects of these chemicals.
Triclopyr	Triclopyr 3; Triclopyr 4; Element 3A; Element 4; Forestry Garlon XRT; Garlon 3A; Garlon 4; Garlon 4 Ultra; Remedy; Remedy Ultra: Pathfinder II; Trycera; Relegate; Relegate RTU; Tahoe 3A; Tahoe 4E; Tahoe 4E Herbicide; Renovate 3; Renovate OTF; Ecotriclopyr 3 SL; Triclopyr 3 SL; Triclopyr RTU; Trycera	A growth-regulating herbicide for control of woody and broadleaf perennial weeds in non-cropland, forest lands, and lawns.
Triclopyr + 2,4-D	Everett; Crossbow; Aquasweep; Candor	See *triclopyr* and *2,4-D* for effects of these chemicals.
Triclopyr + Clopyralid	Prescott Herbicide; Redeem RandP; Brazen	See *triclopyr* and *clopyralid* for effects of these chemicals.

Appendix D - Herbicide Application Criteria

The following herbicide application criteria along with BLM herbicide mitigation measures and design features would be utilized to formulate site-specific vegetation treatment plans and Pesticide Use Proposals across the TFD. The 2007 PEIS and 2016 PEIS decisions concerning specific use of certain chemicals approved for BLM use were carried forward in the development of local use criteria.

Herbicides used for pre-emergent control of noxious weeds or invasive plants would not be applied to bare soil where there is potential for off-site soil movement that may negatively impact sensitive resources or private agricultural crop land. Site factors to consider in this determination are topography, soil type and erosion potential, treatment location relative to sensitive resources or private agricultural crop land, project size, wildfire or prescribed fire intensity, and residual vegetation and litter cover. Appropriate SOP would also be applied in the determination (see Appendix E).

The selection of an appropriate herbicide will rest on several factors. Some of these factors will include proximity to water, proximity to croplands, soil permeability, target species, associated plant species, time of application, and prior herbicide use on a target population.

Specific pesticide label requirements will be followed. If minimums from H-9011-1 Chemical Pest Handbook are above pesticide labeling, specific buffer strip widths indicated on pesticide labels or by State regulations must be followed. Pesticide program planners will refer to pesticide labels and State regulations for specific requirements.

In addition to specific label requirements and guidance from BLM Handbook H-9011-1, aquatic habitats, riparian areas, and wetland resources buffers would be applied as shown in the *Design Features and Conservation Measures* section of Chapter 2.

Active Ingredient	Aerial Application	Ground Application	Spot Treatment	Buffers	Target Vegetation	General Effects to Vegetation
Aminopyralid	Yes. Pesticide labels allow for aerial application.	Yes	Yes	Yes. See BLM Handbook H-9011-1 Chapter 2, II. Application Guidance	Invasive annual, biennial, and perennial herbaceous species. Species targeted include: Knapweeds, yellow starthistle, thistles, and rush skeletonweed.	*Aminopyralid* is a post emergence, selective herbicide that is used to manage invasive annual, biennial, and perennial species. Areas where registered use is **not** appropriate include riparian and aquatic habitats. Areas where registered use is appropriate include rangeland, forestland, ROW, recreation and cultural resources, and oil, gas, and minerals.
Bromacil	No. To address concerns regarding herbicide drift, the BLM will not utilize aerial application of B*romacil.*	Yes	Yes	Yes. See BLM Handbook H-9011-1 Chapter 2, II. Application Guidance	Annual and perennial grasses and broadleaf weeds.	*Bromacil* is a non-selective, "broad spectrum" systemic herbicide, which is most effective against annual and perennial weeds, brush, woody plants, and vines. Areas where registered use is **not** appropriate include rangeland, forestland, and riparian and aquatic habitats. Areas where registered use is appropriate include ROW, recreation and cultural resources, and oil, gas, and minerals.

Active Ingredient	Aerial Application	Ground Application	Spot Treatment	Buffers	Target Vegetation	General Effects to Vegetation
Chlorsulfuron	No. To address concerns regarding herbicide drift, the BLM will not utilize aerial application of C*hlorsulfuron.*	Yes	Yes	Yes. See BLM Handbook H-9011-1 Chapter 2, II. Application Guidance	Dyers woad, thistles, annual and perennial mustards, Russian knapweed, whitetop.	A selective herbicide used on perennial broadleaf weeds and grasses. Areas where registered use is **not** appropriate include forestland and riparian and aquatic habitats. Areas where registered use is appropriate include rangeland habitats, ROW, recreation and cultural resources, and oil, gas and minerals.
Clopyralid	Yes. Pesticide labels allow for aerial application.	Yes	Yes	Yes. See BLM Handbook H-9011-1 Chapter 2, II. Application Guidance	Knapweeds, thistles.	A selective post-emergence herbicide used to control broadleaf weeds. Areas where registered use is **not** appropriate include riparian and aquatic habitats. Areas where registered use is appropriate include rangeland and forestland habitats, ROW, recreation and cultural resources, and oil, gas, and minerals.

Active Ingredient	Aerial Application	Ground Application	Spot Treatment	Buffers	Target Vegetation	General Effects to Vegetation
2,4-D	Yes. Pesticide labels allow for aerial application.	Yes	Yes	Yes. See BLM Handbook H-9011-1 Chapter 2, II. Application Guidance	Dyers woad, annual and perennial mustards, knapweeds, Russian thistle.	*2,4-D* is a plant growth regulator and acts as a synthetic auxin hormone. Broad-leaved plants are more susceptible than narrow-leaved plants like grasses. Areas where registered use is appropriate include rangeland, forestland, riparian and aquatic habitats, ROW, recreation and cultural resources, and oil, gas, and minerals.
Dicamba	Yes. Pesticide labels allow for aerial application.	Yes	Yes	Yes. See BLM Handbook H-9011-1 Chapter 2, II. Application Guidance	Dyers woad, knapweeds, thistles, whitetop, toadflax.	A growth-regulating herbicide readily absorbed and translocated from either roots or foliage. This herbicide produces effects similar to those found with *2,4-D*. Areas where registered use is **not** appropriate include forestland and riparian and aquatic habitats. Areas where registered use is appropriate include rangeland habitats, ROW, recreation and cultural resources, and oil, gas and minerals.

Active Ingredient	Aerial Application	Ground Application	Spot Treatment	Buffers	Target Vegetation	General Effects to Vegetation
Diflufenzopyr	NA	NA	NA	NA	NA	This active ingredient is approved as a formulation with *dicamba* and is labeled as Distinct® and Overdrive®, but cannot be used as a stand-alone active ingredient by the BLM until it is registered with the EPA.
*Diflufenzopyr + Dicamba**	Yes. Pesticide labels allow for aerial application.	Yes	Yes	Yes. See BLM Handbook H-9011-1 Chapter 2, II. Application Guidance	Knapweeds, thistles, Russian thistle.	*Diflufenzopyr*, which is used in combination with *dicamba* for weed control, is a postemergent that inhibits the transport of auxin in the plant resulting in an abnormal accumulation of auxin or auxin-like compounds in the growing points of susceptible plants and an imbalance in growth hormones in the plant. Works well on broadleaf weeds. Areas where registered use is **not** appropriate include forestland and riparian and aquatic habitats. Areas where registered use is appropriate include rangeland, ROW, recreation and cultural resources, oil, gas and minerals.

Active Ingredient	Aerial Application	Ground Application	Spot Treatment	Buffers	Target Vegetation	General Effects to Vegetation
Diquat	No. *Diquat* will not be aerially applied in riparian areas and wetlands.	No. Aquatic herbicide.	Yes	Yes. Buffers should be applied to avoid drift onto non-target terrestrial vegetation. See BLM Handbook H-9011-1 Chapter 2, II. Application Guidance	Watermilfoils.	*Diquat* is a post-emergence, nonselective herbicide that can be applied directly to vegetation or to ponds, lakes, or drainage ditches for the management of aquatic weed species. *Diquat* is a cell membrane disrupter whose mode of action intercepts electrons from photosynthesis and transfers the energy from photosynthesis to various free radicals that damage cell membranes. Areas where registered use is **not** appropriate include rangeland and forestland habitats. Areas where registered use is appropriate include riparian and aquatic habitats. Areas where approved registration exists but BLM does not propose to use include ROW, recreation and cultural resources, oil, gas, and minerals.

Active Ingredient	**Aerial Application**	**Ground Application**	**Spot Treatment**	**Buffers**	**Target Vegetation**	**General Effects to Vegetation**
Diuron	No. To address concerns regarding herbicide drift, the BLM will not utilize aerial application of d*iuron.*	Yes	Yes	Yes. See BLM Handbook H-9011-1 Chapter 2, II. Application Guidance	Annual grasses, broadleaf weeds, Russian thistle.	*Diuron* is a non-selective, broad-spectrum herbicide, effective both pre- and post- emergence. Areas where registered use is **not** appropriate include rangeland, forestland, and riparian and aquatic habitats. Areas where registered use is appropriate include ROW, recreation and cultural resources, and oil, gas and minerals.

Active Ingredient	Aerial Application	Ground Application	Spot Treatment	Buffers	Target Vegetation	General Effects to Vegetation
Fluridone	Yes.	No. Aquatic herbicide.	Yes	Yes. Buffers should be applied to avoid drift onto non-target terrestrial vegetation. See BLM Handbook H-9011-1 Chapter 2, II. Application Guidance	Watermilfoils.	*Fluridone* is a systemic, selective, aquatic herbicide that can be applied to the water surface or subsurface, or as a bottom application just above the floor of the water body. *Fluridone* is absorbed from the water by the plant shoots and taken up from the soil by the roots. In susceptible plants, *fluridone* inhibits the formation of carotene, which is essential in maintaining the integrity of chlorophyll. Areas where registered use is **not** appropriate include rangeland and forestland habitats, ROW, recreation and cultural resources, oil, gas, and minerals. Areas where registered use is appropriate include riparian and aquatic habitats.

Active Ingredient	Aerial Application	Ground Application	Spot Treatment	Buffers	Target Vegetation	General Effects to Vegetation
Fluroxypyr	Yes. Pesticide labels allow for aerial application.	Yes	Yes	Yes. See BLM Handbook H-9011-1 Chapter 2, II. Application Guidance	Broadleaf species such as weedy (annual) kochia, mustards, and leafy spurge.	*Fluroxypyr* is a selective post-emergence herbicide that is used to manage certain annual and perennial weeds. Areas where registered use is **not** appropriate include riparian and aquatic habitats. Areas where registered use is appropriate include rangeland, forestland, ROW, recreation and cultural resources, and oil, gas, and minerals.
Glyphosate	Yes. Pesticide labels allow for aerial application.	Yes	Yes	Yes. See BLM Handbook H-9011-1 Chapter 2, II. Application Guidance	Annual grasses, mustards.	A nonselective systemic herbicide that can damage all groups or families of non-target plants to varying degrees. Areas where registered use is appropriate include rangeland, forestland, riparian and aquatic habitats, ROW, recreation and cultural resources, oil, gas, and minerals.

Active Ingredient	Aerial Application	Ground Application	Spot Treatment	Buffers	Target Vegetation	General Effects to Vegetation
Hexazinone	Yes. Pesticide labels allow for aerial application.	Yes	Yes	Yes. See BLM Handbook H-9011-1 Chapter 2, II. Application Guidance	Saltcedar.	A foliar-or soil-applied herbicide with soil activity. It is used for broadleaf weed, brush, and grass control in non-cropland and in forest lands. Areas where registered use is **not** appropriate include riparian and aquatic habitats. Areas where registered use is appropriate include rangeland and forestland habitats, ROW, recreation and cultural resources, oil, gas, and minerals.
Imazapic	Yes. Pesticide labels allow for aerial application.	Yes	Yes	Yes. See BLM Handbook H-9011-1 Chapter 2, II. Application Guidance	Downy brome, medusahead wildrye, leafy spurge, mustards.	This is a selective, systemic herbicide that can be applied both pre-emergence and post-emergence for the management of selective broadleaf and grassy plant species. Its mode of action is associated with the synthesis of branch-chained amino acids. Areas where registered use is **not** appropriate include riparian and aquatic habitats. Areas where registered use is appropriate include rangeland and forestland habitats, ROW, recreation and cultural resources, oil, gas, and minerals.

Active Ingredient	Aerial Application	Ground Application	Spot Treatment	Buffers	Target Vegetation	General Effects to Vegetation
Imazapyr	Yes. Pesticide labels for this chemical allow aerial application.	Yes	Yes	Yes. See BLM Handbook H-9011-1 Chapter 2, II. Application Guidance	Saltcedar, annual and perennial broadleaf weeds.	This broad-spectrum herbicide can be applied pre or postemergence to weeds. Stable for at least 18 months. Kills plants within two to four weeks with residual activity. Areas where registered use is appropriate include rangeland, forestland, riparian and aquatic habitats, ROW, recreation and cultural resources, oil, gas, and minerals.
Metsulfuron methyl	No. To address concerns regarding herbicide drift, the BLM will not utilize aerial application of *metsulfuron.*	Yes	Yes	Yes. See BLM Handbook H-9011-1 Chapter 2, II. Application Guidance	Thistles, annual and perennial broadleaf weeds.	*Metsulfuron methyl* is a selective herbicide used pre- and post-emergence in the control of many annual and perennial weeds and woody plants. Areas where registered use is **not** appropriate include riparian and aquatic habitats. Areas where registered use is appropriate include rangeland, forestland, ROW, recreation and cultural resources, oil, gas, and minerals.

Active Ingredient	Aerial Application	Ground Application	Spot Treatment	Buffers	Target Vegetation	General Effects to Vegetation
Picloram	Yes. Pesticide labels allow for aerial application.	Yes	Yes	Yes. See BLM Handbook H-9011-1 Chapter 2, II. Application Guidance	Certain annual and perennial broadleaf weeds, leafy spurge, rush skeletonweed, knapweeds, thistles.	*Picloram* is a selective herbicide that is more toxic to broadleaf and woody plants than grains or grasses. Areas where registered use is **not** appropriate include riparian and aquatic habitats. Areas where registered use is appropriate include rangeland, forestland, ROW, recreation and cultural resources, oil, gas, and minerals.
Rimsulfuron	Yes. Pesticide labels allow for aerial application.	Yes	Yes	Yes. See BLM Handbook H-9011-1 Chapter 2, II. Application Guidance	Invasive annual grasses such as cheatgrass and medusahead rye and other annuals.	*Rimsulfuron* is a selective ALS-inhibiting herbicide applied both pre- and post-emergence to target annual species such as cheatgrass and medusahead rye. Areas where registered use is **not** appropriate include riparian and aquatic habitats. Areas where registered use is appropriate include rangeland, forestland, ROW, recreation and cultural resources, oil, gas, and minerals.

Active Ingredient	Aerial Application	Ground Application	Spot Treatment	Buffers	Target Vegetation	General Effects to Vegetation
Tebuthiuron	Yes. Pesticide labels allow for aerial application.	Yes	Yes	Yes. See BLM Handbook H-9011-1 Chapter 2, II. Application Guidance	Shrubs (thinning), Russian olive.	A soil-applied herbicide used for control of woody plants and vegetation. *Tebuthiuron* has a two to four year residual on dry sites depending on application rates. Areas where registered use is **not** appropriate include forestland and riparian and aquatic habitats. Areas where registered use is appropriate include rangeland, ROW, recreation and cultural resources, oil, gas, and minerals.
Triclopyr	Yes. Pesticide labels allow for aerial application.	Yes	Yes	Yes. See BLM Handbook H-9011-1 Chapter 2, II. Application Guidance	Broadleaf weeds, thistles, saltcedar.	A growth-regulating herbicide for control of woody and broadleaf perennial weeds in non-cropland, forest lands, and lawns. Areas where registered use is appropriate include rangeland, forestland, riparian and aquatic habitats, ROW, recreation and cultural resources, oil, gas, and minerals.

Appendix E - Standard Operating Procedures for Applying Herbicides

Resource Element	Standard Operating Procedure
Guidance Documents	BLM Handbook H-9011-1 (*Chemical Pest Control*); and manuals 1112 (*Safety*), 9011 (*Chemical Pest Control*), 9012 (*Expenditure of Rangeland Insect Pest Control Funds*), 9015 (*Integrated Weed Management)*, and 9220 (*Integrated Pest Management*).
General	• Prepare operational and spill contingency plan in advance of treatment. • Conduct a pretreatment survey before applying herbicides. • Select herbicide that is least damaging to the environment while providing the desired results. • Select herbicide products carefully to minimize additional impacts from degradates, adjuvants, inert ingredients, and tank mixtures. • Apply the least amount of herbicide needed to achieve the desired result. • Follow herbicide product label for use and storage. • Have licensed applicators apply herbicides. • Use only USEPA-approved herbicides and follow product label directions and “advisory” statements. • Review, understand, and conform to the “Environmental Hazards” section on the herbicide product label. This section warns of known pesticide risks to the environment and provides practical ways to avoid harm to organisms or to the environment. • Consider surrounding land use before assigning aerial spraying as a treatment method and avoid aerial spraying near agricultural or densely populated areas. • Minimize the size of application area, when feasible. • Comply with herbicide-free buffer zones to ensure that drift will not affect crops or nearby residents/landowners. • Post treated areas and specify reentry or rest times, if appropriate. • Notify adjacent landowners prior to treatment. • Keep a copy of Material Safety Data Sheets (MSDSs) at work sites. MSDSs are available for review at http://www.cdms.net/. • Keep records of each application, including the active ingredient, formulation, application rate, date, time, and location. • Avoid accidental direct spray and spill conditions to minimize risks to resources. • Consider surrounding land uses before aerial spraying. • Avoid aerial spraying during periods of adverse weather conditions (snow or rain imminent, fog, or air turbulence). • Make helicopter applications at a target airspeed of 40 to 50 miles per hour (mph), and at about 30 to 45 feet above ground.

Resource Element	Standard Operating Procedure
	• Take precautions to minimize drift by not applying herbicides when winds exceed >10 mph (>6 mph for aerial applications), or a serious rainfall event is imminent. • Use drift control agents and low volatile formulations. • Conduct pre-treatment surveys for sensitive habitat and special status species within or adjacent to proposed treatment areas. • Consider site characteristics, environmental conditions, and application equipment in order to minimize damage to non-target vegetation. • Use drift reduction agents, as appropriate, to reduce the drift hazard to non-target species. • Turn off applied treatments at the completion of spray runs and during turns to start another spray run. • Refer to the herbicide product label when planning re-vegetation to ensure that subsequent vegetation would not be injured following application of the herbicide. • Clean OHVs to remove seeds.
Air Quality See Manual 7000 (*Soil, Water, and Air Management)*	• Consider the effects of wind, humidity, temperature inversions, and heavy rainfall on herbicide effectiveness and risks. • Apply herbicides in favorable weather conditions to minimize drift. For example, do not treat when winds exceed 10 mph (>6 mph for aerial applications) or rainfall is imminent. • Use drift reduction agents, as appropriate, to reduce the drift hazard. • Select proper application equipment (e.g., spray equipment that produces 200- to 800-micron diameter droplets [spray droplets of 100 microns and less are most prone to drift]). • Select proper application methods (e.g., set maximum spray heights, use appropriate buffer distances between spray sites and non-target resources).
Soil See Manual 7000 (*Soil, Water, and Air Management*)	• Minimize treatments in areas where herbicide runoff is likely, such as steep slopes when heavy rainfall is expected. • Minimize use of herbicides that have high soil mobility, particularly in areas where soil properties increase the potential for mobility. • Do not apply granular herbicides on slopes of more than 15% where there is the possibility of runoff carrying the granules into non-target areas.
Water Resources See Manual 7000 (*Soil, Water, and Air Management*)	• Consider climate, soil type, slope, and vegetation type when developing herbicide treatment programs. • Select herbicide products to minimize impacts to water. This is especially important for application scenarios that involve risk from active ingredients in a particular herbicide, as predicted by risk assessments.

Resource Element	Standard Operating Procedure
	• Use local historical weather data to choose the month of treatment. Considering the phenology of the target species, schedule treatments based on the condition of the water body and existing water quality conditions. • Plan to treat between weather fronts (calms) and at appropriate time of day to avoid high winds that increase water movements, and to avoid potential stormwater runoff and water turbidity. • Review hydrogeologic maps of proposed treatment areas. Note depths to groundwater and areas of shallow groundwater and areas of surface water and groundwater interaction. Minimize treating areas with high risk for groundwater contamination. • Conduct mixing and loading operations in an area where an accidental spill would not contaminate an aquatic body. • Do not rinse spray tanks in or near water bodies. Do not broadcast pellets where there is danger of contaminating water supplies. • Maintain buffers between treatment areas and water bodies. Buffer widths should be developed based on herbicide- and site-specific criteria to minimize impacts to water bodies. • Minimize the potential effects to surface water quality and quantity by stabilizing terrestrial areas as quickly as possible following treatment.
Wetlands and Riparian Areas	• Use a selective herbicide and a wick or backpack sprayer. • Use appropriate herbicide-free buffer zones for herbicides not labeled for aquatic use based on risk assessment guidance, with minimum widths of 100 feet for aerial, 25 feet for vehicle, and 10 feet for hand spray applications.
Vegetation See Handbook H-4410-1 (*National Range Handbook*), and manuals 5000 (*Forest Management*) and 9015 (*Integrated Weed Management*)	• Refer to the herbicide label when planning re-vegetation to ensure that subsequent vegetation would not be injured following application of the herbicide. • Use native or sterile species for re-vegetation projects to compete with invasive species until desired vegetation establishes. • Use weed-free feed for horses and pack animals. Use weed-free straw and mulch for re-vegetation and other activities. • Identify and implement any temporary domestic livestock grazing and/or supplemental feeding restrictions needed to enhance desirable vegetation recovery following treatment. Consider adjustments in the existing grazing permit, needed to maintain desirable vegetation on the treatment site. • Minimize the use of terrestrial herbicides in watersheds with downgradient ponds and streams if potential impacts to aquatic plants are identified. • Establish appropriate (herbicide-specific) buffer zones (see Tables 4-12 and 4-14 in the 2007 PEIS) around downstream water bodies, habitats, and species/populations of interest. Consult the ecological risk assessments (ERAs) prepared for the PEIS for more specific information on appropriate

Resource Element	Standard Operating Procedure
	buffer distances under different soil, moisture, vegetation, and application scenarios.
Pollinators	• Complete vegetation treatments seasonally before pollinator foraging plants bloom. • Time vegetation treatments to take place when foraging pollinators are least active both seasonally and daily. • Design vegetation treatment projects so that nectar and pollen sources for important pollinators and resources are treated in patches rather than in one single treatment. • Minimize herbicide application rates. Use typical rather than maximum application rates where there are important pollinator resources. • Maintain herbicide free buffer zones around patches of important pollinator nectar and pollen sources. • Maintain herbicide free buffer zones around patches of important pollinator nesting habitat and hibernacula. • Make special note of pollinators that have single host plant species, and minimize herbicide spraying on those plants (if invasive species) and in their habitats.
Fish and Other Aquatic Organisms See manuals 6500 (*Wildlife and Fisheries Management*) and 6780 (*Habitat Management Plans*)	• Use appropriate buffer zones based on label and risk assessment guidance. • Minimize treatments near fish-bearing water bodies during periods when fish are in life stages most sensitive to the herbicide(s) used, and use spot rather than broadcast or aerial treatments. • Use appropriate application equipment/method near water bodies if the potential for off-site drift exists. • For treatment of aquatic vegetation: 1) treat only that portion of the aquatic system necessary to achieve acceptable vegetation management; 2) use the appropriate application method to minimize the potential for injury to desirable vegetation and aquatic organisms; and 3) follow water use restrictions presented on the herbicide label. • Limit the use of terrestrial herbicides in watersheds with characteristics suitable for potential surface runoff that have fish-bearing streams during periods when fish are in life stages most sensitive to the herbicide(s) used. • Consider the proximity of application areas to salmonid habitat and the possible effects of herbicides on riparian and aquatic vegetation. Maintain appropriate buffer zones around salmonid-bearing streams (see Appendix C, Table C-16, of the 2007 PEIS, and recommendations in the individual ERAs). • Avoid using the adjuvant R-11® in aquatic environments, and either avoid using glyphosate formulations containing polyoxyethyleneamine (POEA), or seek to use formulations with the least amount of POEA, to reduce risks to aquatic organisms in aquatic environments.

Resource Element	Standard Operating Procedure
Wildlife	• Use herbicides of low toxicity to wildlife, where feasible. • Use spot applications or low-boom broadcast operations where possible to limit the probability of contaminating non-target food and water sources, especially non-target vegetation over areas larger than the treatment area. • Use timing restrictions (e.g., do not treat during critical wildlife breeding or staging periods) to minimize impacts to wildlife. • Avoid using glyphosate formulations that include R-11® in the future, and either avoid using and formulations with POEA, or seek to use the formulation with the lowest amount of POEA available, to reduce risks to amphibians. • Use appropriate buffer zones (see Table 4-12 and 4-14 in Chapter 4 of the 2007 PEIS) to limit contamination of off-site vegetation, which may serve as forage for wildlife.
Threatened, Endangered, and Sensitive Species See Manual 6840 (*Special Status Species*)	• Survey for special status species before treating an area. Consider effects to special status species when designing herbicide treatment programs. • Use drift reduction agents to reduce the risk of drift hazard. • Use a selective herbicide and a wick or backpack sprayer to minimize risks to special status plants. • Avoid treating vegetation during time-sensitive periods (e.g., nesting and migration, sensitive life stages) for special status species in area to be treated. • Implement all conservation measures for special status plant and animal species presented in the 2007 and 2016 PEIS BAs.
Livestock See Handbook H-4120-1 (*Grazing Management*)	• Whenever possible and whenever needed, schedule treatments when livestock are not present in the treatment area. Design treatments to take advantage of normal livestock grazing rest periods, when possible. • As directed by the herbicide product label, remove livestock from treatment sites prior to herbicide application, where applicable. • Use herbicides of low toxicity to livestock, where feasible. • Take into account the different types of application equipment and methods, where possible, to reduce the probability of contamination of non-target food and water sources. • Avoid use of diquat in riparian pasture while pasture is being used by livestock. • Notify permittees of the herbicide treatment project to improve coordination and avoid potential conflicts and safety concerns during implementation of the treatment. • Notify permittees of livestock grazing, feeding, or slaughter restrictions, if necessary. • Provide alternative forage sites for livestock, if possible.

Resource Element	Standard Operating Procedure
Wild Horses and Burros	• Minimize using herbicides in areas grazed by wild horses and burros. • Use herbicides of low toxicity to wild horses and burros, where feasible. • Remove wild horses and burros from identified treatment areas prior to herbicide application, in accordance with herbicide product label directions for livestock. • Take into account the different types of application equipment and methods, where possible, to reduce the probability of contaminating non-target food and water sources.
Cultural Resources and Paleontological Resources See handbooks H-8120-1 (*Guidelines for Conducting Tribal Consultation*) and H-8270-1 (*General Procedural Guidance for Paleontological Resource Management*), and manuals 8100 (*The Foundations for Managing Cultural Resources*), 8120 (*Tribal Consultation Under Cultural Resource Authorities*), and 8270 (*Paleontological Resource Management*) See also: *Programmatic Agreement among the Bureau of Land Management, the Advisory Council on Historic Preservation, and the National Conference of State Historic Preservation Officers Regarding the Manner in Which BLM Will Meet Its Responsibilities Under the National Historic Preservation Act*	• Follow standard procedures for compliance with Section 106 of the National Historic Preservation Act as implemented through the Programmatic Agreement among the Bureau of Land Management, the Advisory Council on Historic Preservation, and the National Conference of State Historic Preservation Officers Regarding the Manner in Which BLM Will Meet Its Responsibilities Under the National Historic Preservation Act and state protocols or 36 Code of Federal Regulations Part 800, including necessary consultations with State Historic Preservation Officers and interested tribes. • Follow BLM Handbook H-8270-1 (General Procedural Guidance for Paleontological Resource Management) to determine known Condition I and Condition 2 paleontological areas, or collect information through inventory to establish Condition 1 and Condition 2 areas, determine resource types at risk from the proposed treatment, and develop appropriate measures to minimize or mitigate adverse impacts. • Consult with tribes to locate any areas of vegetation that are of significance to the tribe and that might be affected by herbicide treatments. • Work with tribes to minimize impacts to these resources. • Follow guidance under Human Health and Safety in the PEIS in areas that may be visited by Native peoples after treatments.
Visual Resources See handbooks H-8410-1 (*Visual Resource Inventory*) and H-8431-1 (*Visual Resource Contrast Rating*), and manual 8400 (*Visual Resource Management*)	• Minimize the use of broadcast foliar applications in sensitive watersheds to avoid creating large areas of browned vegetation. • Consider the surrounding land use before assigning aerial spraying as an application method. • Minimize off-site drift and mobility of herbicides (e.g., do not treat when winds exceed 10 mph; minimize treatment in areas where herbicide runoff is likely; establish appropriate buffer widths between treatment areas and residences) to contain visual changes to the intended treatment area.

Resource Element	Standard Operating Procedure
	• If the area is a Class I or II visual resource, ensure that the change to the characteristic landscape is low and does not attract attention (Class I), or if seen, does not attract the attention of the casual viewer (Class II). • Lessen visual impacts by: 1) designing projects to blend in with topographic forms; 2) leaving some low-growing trees or planting some low-growing tree seedlings adjacent to the treatment area to screen short-term effects; and 3) re-vegetating the site following treatment. • When restoring treated areas, design activities to repeat the form, line, color, and texture of the natural landscape character conditions to meet established VRM objectives.
Wilderness and Other Special Areas See handbooks H-8550-1 (*Management of Wilderness Study Areas (WSAs)*), and H-8560-1 (*Management of Designated Wilderness Study Areas*), and Manual 8351 (*Wild and Scenic Rivers*)	• Encourage backcountry pack and saddle stock users to feed their livestock only weed-free feed for several days before entering a wilderness area. • Encourage stock users to tie and/or hold stock in such a way as to minimize soil disturbance and loss of native vegetation. • Re-vegetate disturbed sites with native species if there is no reasonable expectation of natural regeneration. • Provide educational materials at trailheads and other wilderness entry points to educate the public on the need to prevent the spread of weeds. • Use the “minimum tool” to treat noxious and invasive vegetation, relying primarily on the use of ground-based tools, including backpack pumps, hand sprayers, and pumps mounted on pack and saddle stock. • Use chemicals only when they are the minimum method necessary to control weeds that are spreading within the wilderness or threaten lands outside the wilderness. • Give preference to herbicides that have the least impact on non-target species and the wilderness environment. • Implement herbicide treatments during periods of low human use, where feasible. • Address wilderness and special areas in management plans. • Maintain adequate buffers for Wild and Scenic Rivers (¼ mile on either side of river, ½ mile in Alaska).
Recreation See Handbook H-1601-1 (*Land Use Planning Handbook, Appendix C*)	• Schedule treatments to avoid peak recreational use times, while taking into account the optimum management period for the targeted species. • Notify the public of treatment methods, hazards, times, and nearby alternative recreation areas. • Adhere to entry restrictions identified on the herbicide product label for public and worker access. • Post signs noting exclusion areas and the duration of exclusion, if necessary. • Use herbicides during periods of low human use, where feasible.

Resource Element	Standard Operating Procedure
Social and Economic Values	• Consider surrounding land use before selecting aerial spraying as a method, and avoid aerial spraying near agricultural or densely-populated areas. • Post treated areas and specify reentry or rest times, if appropriate. • Notify grazing permittees of livestock feeding restrictions in treated areas, if necessary, as per herbicide product label instructions. • Notify the public of the project to improve coordination and avoid potential conflicts and safety concerns during implementation of the treatment. • Control public access until potential treatment hazards no longer exist, per herbicide product label instructions. • Observe restricted entry intervals specified by the herbicide product label. • Notify local emergency personnel of proposed treatments. • Use spot applications or low-boom broadcast applications where possible to limit the probability of contaminating non-target food and water sources, especially vegetation over areas larger than the treatment area. • Consult with Native American tribes and Alaska Native groups to locate any areas of vegetation that are of significance to the tribes and Native groups and that might be affected by herbicide treatments. • To the degree possible within the law, hire local contractors and workers to assist with herbicide application projects and purchase materials and supplies, including chemicals, for herbicide treatment projects through local suppliers. • To minimize fears based on lack of information, provide public educational information on the need for vegetation treatments and the use of herbicides in an integrated pest management program for projects proposing local use of herbicides.
Rights-of-way	• Coordinate vegetation management activities where joint or multiple use of a ROW exists. • Notify other public land users within or adjacent to the ROW proposed for treatment. • Use only herbicides that are approved for use in ROW areas.

Resource Element	Standard Operating Procedure
Human Health and Safety	• Establish a buffer between treatment areas and human residences based on guidance given in the HHRA, with a minimum buffer of ¼ mile for aerial applications and 100 feet for ground applications, unless a written waiver is granted. • Use protective equipment as directed by the herbicide product label. • Post treated areas with appropriate signs at common public access areas. • Observe restricted entry intervals specified by the herbicide product label. • Provide public notification in newspapers or other media where the potential exists for public exposure. • Have a copy of MSDSs at work site. • Notify local emergency personnel of proposed treatments. • Contain and clean up spills and request help as needed. • Secure containers during transport. • Follow label directions for use and storage. • Dispose of unwanted herbicides promptly and correctly.

Appendix F - Plant Species Seed List and Guidance for Selecting Plant Materials

Plant species for use in vegetation treatment seed mixes within the TFD are identified for four geographical areas: 1) low elevation areas (8 – 10 inch ppt.), 2) Big Desert (10 – 12 inch ppt.), 3) mid elevation (>12 inch ppt.), and 4) juniper sites (>11 inch ppt.). Refer to the table below for plant species and varieties.

The geographical areas were identified because of their high fire frequencies; they are the locations where most vegetation treatment activities occur in the TFD. Plant species and varieties are chosen for a seed mix based on their adaptability to the geographical areas. Species not currently listed on Table F-1 can be used in vegetation treatment seed mixes with field office management concurrence. Rationale for seed mixes (such as plant species and seed rates) will be provided in the vegetation treatment plans.

The following list identifies the plant species that will generally be used in the development of seed mixes in each of the four designated areas.

<u>Low Elevation</u>

Grasses: Snake River Wheatgrass, Bluebunch Wheatgrass, Tall Wheatgrass, Siberian Wheatgrass, Bluegrasses, Indian Ricegrass, Bottlebrush Squirreltail, Basin Wildrye, Russian Wildrye, Crested Wheatgrass

Forbs: Lewis Flax, Globemallow, Sainfoin

Shrubs: Big Sagebrush, Four-winged Saltbush

<u>Big Desert</u> (i.e. Wildhorse/Minidoka)

Grasses: Snake River Wheatgrass, Bluebunch Wheatgrass, Bluegrasses, Basin Wildrye, Bottlebrush Squirreltail, Indian Ricegrass, Siberian Wheatgrass, Tall Wheatgrass, Crested Wheatgrass

Forbs: Sainfoin, Dark Blue Penstemon, Globemallow

Shrubs: Antelope Bitterbrush, Big Sagebrush

<u>Mid Elevation</u>

Grasses: Bluebunch Wheatgrass, Bluegrasses, Basin Wildrye, Bottlebrush Squirreltail, Siberian Wheatgrass, Tall Wheatgrass

Forbs: Western Yarrow, Palmer Penstemon, Sainfoin, Utah Sweetvetch

Shrubs: Antelope Bitterbrush, Black Sagebrush, Low Sagebrush

Juniper Sites

Grasses: Snake River Wheatgrass, Bluebunch Wheatgrass, Bluegrasses, Basin Wildrye, Russian Wildrye, Tall Wheatgrass, Siberian Wheatgrass, Indian Ricegrass, Bottlebrush Squirreltail, Crested Wheatgrass

Shrubs: Antelope Bitterbrush, Big Sagebrush, Black Sagebrush, Low Sagebrush

Due to the variability in environmental conditions, wildfire intensity, and seeding methods (i.e. drill, aerial), seed rates are not specifically identified, but a range of drill rates for individual plant species is shown in Table F-1. Aerial grass seeding rates will generally be 25-50% higher than the drill seed rates. For a typical juniper burn where chaining is identified in the vegetation treatment plan, the amount of grass seed applied should approximately double the drill rates.

The plant species identified for use in vegetation treatment seed mixtures are chosen on their ability to adapt to the geographic areas in the Great Basin and proven success in past seeding efforts in the TFD. Non-native species are included for their known ability to out-compete weedy invasive plants. The need to plant more diverse seed mixtures that include other native species than those listed above, particularly in areas having specific resource needs or higher values (i.e. important sage-grouse nesting/brood rearing habitats) is preferred.

As more desirable species and new varieties become available and/or are more economical, the plant species identified in Table F-1 will be revisited and adjusted accordingly. Opportunities to experiment with new varieties should be implemented at a smaller scale and on a limited basis to determine whether they might be suitable for more widespread use throughout the District. Monitoring results will be used to identify or modify seed selection in future efforts.

Table F-1 Plant Species and Varieties for Use in Vegetation Treatments

Common Name	Species/Variety	Seeds/Lb	Typical Seeding Rate-Lbs/Acre/PLS	Comments
Grasses				
Bluebunch Wheatgrass	Whitmar, Goldar, P7, Anatone	140,000	2-6	When mixed with non-natives and native species are emphasized, limit the non-native species to <2 lbs./acre.
Snake River Wheatgrass	Secar, Discovery	170,000	1-3	Generally mixed with other natives or non-natives such as Siberian wheatgrass.
Siberian Wheatgrass	P-27, Vavilov, Vavilov II	220,000	2-5	Seeding rates for sole use or with other non-natives, or when natives are not emphasized.

Common Name	Species/Variety	Seeds/Lb	Typical Seeding Rate- Lbs/Acre/PLS	Comments
Crested Wheatgrass	Nordan, Hycrest, Hycrest II Fairway, Roadcrest	200,000	2-6	Seeding rates for sole use or with other non-natives, or when natives are not emphasized.
Tall Wheatgrass	Alkar	80,000	0.25-1.0	Use at lower rate when mixed with Basin Wildrye. Use higher when mixed alone.
Basin Wildrye	Trailhead, Magnar, Continental	150,000	0.25-1.0	N/A
Russian Wildrye	Bozoisky, Bozoisky II	175,000	0.25-1.0	N/A
Big Bluegrass	Sherman	917,000	0.2-0.3	Small seed
Canby Bluegrass	Canbar	930,000	0.2-0.3	Small seed
Sandberg Bluegrass	Reliable, Mountain Home	950,000	0.2-0.3	Small Seed
Bottlebrush Squirreltail	Fish Creek, Rattlesnake, Toe Jam Creek	220,000	1.0-3.0	N/A
Big Squirreltail	Sand Hollow, Turkey Lake	220,000	1.0-3.0	N/A
Indian Ricegrass	Rimrock, Nezpar	205,000	1.0-3.0	N/A
Forbs				
Sainfoin	Eski	28,000	2.0	Large seed
Lewis Flax	Maple Grove	420,000	0.1-0.2	N/A
Blue Flax	Appar	295,000	0.1-0.2	N/A
Palmer Penstemon	Cedar	600,000	0.1	N/A
Dark Blue Penstemon	N/A	600,000	0.1	N/A

Common Name	Species/Variety	Seeds/Lb	Typical Seeding Rate-Lbs/Acre/PLS	Comments
Western Yarrow	Eagle	2,700,000	0.1	Broadcast seed
Globemallow	Scarlett, Munroe, Gooseberry Leaf	500,000	0.1	N/A
Utah Sweetvetch	Timp	90,000	0.5 – 1.0	N/A
Shrubs				
Antelope Bitterbrush	N/A	15,000	0.5-1.0	Should drill seed in separate box
Big Sagebrush	Wyoming, Basin, Mountain	2,500,000	0.5-1.0	Bulk rate
Four-Wing Saltbush	N/A	55,000	0.5-1.0	
Black Sagebrush	N/A	900,000	0.5-1.0	Bulk rate
Low Sagebrush	N/A	980,000	0.5-1.0	Bulk rate

Appendix G - Important Seasonal Periods for ESA Listed and Proposed Species in the TFD

Species	Important Seasonal Periods	Approximate Dates
Jarbidge River Bull Trout	Spawning[1]	August through November
	Incubation[1]	November through May
	Incubation[1]	April through July
Bliss Rapids Snail	Reproduction	October through February
Bruneau hot Springsnail	Reproduction	Year-round
Snake River Physa Snail	Reproduction	Year-round
Banbury Springs lanx	Reproduction	Year-round
Yellow-billed cuckoo	Nesting and brood rearing	May 1 – August 31
Canada lynx	Breeding	May 1 through July 31
Wolverine	Breeding	May 1 through July 15
Slickspot peppergrass	Flowering through seed dispersal	April 15 – July 15

[1]Spawning and egg incubation periods are estimates. Rates vary according to local water temperatures.

Appendix H - Seasonal Wildlife Restrictions and Procedures for Processing Requests for Exceptions on Public Lands in Idaho

From Idaho Information Bulletin IDIB2010-039 (July 2010 Version)

1.0. Introduction: In general, BLM-generated projects (e.g., vegetation treatments, range improvements) and other actions for which BLM authorization is required (e.g., rights-of-way, lease authorizations, organized recreational events), should be analyzed in accordance with NEPA and sited or designed in a manner that avoids impacts to wildlife species or habitats of concern to the extent possible, based on current science. Seasonal wildlife restrictions are intended to protect wildlife resources from disturbance during important seasons of the year, such as breeding, nesting or wintering. However, such restrictions may or may not have been previously developed for existing RMPs or Management Framework Plans (MFPs) in Idaho or they may lack consistency between BLM districts or field offices, or existing measures may not reflect current science. The purpose of this document is to establish a consistent suite of recommended seasonal restrictions for a selected group of wildlife species of concern to Idaho BLM and to provide a framework for considering appropriate temporary exceptions to those restrictions. Where existing RMP or MFP restrictions are similar to or exceed those described in this document, they can continue to be used. If less restrictive, they should be replaced with those specified in this document unless there is scientific, reasonable justification to the contrary. Where large projects (e.g., transmission, wind etc.) cross multiple field offices or districts, this document can also provide helpful consistency for project planners. This document may be revised in the future, based on new science, policy or other factors.

2.0. Wildlife seasonal restrictions and considerations for granting exceptions:

2.1. Big game winter ranges and bighorn sheep habitat: Seasonal restrictions for potentially disruptive construction or other activities within big game winter ranges in Idaho typically will apply from November 15 through April 30 unless a temporary, short-term exception is granted by the BLM field office manager. General time-frames for calving/fawning are May 1-June 30 for elk and deer and May 15 through June 30 for pronghorn. Seasonal restrictions within bighorn sheep lambing areas will apply from approximately April 15 to June 15. These dates, as specified, are general in nature for purposes of this document, and may be adjusted as needed based on local conditions.

Since there presently is not widespread consistency across the state as to the various winter range sub-categories, we will not make distinctions as to “crucial” or other designations of winter habitat when applying seasonal restrictions or when reviewing requests for exceptions at this time. Rather, we will use the term “winter range”, as delineated locally by the IDFG region for each big game species, based on the most recent available information. Additional factors to consider when granting exceptions to seasonal restrictions on winter ranges or in bighorn sheep lambing habitat include:

1. Animal presence or absence
2. Animal condition
3. Weather severity
    - Snow conditions (depth, crusting , longevity)
    - Seasonal weather patterns
    - Wind chill factor (indication of animal’s energy use)
    - Air temperatures and variation
    - Duration of winter conditions

- Forecasts (long range for duration of winter)

4. Habitat condition and availability

   - Animal density (high or low)
   - Forage condition (good or poor)
   - Competition (livestock and other wildlife)
   - Forage availability/accessibility (amount of forage, snow depth/crusting)
   - Whether or not there is suitable and ample forage immediately available and accessible nearby that is not being used

5. Site location

   - Likelihood of animals habituating to activity
   - Presence of thermal and security (hiding) cover and other related factors
   - Proportion of winter range affected
   - Topographic Features (sight distances)
   - Location of site within winter range (adjacent? edge? center? etc.)
   - Whether there is other activity in the area and whether it is likely to increase the cumulative adverse impact

6. Timing

   - Early in winter season?
   - Nearing end of winter season?
   - Kind and duration of disruptive activity expected

2.2. Raptors:

a. Raptor nest disturbance: Nest management guidelines are currently under revision by the Service. Pending finalization of these Service guidelines, protective buffers described in the February 2008 draft version of the Service's "*Guidelines for Raptor Conservation in the Western United States*" (Whittington & Allen, 2008) will be used on Idaho BLM lands unless more restrictive buffers are identified in existing RMPs of MFPs. While the draft Service guidelines provide recommended disturbance buffers for a comprehensive list of raptor species, several species of interest to Idaho BLM are summarized below for convenience.

Species	**Spatial Buffer in Non-Urban Areas**
Bald eagle	0.5 to 1.0 mile
Northern goshawk	0.5 mile
Ferruginous hawk	1.0 mile
Golden eagle	0.5 mile
Peregrine falcon	1.0 mile
Red-tailed hawk	0.33 mile
Prairie falcon	0.5 mile

Species	Spatial Buffer in Non-Urban Areas
Swainson's hawk	0.25 mile
Burrowing owl	0.25 mile

The Service's Bald Eagle Management Guidelines (BEMG) specifies a 660 foot nest buffer for bald eagles. However page 64 in the 2008 draft Service Guidelines for Raptor Conservation in the Western United States (Raptor Guidelines) referenced above, the Service recommends a broader 0.5 to 1.0 mile buffer in more open areas of the western U.S. due to greater line-of-sight distances. For winter roosts, a 0.25 to 1 mile buffer is recommended, depending on the degree of screening provided by vegetation or topographic features.

Seasonal restrictions for potentially disruptive construction or other human activities, will generally apply for raptors from February 1 through July 31 unless an exception is granted by the BLM field office manager. Temporary exceptions can be granted in situations where the raptor nest has been destroyed (e.g., by wind, wildfire, lightning), or is not currently active (i.e., young have fledged or if the nest is unused in the current nesting season). Exceptions or temporal deviations from the established February 1 - July 31 timeframe may also be granted based on species, variations in nesting chronology of particular species locally, topographic considerations (e.g., intervening ridge between construction activities and a nest) or other factors that are biologically reasonable. Biologists should review the Bald Eagle Management Guidelines, Draft Guidelines for Raptor Conservation in the Western United States, and Interim Golden Eagle Technical Guidance documents for additional details and protocols.

b. Golden eagle- additional considerations: During project planning, the BLM and project proponents should work closely with the Service in incorporating appropriate provisions and protocols found in *Interim Golden Eagle Technical Guidance: Inventory and Monitoring Protocols; and other Recommendations in Support of Golden Eagle Management and Permit Issuance* (Pagel et al., 2010). Consideration of golden eagles and their habitat must be incorporated into NEPA analyses for all renewable energy projects per BLM Washington Office Instruction Memorandum 2010-156.

2.3. Greater Sage-grouse: The greater sage-grouse has been determined warranted for listing under Endangered Species Act but precluded by other listing priorities (Federal Register March 23, 2010). Projects should be designed and sited to avoid impacts and disturbance to leks and sage-grouse habitats to the extent possible; in particular infrastructure/energy development projects (Idaho Sage-grouse Advisory Committee 2006- see pages 4.42-4.45.).

The *Conservation Plan for the Greater Sage-grouse in Idaho* suggests that new infrastructure projects avoid seasonal habitats by a minimum of 2-5 miles, depending on the type of project. In addition, new research suggests that disturbance-related impacts from energy development on counts of displaying male sage-grouse at leks were apparent out to 6.4 km or approximately 4 miles (Naugle et al., *in press*), and that most (79%) nests occur within 6.4 km of leks (Doherty et al., *in press* citing Colorado Division of Wildlife 2008-Appendix B Page 7). Since impacts from infrastructure development may be uncertain, and are contingent on multiple factors, a conservative approach to seasonal restrictions is warranted, pending further review of recent scientific findings and refinement of conservation measures.

Therefore, assuming that projects, including large-scale infrastructure/energy development projects, have been sited to avoid most occupied or undetermined status leks and important seasonal habitats (e.g., breeding, winter) to the extent possible, and in accordance with the

Conservation Plan for the Greater Sage-grouse in Idaho, the following seasonal restrictions apply to remaining leks/habitat potentially affected by the project:

a. Controlled surface and timing limitation use near sage-grouse leks and/or nesting/early brood rearing habitat: Potentially disruptive larger-scale construction activities (e.g., infrastructure/ energy development and similar projects), shall be avoided within 6.4 km (~4 miles) of occupied or undetermined status sage-grouse leks from March 1 to June 30 to reduce disturbance to lekking or nesting grouse (and/or hens with early broods). Specific dates may be earlier or later, depending on local breeding chronology. The spatial buffer may be increased or decreased based on site-specific factors analyzed and documented in an Environmental Assessment (EA) or Environmental Impact Statement (EIS) and authorized via the appropriate Decision document.

Exceptions may be granted for construction or maintenance activities involving only infrequent, short-term disturbance (less than 1 hour within a 24- hour period in a specific area); or if there are intervening topographic features or line-of-sight screening that buffer the lek or nesting habitat from disturbance; or if recent (within the past 5 years) site-specific studies or local expertise suggest that nesting hens are unlikely to be present within the 4.0 mile zone surrounding the project activity. Suitable nesting and early brood-rearing habitats have not been mapped in most parts of Idaho, so these will need to be identified on a project by project basis.

b. For smaller-scale human disturbances, (e.g., water pipeline construction, routine fence maintenance, facility maintenance etc. of a minor nature) a 1.0 km (0.62 mile) lek disturbance buffer will apply between approximately March 15-May 1 in lower elevations and March 25 through May 15 in higher elevations, from 6:00 PM to 9:00 AM in a specific area to minimize disturbance to lekking grouse (Idaho Sage-grouse Advisory Committee 2006, Page 4-70). Specific dates may be earlier or later, depending on local breeding chronology.

c. For mechanical control of conifers in sage-grouse breeding habitat, work should occur between approximately July 15 and January 30 to minimize disturbance to lekking or nesting sage-grouse and early broods (ISAC 2006, Page 4.97). Specific dates may be earlier or later, depending on local breeding chronology.

d. Specific conservation measures for organized recreational events that may affect sage-grouse or sage-grouse habitat have not been developed to date. In the interim, events should be sited and timed in a manner to minimize impacts to sage-grouse. Spatial and temporal buffers will be developed on a site-specific basis in consideration of the nature of the activity.

2.4. Columbian sharp-tailed grouse: Assuming that projects, including large-scale projects (e.g., infrastructure/energy) have been sited to avoid most occupied or undetermined status leks and important seasonal habitat (e.g., breeding, winter) to the extent possible, the following seasonal restrictions apply to remaining leks/habitat potentially affected:

a. Where sharp-tailed grouse leks occur in proximity to sage-grouse leks, the 4 mile sage-grouse lek/nesting habitat disturbance buffer, as described above, will apply for larger-scale projects (e.g.. infrastructure, energy development), from March 1 to June 30. The spatial buffer may be increased or decreased based on site-specific factors analyzed and documented in an EA or EIS and authorized via the appropriate Decision document. Specific dates may be earlier or later, depending on local breeding chronology.

b. Where sharp-tailed grouse leks occur separately (i.e., not intermingled or near sage-grouse leks), the following will apply:

1. Controlled surface and timing limitation use near Columbian sharp-tailed grouse leks and/or nesting/early brood rearing habitat: Potentially disruptive larger-scale construction activities (e.g.. infrastructure/ energy development and similar projects), shall be avoided within 2.0 km (1.2 miles) of occupied or undetermined status leks from March 15 to June 30 to reduce disturbance to lekking or nesting sharp-tailed grouse unless specifically analyzed in an EA or EIS and authorized through an appropriate Decision. Specific dates may be earlier or later, depending on local breeding chronology. The spatial buffer may be increased or decreased based on site-specific factors analyzed and documented in an EA or EIS and authorized via the appropriate Decision document.

2. Exceptions may be granted for construction or maintenance activities involving only infrequent, short-term (less than one hour within a 24-hour period in a specific area) disturbance; or if there are intervening topographic features or line-of-sight screening that buffer the lek or nesting habitat from disturbance; or if recent (within the past 5 years) site-specific studies or local expertise suggest that nesting hens are unlikely to be present within the 1.2 mile zone surrounding the project activity. Suitable nesting and early brood-rearing habitats have not been mapped in most parts of Idaho, so these will need to be identified on a project by project basis.

3. For smaller scale disturbances, (e.g., water pipeline construction, fence maintenance, facility maintenance etc.), a 1.0 km (0.62 mile) lek disturbance buffer will apply between approximately March 15 and April 30 from 6:00 PM to 9:00 AM in a specific area to minimize disturbance to lekking sharp-tailed grouse. Specific dates may be earlier or later, depending on local breeding chronology.

4. Development of specific conservation measures for organized recreational events that may affect sharp-tailed grouse or habitat have not been developed to date. In the interim, events should be sited and timed in a manner to minimize impacts to grouse. Spatial and temporal buffers will be developed on a site-specific basis in consideration of the nature of the activity.

3.0. General procedure for requesting and granting exceptions to seasonal wildlife restrictions:

Even with conscientious planning up front, it is sometimes not possible to avoid impacts to wildlife. In such cases, temporary exceptions to wildlife seasonal restrictions may be allowed at times to accommodate certain activities, such as construction of energy development facilities, power transmission lines or other projects, if the activities can be done quickly and with little or no disturbance to the wildlife species of interest. The intent of allowing an exception is to eliminate a restriction when it has no applicability or is not needed to avoid impacts to wildlife. The discretion to allow an exception is limited to those situations where the degree of impacts to wildlife, as predicted in the NEPA analysis (e.g., as completed in the EA or EIS for the project in question), would be the same, with or without the restriction. An exception is a case-by–case, one time exemption from a seasonal restriction for a specified portion of the project, right-of-way or lease area.

The unpredictability of factors such as weather, animal movement and animal condition precludes analysis and processing of specific requests for exception very far in advance of the time periods in question. However the restrictions and potential need for exceptions should be described and evaluated in project NEPA analyses to the extent possible. Exceptions to seasonal restrictions may be considered and granted by the field office manager if the BLM field office biologist in consultation with IDFG believes that granting an exception will not unacceptably disturb, displace or stress the wildlife species being protected. There is no clear-cut formula but use of available data and knowledge of local conditions will be the primary factors in making the recommendation. The general process will be as follows:

1. A request for an exception to a seasonal wildlife restriction must be initiated in writing (via letter or email) by the operator or project proponent (or appropriate representative) to the BLM field office manager/ authorized officer. The request must include a 1) description of the activity needing exception, 2) description of the need and rationale for the exception, 3) description of mitigation measures and alternatives such as traffic restrictions, alternative scheduling, staged activity, etc., that may reduce impacts to the wildlife resource, and 4) date or dates for the requested exception.

2. The BLM field office biologist, in coordination with the appropriate IDFG staff, will review the application for exception and available information, including site visits, as appropriate, along with the considerations and criteria in section 2.0 of this document. Analyses of requests for exception will include validation of the seasonal restriction (e.g., is the area still serving as mule deer winter range? Is there still a likelihood of nesting raptors in the area, etc.?) and a review of potential mitigation measures and alternatives proposed in the application, such as traffic restrictions, alternative scheduling, staged activity, etc. The BLM field office biologist will then provide a recommendation in writing to the field office manager as expeditiously as is practical.

3. A final determination for granting an exception to seasonal wildlife restrictions will be made by the BLM field office manager, in consideration of the biologist's recommendation and consistent with applicable law, regulation, policy, or local planning. The request for exception is considered as a unique, site-specific action and is analyzed and subsequently documented by the field office manager or his/her representative, with respect to RMP and project NEPA compliance. If existing project-level NEPA documentation is adequate, a DNA and Decision Record are sufficient (See BLM NEPA Handbook H-1790-1 (2008). In other cases, preparation of a separate EA may be necessary; however under those circumstances it would be difficult to accommodate an exception on short notice. In all cases, the rationale for granting or not granting the exception must be documented in the Decision Record, including the biologists' findings and recommendation and concurrence or non-concurrence with IDFG recommendations.

4. Notification to the applicant will occur in writing, via letter or email from the field office manager or his/her representative.

5. Exceptions may be cancelled by the field office manager/ authorized officer in the event that local conditions change suddenly in a manner that places wildlife at unacceptable risk. For example, a temporary exception for construction activities in big game winter range granted on a Monday could be cancelled if heavy snowfall on the following Wednesday results in an unanticipated concentration of mule deer in the project area. In such cases, the field office manager or his/her representative will contact the project proponent as soon as possible to discuss the situation and negotiate an appropriate resolution.

Literature Cited:

Colorado Division of Wildlife. 2008. Colorado Greater Sage-grouse Conservation Plan http://wildlife.state.co.us/WildlifeSpecies/SpeciesOfConcern/Birds/GreaterSageGrouseConservationPlan.htm.

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Naugle, D.E., K.E. Doherty, B. L. Walker, M.J. Holloran and H. E. Copeland. *In press*. Energy Development and greater sage-grouse. Studies in Avian Biology.

Pagel, J.E., D.M. Whittington, and G.T. Allen. 2010. Interim Golden Eagle technical guidance: inventory and monitoring protocols; and other recommendations in support of eagle management and permit issuance. Division of Migratory Bird Management, U.S. Fish and Wildlife Service, Washington, D.C..

Whittington, D.M., and G.T. Allen. 2008. Draft Guidelines for Raptor Conservation in the Western United States. U.S. Fish and Wildlife Service, Division of Migratory Bird Management, Washington, D.C.

Special Status Animal Categories:

Type 1. Federally listed Threatened or Endangered species, Experimental Essential populations and designated Critical Habitat.

Type 2. Idaho BLM Sensitive Species, including Service Proposed and Candidate species, ESA species delisted during the past five years, and ESA Experimental Non-essential populations.

Special Status Plant Categories:

Type 1. Federally listed Threatened or Endangered Species and designated Critical Habitat.

Type 2. These are species that have a high likelihood of being listed in the foreseeable future due to their global rarity and significant endangerment factors. Species also include Service Proposed and Candidate species, ESA species delisted during the past five years, ESA Experimental Non-essential species, and ESA Proposed Critical Habitat.

Type 3. Range-wide or State-wide Imperilied – Moderate Endangerment

These are species that are globally rare or very rare in Idaho, with moderate endangerment factors. Their global or state rarity and the inherent risks associated with rarity make them imperiled species.

Type 4. Species of Concern

These are species that are generally rare in Idaho with small populations or localized distribution and currently have low threat levels. However, due to the small populations and habitat area, certain future land uses in close proximity could significantly jeopardize these species.

NOTE: The following lists are dynamic, and the conservation status for individual species may change in the future.

Table I-1 - Special Status Plants

Scientific Name	Common Name	Status	JFO	BFO	SFO
Allium anceps	Two-headed onion	Type 4	X	X	
Astragalus anserinus	Goose Creek milkvetch	Type 2		X	
Astragalus atratus var. *inseptus*	Mourning milkvetch	Type 4			X
Astragalus newberryi var. *castoreus*	Newberry's milkvetch	Type 4	X	X	
Astragalus oniciformis	Picabo milkvetch	Type 3			X
Astragalus purshii var. *ophiogenes*	Snake River milkvetch	Type 4	X		X
Astragalus tetrapterus	Four-wing milkvetch	Type 4	X	X	
Astragalus yoder-williamsii	Mudflat milkvetch	Type 3	X		
Calandrinia ciliata	Fringed redmaids	Type 4			X
Catapyrenium congestum	Earth lichen	Type 4	X	X	
Chaenactis stevioides	Desert pincushion	Type 4	X		
Cleomella plocasperma	Twisted or alkali cleomella	Type 3	X		
Cymopterus acaulis var. *greeleyorum*	Greeley's wavewing	Type 3	X		
Damasonium californicum	Fringed waterplantain	Type 4	X		
Downingia bacigalupii	Bacigalupi's downingia	Type 4			X
Eatonella nivea	White eatonella	Type 4	X		X
Epipactis gigantea	Chatterbox or stream orchid	Type 3	X	X	X
Erigeron latus	Broad fleabane	Nevada BLM Sensitive	X		

Scientific Name	Common Name	Status	JFO	BFO	SFO
Eriogonum lewisii	Lewis buckwheat	Nevada BLM Sensitive	X		
Eriogonum ovalifolium var. *focarium*	Craters-of-the-Moon wild buckwheat	Type 3			X
Eriogonum shockleyi var. *packardiae*	Packard's buckwheat	Type 4	X		
Eriogonum shockleyi var. *shockleyi*	Matted cowpie buckwheat	Type 4	X		
Glyptopleura marginata	White-margined wax plant	Type 4	X	X	
Ipomopsis polycladon	Spreading gilia	Type 3	X		
Lepidium davisii	Davis' peppergrass	Type 3	X	X	
Lepidium papilliferum	Slickspot peppergrass	Type 1 Threatened	X		
Leptodactylon glabrum	Bruneau River prickly phlox	Type 3	X		
Mentzelia congesta	United blazingstar	Type 4			X
Nemacladus rigidus	Rigid threadbush	Type 4	X		
Pediocactus simpsonii	Simpson's hedgehog cactus	Type 4	X	X	X
Penstemon idahoensis	Idaho penstemon	Type 3		X	
Penstemon janishiae	Janish's penstemon	Type 3	X		
Peteria thompsoniae	Spine-noded milkvetch	Type 4	X		
Phacelia inconspicua	Obscure phacelia	Type 2			X
Phacelia minutissima	Least phacelia	Type 2			X
Potamogeton diversifolius	Waterthread pondweed	Type 4	X		
Pyrrocoma insecticruris	Bugleg goldenweed	Type 3			X

Scientific Name	Common Name	Status	JFO	BFO	SFO
Sporobolus compositus var. *compositus*	Tall dropseed	Type 3			X
Stanleya confertiflora	Malheur princesplume	Type 2			X
Teucrium canadense var. *occidentale*	American wood sage	Type 4	X		
Townsendia scapigera	Scapose townsendia	Type 3		X	

Table I-2 - Special Status Animals

Scientific Name	Common Name	Status	JFO	BFO	SFO
Mammals					
Antrozous pallidus	Pallid bat	Type 2	X	X	X
Brachylagus idahoensis	Pygmy rabbit	Type 2	X	X	X
Canis lupus	Gray wolf	Type 2			X
Eptesicus fuscus	Big brown bat	Type 2	X	X	X
Euderma maculatum	Spotted bat	Type 2	X	X	X
Gulo gulo luscus	Wolverine	Type 1 Proposed Threatened			X
Lasionycteris noctivagans	Silver-haired bat	Type 2	X	X	X
Lasiurus cinereus	Hoary bat	Type 2	X	X	X
Lynx canadensis	Canada lynx	Type 1 (Threatened, Critical Habitat)			X
Martes pennanti	Fisher	Type 2			X
Myotis ciliolabrum	Western small-footed myotis	Type 2	X	X	X

Scientific Name	Common Name	Status	JFO	BFO	SFO
Myotis evotis	Long-eared myotis	Type 2	X	X	X
Myotis lucifugus	Little brown bat	Type 2	X	X	X
Myotis volans	Long-legged myotis	Type 2	X	X	X
Myotis yumanensis	Yuma myotis	Type 2	X	X	X
Ovis canadensis sp.	Bighorn sheep	Type 2	X	X	X
Parastrellus hesperus	Canyon bat (formerlyWestern pipistrelle)	Type 2	X	X	X
Plecotus (Corynorhinus) townsendii	Townsend's big-eared bat	Type 2	X	X	X
Urocitellus mollis (formerly *Spermophilus mollis artemisae*)	Piute ground squirrel	Type 2	X	X	X
Vulpes macrotis	Kit fox	Type 2	X	X	X
Birds					
Accipiter gentilis	Northern goshawk	Type 2	X	X	X
Ammodramus savannarum	Grasshopper sparrow	Type 2	X	X	X
Amphispiza belli	Sage sparrow	Type 2	X	X	X
Amphispiza bilineata	Black-throated sparrow	Type 2	X	X	X
Aquila chrysaetos	Golden eagle	Type 2	X	X	X
Asio flammeus	Short-eared owl	Type 2	X	X	X
Athene cunicularia	Burrowing owl	Type 2	X	X	X
Buteo regalis	Ferruginous hawk	Type 2	X	X	X
Carpodacus cassinii	Cassin's finch	Type 2		X	X
Centrocercus urophasianus	Greater sage-grouse	Type 2	X	X	X

Scientific Name	Common Name	Status	JFO	BFO	SFO
Chlidonias niger	Black tern	Type 2	X	X	X
Coccyzus americanus	Yellow-billed cuckoo	Type 1 (Threatened, proposed Critical Habitat)	X	X	X
Contopus cooperi	Olive-sided flycatcher	Type 2	X	X	X
Cygnus buccinator	Trumpeter swan	Type 2	X		X
Empidonax trailii	Willow flycatcher	Type 2	X	X	X
Gymnorhinus cyanocephalus	Pinyon jay	Type 2		X	
Haliaeetus leucocephalus	Bald eagle	Type 2	X	X	X
Lanius ludovicianus	Loggerhead shrike	Type 2	X	X	X
Melanerpes lewis	Lewis' woodpecker	Type 2	X	X	X
Numenius americanus	Long-billed curlew	Type 2	X	X	X
Oreoscoptes montanus	Sage thrasher	Type 2	X	X	X
Oreotyx pictus	Mountain quail	Type 2			X
Otus flammeolus	Flammulated owl	Type 2		X	X
Picoides albolarvatus	White-headed woodpecker	Type 2			X
Pipilo chlorurus	Green-tailed towhee	Type 2	X	X	X
Spizella breweri	Brewer's sparrow	Type 2	X	X	X
Tympanuchus phasianellus columbianus	Columbian sharp-tailed grouse	Type 2	X	X	X
Vermivora virginae	Virginia's warbler	Type 2	X	X	

Amphibians					
Anaxyrus boreas	Western/boreal toad	Type 2	X	X	X
Rana luteiventris	Columbia spotted frog	Type 2	X		
Rana pipiens	Northern leopard frog	Type 2	X	X	X
Reptiles					
Crotaphytus bicinctores	Great Basin black-collared lizard	Type 2	X		
Rhinocheilus lecontei	Longnose snake	Type 2			X
Sonora semiannulata	Ground snake	Type 2			X
Fish					
Acipencer transmontanus	White Sturgeon	Type 2	X	X	X
Cottus greenei	Shoshone sculpin	Type 2	X		X
Cottus leiopomus	Wood River sculpin	Type 2			X
Lepidomeda copei	Northern Leatherside chub	Type 2		X	X
Oncorhynchus clarki bouvieri	Yellowstone cutthroat trout	Type 2		X	
Oncorhynchus mykiss gairdneri	Redband trout	Type 2	X	X	X
Salvelinus confluentus	Jarbidge River Bull trout	Type 1 (Threatened, Critical Habitat)	X		
Invertebrates					
Anodonta californiensis	California floater	Type 2	X	X	X
Cicindela arenicola	St. Anthony Sand Dunes tiger beetle	Type 2		X	X

Amphibians					
Cicindela waynei waynei	Bruneau Dunes tiger beetle	Type 2	X		
Fisherola nuttalli	Shortface lanx	Type 2	X	X	X
Flumincola fuscus	Ashy (Columbia) pebblesnail	Type 2	X	X	X
Glacicavicola bathyscoides	Blind Cave leiodid beetle	Type 2		X	X
Haitia (Physa) natricina	Snake River physa snail	Type 1 (Endangered)	X	X	X
Lanx spp.	Banbury Springs lanx	Type 1 (Endangered)			X
Oreohelix strigose goniogyra	Striate mountainsnail	Type 2		X	
Pyrgulopsis bruneauensis	Bruneau hot springsnail	Type 1 (Endangered)	X		
Taylorconcha serpenticola	Bliss Rapids snail	Type 1 (Threatened)	X	X	X

Appendix J - Migratory Bird Species of Conservation Concern in the Great Basin

All species listed below are also designated Birds of Management Concern; a subset of the species protected by the Migratory Bird Treaty Act (see 50 CFR 10.13) which pose special management challenges because of a variety of factors (e.g., too few, too many, conflicts with human interests, societal demands). Some are also BLM special status species. The Migratory Bird Program places priority emphasis on these birds. (U.S. Fish and Wildlife Service Migratory Bird Program Strategic Plan 2004-2014).

Common Name	Scientific Name	Status
Bald Eagle	*Haliaeetus leucocephalus*	Type 2
Black-chinned Sparrow	*Spizella atrogularis*	Migratory
Black Rosy-Finch	*Leucosticte atrata*	Migratory
Black swift	*Cypseloides niger*	Migratory
Black Tern	*Chlidonias niger*	Type 2
Black-throated Sparrow	*Amphispiza bilineata*	Type 2
Brewer's sparrow	*Spizella breweri*	Type 2
Burrowing Owl	*Athene cunicularia*	Type 2
Calliope Hummingbird	*Selasphorus calliope*	Migratory
Cassin's Finch	*Carpodacus cassinii*	Type 2
Columbian Sharp-tailed Grouse	*Tympanuchus phasianellus columbianus*	Type 2
Eared Grebe	*Podiceps nigricollis*	Migratory
Ferruginous hawk	*Buteo regalis*	Type 2
Flammulated owl	*Otus flammeolus*	Type 2
Golden eagle	*Aquila chrysaetos*	Type 2
Grasshopper Sparrow	*Ammodramus savannarum*	Type 2
Greater Sage-grouse	*Centrocercus urophasianus*	Type 2

Common Name	**Scientific Name**	**Status**
Green-tailed Towhee	*Pipilo chlorurus*	Type 2
Lewis woodpecker	*Melanerpes lewis*	Type 2
Loggerhead shrike	*Lanius ludovicianus*	Type 2
Long-billed curlew	*Numenius americanus*	Type 2
Marbled godwit	*Limosa fedoa*	Migratory
Mountain Quail	*Oreortyx gentilis*	Type 2
Northern Goshawk	*Accipiter gentilis*	Type 2
Olive-sided Flycatcher	*Contopus cooperi*	Type 2
Peregrine falcon	*Falco peregrinus anatum*	Migratory
Pinyon Jay	*Gymnorhinus cyanocephalus*	Type 2
Sage Sparrow	*Amphispiza belli*	Type 2
Sage Thrasher	*Oreoscoptes montanus*	Type 2
Short-eared Owl	*Asio flammeus*	Type 2
Snowy Plover	*Charadrius alexandrinus*	Migratory
Tricolored blackbird	*Agelaius tricolor*	Migratory
Trumpeter Swan	*Cygnus buccinators*	Type 2
Virginia's warbler	*Vermivora virginae*	Type 2
White-headed Woodpecker	*Picoides albolarvatus*	Type 2
Williamson's Sapsucker	*Sphyrapicus thyroideus*	Migratory
Willow Flycatcher	*Empidonax trailii*	Type 2
Yellow Rail	*Coturnicops noveborucensis*	Migratory
Yellow-billed cuckoo	*Coccyzus americanus*	Type 1

Appendix K - Land Treatment Monitoring Guidelines

From Twin Falls District Instruction Memorandum IDIMT000-2012-001

The following criteria and guidelines will be used to determine and establish monitoring data collection techniques, methodology by treatment type, data collection intensity, and monitoring point locations.

Data Collection Methods

The following data collection methods will be the standard for TFD vegetation treatments. Additional monitoring data collection methods may be necessary for unique or uncommon treatments. All monitoring points will have geographic positioning system (GPS) data collected for point establishment and during each subsequent data collection visit. GPS data will be maintained within established geodatabases and tabular datasets including ArcGIS and Firemon and Feat Integrated (FFI).

Plot Design

- Triad transect lines (U.S. Geologic Survey [USGS] Standards)

Quantitative Methods

- Line-Point Intercept (USGS Standards) for the measurement of vegetation cover
- Quadrats (USGS Standards) for the measurement of grass/forb density
- Belt Transects (USGS Standards) for the measurement of shrub density
- Shrub seedling survival transects for hand or mechanical planting projects

Qualitative Methods

- Photo Points taken in the four Cardinal directions (Idaho BLM Fuels Standards)
- Data Dictionary "Vegetation Survey" (Idaho BLM Fuels Standards)

Methodology by Treatment Type

Recommended monitoring methods for vegetation treatments are outlined in the following table.

Treatment	Cover	Density (quadrat)	Density (belt transect)	Shrub seedling survival transect	Photos	Data Dictionary /GPS point
Drill/Harrow Seeding	Yes	Yes	No	No	Yes	Yes
Aerial Seeding (grass)	Yes	Yes	No	No	Yes	Yes
Aerial Seeding (brush)	No	No	Yes	No	Yes	Yes
Hand/Mechanical Shrub Planting	No	No	No	Yes	Yes	Yes
Chemical (broadcast)	Yes	No	No	No	Yes	Yes
Hand Thinning	Yes	No	No	No	Yes	Yes
Mastication	Yes	No	No	No	Yes	Yes
Prescribed Fire	Yes	Yes	No	No	Yes	Yes

Monitoring Intensity Determinations

Number of monitoring points recommended for vegetation treatments are outlined in the following table. Total monitoring point determination may be adjusted for unique circumstances such as a high degree of ecological site variability within a single treatment. Reference monitoring points for untreated areas should not exceed 10% of total monitoring points for the treatment area.

Vegetation Type	Treatment Size (acres)	Monitoring Point Intensity
Grass/Shrub	Less than 500	1
Grass/Shrub	500 to 2,999	1/500 acres (minimum 3)
Grass/Shrub	3,000 to 24,999	1/1,000 acres (minimum 5)
Grass/Shrub	25,000 to 50,000	25 points total
Grass/Shrub	Greater than 50,000	35 points total

Vegetation Type	Treatment Size (acres)	Monitoring Point Intensity
Woodland/Forest	Less than 250	1
Woodland/Forest	250 to 1,499	1/250 acres (minimum 3)
Woodland/Forest	1,500 to 12,500	1/500 acres (minimum 5)
Woodland/Forest	Greater than 12,500	25 points total

Randomized Point Determinations

Monitoring points within a treatment area should use existing vegetation data collection points when possible to build a site "history." Monitoring points should be determined using randomization when there are no pre-existing data collection points. The preferred method is the use of ArcGIS randomization tools. Randomized points may need to be moved to a more representative location based on professional judgment (i.e. if a randomized point falls on a large rock outcrop or road the point may be moved to the nearest representative area).

Point randomization may be stratified to monitor treatment results across a range of variables. Stratification of monitoring points should use the following hierarchy of variables. Other stratification variables may be used based on unique site conditions or treatment objectives.

Exclosures may be used as a means of obtaining data from a controlled site and should contain both treated and untreated vegetation.

Stratification Hierarchy:

1. Treatment type
2. Pre-existing inventory/monitoring points
3. Seed mixtures
4. Soil types
5. Allotment (if practical and feasible)
6. Land designation (if necessary and feasible)

Appendix L - Idaho and Southwestern Montana and Nevada and Northeastern California Greater Sage-Grouse ARMPA Management Decisions

Idaho and Southwestern Montana ARMPA Management Decisions

The management actions listed below are pertinent to the proposed action. Refer to the ARMPA for a complete listing of management decisions.

MD SSS 5: Prioritize activities and mitigation to conserve, enhance and restore Greater sage-grouse (GRSG) habitats (i.e., fire suppression activities, fuels management activities, vegetation treatments, invasive species treatments etc.) first by Conservation Area, if appropriate (Conservation Area under adaptive management or at risk of meeting an adaptive management soft or hard trigger), followed by PHMA, then IHMA then GHMA within the Conservation Areas. Local priority areas within these areas will be further refined as a result of completing the GRSG Wildfire and Invasive Species Habitat Assessments as described in Appendix H. This can include projects outside GRSG habitat when those projects will provide a benefit to GRSG habitat.

MD SSS 7: GRSG habitat within the project area will be assessed during project-level NEPA analysis within the management area designations (PHMA, IHMA, GHMA). Project proposals and their effects will be evaluated based on the habitat and values affected.

MD SSS 9: Areas of habitat outside of delineated habitat management areas identified during the Key habitat update process will be evaluated during site-specific NEPA for project level activities and GRSG required design features (Appendix C) and buffers (Appendix B) will be included as part of project design. These areas will be further evaluated during plan evaluation and the 5-year update to the management areas, to determine whether they should be included as PHMA, IHMA, or GHMA.

MD SSS 10: Designate Sagebrush Focal Areas (SFA) as shown on Figure 1-2 (ARMPA, 2015). SFA will be managed as PHMA, with the following additional management:

- Recommended for withdrawal from the General Mining Act of 1872, as amended, subject to valid existing rights.
- Managed as NSO, without waiver, exception, or modification, for fluid mineral leasing.
- Prioritized for vegetation management and conservation actions in these areas, including, but not limited to land health assessments, wild horse and burro management actions, review of livestock grazing permits/leases, and habitat restoration (see specific management sections).

MD SSS 32: Incorporate RDFs as described in Appendix C in the development of project or proposal implementation, reauthorizations or new authorizations and suppression activities, as conditions of approval (COAs) into any post-lease activities and as best management practices for locatable minerals activities, to the extent allowable by law, unless at least one of the following conditions can be demonstrated and documented in the NEPA analysis associated with the specific project:

a) A specific RDF is not applicable to the site-specific conditions of the project or activity;

b) A proposed design feature or BMP is determined to provide equal or better protection for GRSG or its habitat; or
c) Analysis concludes that following a specific RDF will provide no more protection to GRSG or its habitat than not following it, for the project being proposed.

MD SSS 33: Conduct implementation and project activities, including construction and short-term anthropogenic disturbances consistent with seasonal habitat restrictions described in Appendix C.

MD SSS 36: Incorporate appropriate conservation measures for slickspot peppergrass (Lepidium papilliferum) as described in the 2014 Conservation Agreement (as updated, amended or reauthorized) into implementation and project design within slickspot peppergrass habitat in the Jarbidge and Four Rivers Field Offices to avoid and minimize impacts on slickspot peppergrass.

MD SSS 38: Monitor the effectiveness of projects (e.g., fuel breaks. fuels treatments) until objectives have been met or until it is determined that objectives cannot be met, according to the monitoring schedule identified for project implementation.

MD SSS 39: Monitor invasive vegetation post vegetation management treatment.

MD SSS 40: Monitor project construction areas for noxious weed and invasive species for at least 3 years, unless control is achieved earlier.

MD VEG 1: Implement habitat rehabilitation or restoration projects in areas that have potential to improve GRSG habitat using a full array of treatment activities as appropriate, including chemical, mechanical and seeding treatments.

MD VEG 2: Implement vegetation rehabilitation or manipulation projects to enhance sagebrush cover or to promote diverse and healthy grass and forb understory to achieve the greatest improvement in GRSG habitat based on FIAT Assessments (Appendix X of the Idaho and Southwestern Montana Greater Sage-Grouse Final EIS), HAF assessments, other vegetative assessment data and local, site-specific factors that indicate sagebrush canopy cover or herbaceous conditions do not meet habitat management objectives (i.e. is minimal or exceeds optimal characteristics). This may necessitate the use of prescribed fire as a site preparation technique to remove annual grass residual growth prior to the use of herbicides in the restoration of certain lower elevation sites (e.g., Wyoming big sagebrush) but such efforts will be carefully planned and coordinated to minimize impacts on GRSG seasonal habitats.

MD VEG 3: Require use of native seeds for restoration based on availability, adaptation (ecological site potential), and probability of success (Richards et al., 1998). Non-native seeds may be used as long as they support GRSG habitat objectives (Pyke 2011) to increase probability of success, when adapted seed availability is low or to compete with invasive species especially on harsher sites.

MD VEG 4: Implement management changes in restoration and rehabilitation areas, as necessary, to maintain suitable GRSG habitat, improve unsuitable GRSG habitat and to ensure long-term persistence of improved GRSG habitat (Eiswerth and Shonkwiler 2006). Management changes can be considered during livestock grazing permit renewals, travel management planning, and renewal or reauthorization of ROWs.

MD VEG 5: Consider establishing seed harvest areas that are managed for seed production (Armstrong 2007) to provide a reliable source of locally adapted seed to use during rehabilitation and restoration activities.

MD VEG 6: Allocate use of native seed to GRSG or ESA listed species habitat in years when preferred native seed is in short supply. This may require reallocation of native seed from ESR projects outside of PHMA or IHMA to those inside it. Where probability of success or native seed availability is low, non-native seeds may be used as long as they meet GRSG habitat conservation objectives (Pyke 2011). Re-establishment of appropriate sagebrush species/subspecies and important understory plants, relative to site potential, shall be the highest priority for rehabilitation efforts.

MD VEG 7: During land health assessments, evaluate the relative value of existing non-native seeding within GRSG habitat as: 1) a component of a grazing system allowing improvement of adjacent native vegetation, 2) development of a forage reserve, 3) incorporation into a fuel break system (Davies et al., 2011) or 4) restoration/diversification for GRSG habitat improvement. Where appropriate and feasible, diversify seedings, or restore to native vegetation when potential benefits to GRSG habitat outweigh the other potential uses of the non-native seeding, with emphasis on PHMA and IHMA. Allow recolonization of seedings by sagebrush and other native vegetation.

MD VEG 9: Incorporate results of the FIAT Assessments into projects and activities addressing invasive species as appropriate.

MD VEG 10: Implement noxious weed and invasive species control using integrated vegetation management actions per national guidance and local weed management plans for Cooperative Weed Management Areas in cooperation with state and Federal agencies, affected counties, and adjoining private lands owners.

MD VEG 11: Conduct integrated weed management actions for noxious and invasive weed populations that are impacting or threatening GRSG habitat quality using a variety of eradication and control techniques including chemical, mechanical and other appropriate means.

MD VEG 13: Treat areas that contain cheatgrass and other invasive or noxious species to minimize competition and favor establishment of desired species.

MD FIRE 9: Implement activities identified within the FIAT Assessments.

MD FIRE 17: Design and implement fuels treatments that will reduce the potential start and spread of unwanted wildfires and provide anchor points or control lines for the containment of wildfires during suppression activities with an emphasis on maintaining, protecting, and expanding sagebrush ecosystems and successfully rehabilitated areas and strategically and effectively reduce wildfire threats in the greatest area.

MD FIRE 19: Apply appropriate seasonal restrictions for implementing vegetation and fuels management treatments according to the type of seasonal habitats present. Allow no treatments in known winter range unless the treatments are designed to strategically reduce wildfire risk around and/or in the winter range and will protect, maintain, increase, or enhance winter range habitat quality. Ensure chemical applications are utilized where they will assist in success of fuels treatments. Strategically place treatments on a landscape scale to prevent fire from spreading into PHMA or WUI.

MD FIRE 22: Fuel treatments will be designed through an interdisciplinary process to expand, enhance, maintain, and protect GRSG habitat which considers a full range of cost effective fuel reduction techniques, including: chemical, biological (including grazing and targeted grazing), mechanical and prescribed fire treatments.

MD FIRE 25: Strategically pre-treat areas to reduce fine fuels consistent with areas and results identified within the Wildfire and Invasive Species Assessments.

MD FIRE 29: Prioritize the use of native seeds for fuels management treatment based on availability, adaptation (site potential), and probability of success. Where probability of success or native seed availability is low or non-economical, non-native seeds may be used to meet GRSG habitat objectives to trend toward restoring the fire regime. When reseeding, use fire resistant native and non-native species, as appropriate, to provide for fuel breaks.

MD FIRE 31: If prescribed fire is used in GRSG habitat, the NEPA analysis for the Burn Plan will address:

- why alternative techniques were not selected as a viable options;
- how GRSG goals and objectives will be met by its use;
- how the COT Report objectives will be addressed and met;
- a risk assessment to address how potential threats to GRSG habitat will be minimized.

Allow prescribed fire as a vegetation or fuels treatment in Wyoming big sagebrush sites or other xeric sagebrush species sites, or in areas with a potential for post-fire exotic annual dominance only after the NEPA analysis for the Burn Plan has addressed the four bullets outlined above. Prescribed fire can be used to meet specific fuels objectives that will protect Greater Sage-Grouse habitat in PHMA (e.g., creation of fuel breaks that will disrupt the fuel continuity across the landscape in stands where annual invasive grasses are a minor component in the understory, burning slash piles from conifer reduction treatments, used as a component with other treatment methods to combat annual grasses and restore native plant communities). Allow prescribed fire in known sage-grouse winter range only after the NEPA analysis for the Burn Plan has addressed the four bullets outlined above. Any prescribed fire in winter habitat will need to be designed to strategically reduce wildfire risk around and/or in the winter range and designed to protect winter range habitat quality.

MD FIRE 34: Provide adequate rest from livestock grazing to allow natural recovery of existing vegetation and successful establishment of seeded species within burned/ESR areas. All new seedings of grasses and forbs should not be grazed until at least the end of the second growing season, and longer as needed to allow plants to mature and develop robust root systems which will stabilize the site, compete effectively against cheatgrass and other invasive annuals, and remain sustainable under long-term grazing management. Adjust other management activities, as appropriate, to meet ESR objectives.

MD LG 11: Design any new structural range improvements, following appropriate cooperation, consultation and coordination, to minimize and/or mitigate impacts on GRSG habitat. Any new structural range improvements should be placed along existing disturbance corridors or in unsuitable habitat, to the extent practical, and are subject to RDFs (Appendix C). Structural range improvement in this context, include, but are not limited to: fences, exclosures, corrals or other livestock handling structures; pipelines, troughs, storage tanks (including moveable tanks used in livestock water hauling), windmills, ponds/reservoirs, solar panels and spring developments.

MD LG 13: Prioritize removal, modification or marking of fences or other structures in areas of high collision risk following appropriate cooperation, consultation and coordination to reduce the incidence of GRSG mortality due to fence strikes (Stevens et al., 2012).

MD CC 9: All prescribed burning will be coordinated with state and local air quality agencies to ensure that local air quality is not significantly impacted by BLM activities.

MD TTM 1: Limit off-highway vehicle travel within Idaho BLM Field Offices to existing roads, primitive roads, and trails in areas where travel management planning has not been completed or is in progress. This excludes areas previously designated as open through a land use plan decision or currently under review for designation as open, currently being analyzed in on-going RMP revision efforts in the Four Rivers, Jarbidge, and Upper Snake Field Offices.

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MD SSS 4: In OHMAs, authorized/permitted activities are implemented adhering to the RDFs described in Appendix C, consistent with applicable law. At the site-specific scale, if an RDF is not implemented, at least one of the following must be demonstrated in the NEPA analysis associated with the project/activity:

- A specific RDF is documented to not be applicable to the site-specific conditions of the project/activity (e.g., due to the site limitations or engineering considerations). Economic considerations, such as increased costs, do not necessarily require that an RDF be varied or rendered inapplicable.
- An alternative RDF is determined to provide equal or better protection for GRSG or its habitat.
- A specific RDF will provide no additional protection to GRSG or its habitat.

MD SSS 11: Design and construct fences consistent with BLM H-1741-1, Fencing Standards Manual (BLM 1990), and apply the Sage-Grouse Fence Collision Risk Tool to Reduce Bird Strikes (NRCS 2012). Bring existing fencing into compliance as opportunities arise.

MD SSS 18: A biologically significant unit (BSU; see Appendix A; Figure 2-2) that has hit a soft trigger due to vegetation disturbance will be a priority for restoration treatments consistent with Fire and Invasives Assessment Tool (FIAT) (Appendix J).

MD VEG 2: Incorporate GRSG habitat objectives (Table 2-2) in the design of habitat restoration projects and manage treated areas to meet GRSG habitat objectives.

MD VEG 3: Use BLM GRSG habitat maps, habitat objectives (see Table 2-2 for GRSG habitat objectives), ecological site potential, state and transition models, and concepts of resistance and resilience (Appendix H) to prioritize habitat restoration projects, including those following wildfire, to address the most limiting GRSG habitat vegetation components and to connect seasonal ranges.

Habitat restoration includes the following:

i. Restoring sagebrush canopy in PHMAs and GHMAs to meet GRSG habitat objectives (Table 2-2)
ii. Reestablishing perennial grasses and native forbs in PHMAs and GHMAs
iii. Reducing or removing pinyon or juniper in PHMAs and GHMAs to enhance seasonal range connectivity and to maintain sagebrush canopy and understory integrity
iv. Restore areas affected by wildfire and the continuing invasive annual fire cycle to meet GRSG habitat objectives (Table 2-2)
v. Prioritize restoration in areas that have not crossed an ecological threshold

MD VEG 4: Plan vegetation treatments (including GRSG habitat treatments) in a landscape-scale context to address habitat fragmentation, effective patch size, invasive species presence, and intact sagebrush community protection, consistent with the GRSG habitat objectives identified in Table 2-2.

MD VEG 5: For Wyoming, mountain, and basin big sagebrush communities in PHMAs and GHMAs:

i. Prioritize treatments that focus on enhancing, reestablishing, or maintaining the most limiting GRSG habitat component
ii. Reestablish sagebrush to meet GRSG habitat objectives (Table 2-2)
iii. Manage sagebrush communities to achieve age-class, structure, cover, and species composition objectives in GRSG habitat (Table 2-2)
iv. Restore herbaceous understory in brush-dominated areas to meet GRSG habitat objectives (Table 2-2)
v. Treat areas that contain cheatgrass and other invasive or noxious species to minimize competition and favor establishment of desired species (Table 2-2)
vi. Treat disturbed areas in accordance with FIAT (see Appendix H), including implementation-level assessments

MD VEG 6: Manage for establishment of sagebrush in unmaintained non-native seedings (e.g., crested wheatgrass seedings) in or next to GRSG habitat to meet habitat objectives (Table 2-2).

MD VEG 7: In PHMAs and GHMAs, give preference to native seeds for restoration, based on availability, adaptation (ecological site potential), and probability of success. Where the probability of success or adapted seed availability is low, non-native seeds may be used, as long as they support GRSG habitat objectives. Choose native plant species outlined in Ecological Site Descriptions (ESDs), where available, to revegetate sites. Emphasize use of local seed collected from intact stands or greenhouse cultivation. If the commercial supply of appropriate native seeds and plants is limited, work with the BLM Native Plant Materials Development Program, Natural Resource Conservation Service (NRCS) Plant Material Program, or State Plant Material Programs. If currently available supplies are limited, use the materials that provide the greatest benefit for GRSG. In all cases, seed must be certified as weed free.

MD VEG 8: To increase seeding success and to ensure effective soil and seed contact, consider the use of specialized seed drills or other proven and effective methods that may become available based on new science.

MD VEG 9a: For Nevada BLM-managed lands, before implementation, establish project monitoring sites where vegetation treatment is planned. Treatment areas will be monitored both pre- and post-treatment on a multiple-year basis to ensure that project objectives are achieved.

MD VEG 10: On public lands, where the attributes, quality, or lack of GRSG winter habitat has been identified as a limiting factor, emphasize vegetation treatments in known winter habitat to enhance quality or reduce wildfire risk around or in winter habitat.

MD VEG 11: In perennial grass, invasive annual grass, and conifer-invaded cover types, restore sagebrush steppe with local sagebrush seedings or planted seedlings where feasible.

MD VEG 12: Continue to coordinate with NDOW, CDFW, and NRCS for all development or habitat restoration proposals in PHMAs and GHMAs. Also, coordinate with the Nevada SETT, tribes, and local working groups on projects proposed in sagebrush ecosystems.

MD VEG 16: Prevent the establishment of invasive species into uninvaded areas in PHMAs and GHMAs through properly managed grazing and by conducting systematic and strategic detection surveys, collecting data, mapping these areas, and engaging in early response to contain and eradicate invasion if it occurs.

MD VEG 17: Control the spread and introduction of noxious weeds listed by the Nevada Department of Agriculture and California Department of Food and Agriculture (NAC 555.010, Classes A through C, inclusive and 3 CCR 4500, Noxious Weed Species Pest Rating A, B, C, and Q) and undesirable non-native plant species (Gelbard and Belnap, 2003; Bergquist et al., 2007). Work with federal, state, local, and tribal groups, such as Weed Control Districts, Cooperative Weed Management Areas, and Conservation Districts, in detecting and treating non-native species.

MD VEG 18: Where scientific support is lacking, carefully construct treatments to rigorously assess the value or detriment of untested methods to determine their value for future application to GRSG habitats.

MD VEG 19: The BLM will cooperate with other federal, state, tribal and local agencies along with academia in researching the development of biological control agents and deploying emerging technologies as they become available.

MD VEG 20: Monitor and adjust treatment sites and methods as needed to ensure effectiveness of efforts to prevent and control invasive species and restore GRSG habitat.

MD VEG 21: Assess invasive annual grass presence and distribution before implementing vegetation restoration projects to determine if treatments are required to treat invasive annual grasses.

MD VEG 22: Treat sites in PHMAs and GHMAs that contain invasive species infestations through an integrated pest management (IPM) approach, using fire, chemical, mechanical, and biological (e.g., targeted grazing) methods, based on site potential and in accordance with FIAT (Appendix H). Treat areas that contain cheatgrass and other invasive or noxious species to minimize competition and favor establishment of desired species.

MD VEG 23: Design and implement vegetation treatments in PHMAs and GHMAs to restore, enhance, and maintain riparian areas (Table 2-2).

MD VEG 24: Consider an array of vegetation treatments to increase edge and expand mesic areas in PHMAs and GHMAs where riparian extent is limited by shrub encroachment (Table 2-2).

MD FIRE 19: Review Objective SSS 4 and apply MDs SSS 1 through SSS 4 when reviewing and analyzing projects and activities proposed in GRSG habitat.

MD FIRE 20: In PHMAs and GHMAs, apply fuels treatments on a landscape level to modify fire behavior, intensity, complexity (fire patchiness), size, and effects in which fire management efforts are enhanced.

MD FIRE 21: Establish and maintain fuel breaks to protect GRSG and its habitat to limit fire size and mitigate fire behavior to increase suppression effectiveness. When possible, establish fuel breaks next to roads or other previously disturbed areas.

MD FIRE 22: Use a full range of fuels management strategies and tactics within acceptable risk levels across the range of GRSG habitat consistent with land use plan direction.

MD FIRE 23: If prescribed fire is used in GRSG habitat, the NEPA analysis for the Burn Plan will address:

- why alternative techniques were not selected as a viable option
- how GRSG goals and objectives will be met by its use
- how the COT report objectives will be addressed and met
- a risk assessment to address how potential threats to GRSG habitat will be minimized.

Allow prescribed fire as a vegetation or fuels treatment, and it shall only be considered after the NEPA analysis for the burn plan has addressed the four bullets outlined above. Prescribed fire can be used to meet specific fuels objectives that will protect GRSG habitat in PHMAs (e.g., creation of fuel breaks that would disrupt the fuel continuity across the landscape in stands where annual invasive grasses are a minor component in the understory, burning slash piles from conifer reduction treatments, used as a component with other treatment methods to combat annual grasses and restore native plant communities).

Allow prescribed fire in known winter range, and it shall only be considered after the NEPA analysis for the burn plan has addressed the four bullets outlined above. Any prescribed fire in winter habitat will need to be designed to strategically reduce wildfire risk around and/or in the winter range and designed to protect winter range habitat quality.

MD FIRE 24: In coordination with the USFWS and relevant state agencies and in accordance with FIAT (see Appendix H), develop a fuels management strategy for the BLM with large blocks of GRSG habitat. The strategy shall include an up-to-date fuels profile, land use plan direction, current and potential habitat fragmentation, sagebrush and GRSG ecological factors, and active vegetation management steps to provide critical breaks in fuel continuity. When developing this strategy, consider the risk of increased habitat fragmentation from a proposed action versus the risk of large-scale fragmentation posed by wildfires if the action were not taken.

MD FIRE 25: Design fuels treatments through an interdisciplinary team process to expand, enhance, maintain, and protect PHMAs and GHMAs. Fuel reduction techniques, such as prescribed fire and chemical, biological (including targeted grazing), and mechanical treatments, are acceptable. Use green strips and fuel breaks, where appropriate, to protect seeding from subsequent fires.

MD FIRE 26: In coordination with the USFWS and relevant state agencies and in accordance with FIAT (see Appendix H), BLM will identify treatment needs for wildfire and invasive species management. On-going treatment needs will be coordinated on state and regional scales and across jurisdictional boundaries for long-term conservation of GRSG and its habitat.

MD FIRE 27: On project completion, monitor and manage fuels projects to ensure long-term success, including persistence of seeded species and other treatment components. Control invasive vegetation post-treatment.

MD FIRE 28: Design fuels treatments to protect sagebrush ecosystems, modify fire behavior, restore ecological function, and create landscape patterns that most benefit PHMAs and GHMAs and promote use by GRSG.

MD FIRE 30: Use burning prescriptions that minimize undesirable effects on vegetation or soils (e.g., minimize killing desirable perennial plant species and reduce risk of annual grass invasion) and incorporate FIAT assessment (Chambers et al., 2014) in PHMAs and GHMAs.

MD FIRE 31: Ensure proposed sagebrush treatments are planned with interdisciplinary input from the BLM and coordinated with USFWS and state fish and wildlife agencies to meet GRSG habitat objectives (Table 2-2).

MD FIRE 32: Design vegetation treatments in areas of high fire frequency to facilitate firefighter safety, reduce the potential acres burned, and reduce the fire risk to GRSG habitat.

MD FIRE 33a: For Nevada BLM-administered lands, before implementation, establish project monitoring sites where fuels management projects are planned. Monitor treatment areas both pre- and post-treatment on a multiple-year basis to ensure that project objectives are achieved.

MD LG 20: In PHMA and GHMA, rest areas that have received vegetative treatments from livestock grazing until resource monitoring data verifies the treatment objectives are being met and an appropriate grazing regime has been developed. Any livestock grazing temporary suspended use or other management changes per 43 CFR, Part 4110.3-2a for the purpose of a vegetation treatment will be done through the grazing decision, prior to treatment.

MD LG 22: After grazing rest associated with vegetation treatments in PHMAs and GHMAs, monitor annually for a minimum of 5 years to ensure project objectives are being maintained.

MD LG 23: Fences shall not be constructed or reconstructed within 1.2 miles from the perimeter of occupied leks, unless the collision risk can be mitigated through design features or markings (e.g., mark, laydown fences, and design).

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Table M-1 - Summary of Effects and Determinations for Noxious Weed and Invasive Plant Treatments: Jarbidge River Bull Trout and Bull Trout Critical Habitat

Treatment Method	Potential Direct and Indirect Effects to Jarbidge River Bull Trout and Bull Trout Critical Habitat	Potential Cumulative Effects	Conservation Measures for Avoiding or Reducing Adverse Effects	Effects Determination for Bull Trout and Bull Trout Critical Habitat by Treatment Method	Rationale for the Effects Determination
On-going (small-scale) treatments determined to have No Effect to bull trout or bull trout critical habitat: Manual methods (removal) in upland areas; biological controls (upland areas, all methods, riparian areas (domestic goats or sheep), herbicide treatments (upland areas, spot treatments).	No direct or indirect effects identified. Treatment methods would not be used in RCAs which would avoid impacts to water quality or hydric vegetation within occupied RCAs.	Potential for cumulative effects to water quality or hydric vegetation from similar on-going and future treatments, or a lack of treatments, on State and/or private land. Measures to reduce potential effects to bull trout or bull trout critical habitat may or may not be applied on State or private land.	Apply the design features, conservation measures, prevention measures, herbicide application criteria, and SOPs for Special Status Species to all treatments (BA Chapter 2; Appendix B, C, D, and E).	NE - short-term and long-term	These treatment methods have no potential for direct or indirect effects to bull trout and bull trout critical habitat because they would not occur in occupied RCAs.
Larger-scale Treatments determined to have No Effect to bull trout or bull trout critical habitat:	No direct or indirect effects identified. Treatment methods would not be used in RCAs which would avoid impacts to water quality or hydric	Potential for cumulative effects to water quality or hydric vegetation from similar on-going and future treatments, or a lack of treatment,	Apply the design features, conservation measures, prevention measures, herbicide application criteria, and SOPs for Special Status Species to all	NE - short-term and long-term	These treatment methods would have no potential for direct or indirect effects to bull trout and bull trout critical habitat because

Treatment Method	**Potential Direct and Indirect Effects to Jarbidge River Bull Trout and Bull Trout Critical Habitat**	**Potential Cumulative Effects**	**Conservation Measures for Avoiding or Reducing Adverse Effects**	**Effects Determination for Bull Trout and Bull Trout Critical Habitat by Treatment Method**	**Rationale for the Effects Determination**
Mechanical methods (removal) in upland and riparian areas; prescribed fire (upland and riparian areas), ground-based herbicide treatments (high boom, upland vegetation, inside and adjacent to RCAs), re-vegetation treatments (seedings, seedling plantings) in upland areas, all methods.	vegetation within occupied RCAs.	on State and/or private land. Measures to reduce potential effects to bull trout or bull trout critical habitat may or may not be applied on State or private land.	treatments (BA Chapter 2; Appendix B, C, D, and E).		they would not occur in occupied RCAs.
On-going treatments; small-scale (one plant to one acre), riparian areas Treatments in RCAs using manual methods (removal), biological controls (pathogens), ground based (spot) herbicide treatments, and re-vegetation treatments (seedings, seedling plantings,	Potential for localized, short-term direct and indirect effects to water quality due to sediment from manual (removal) and re-vegetation treatments or to hydric vegetation from chemical exposure during spot herbicide treatments in occupied RCAs. Design features and conservation measures would reduce potential effects to	Potential for cumulative effects to water quality or hydric vegetation from similar on-going and future treatments, or a lack of treatment, on State and/or private land. Measures to reduce potential effects to bull trout or bull trout critical habitat may or may not be	None identified.	NLAA – Short-term; BE – Long-term	On-going small-scale treatments would occur in occupied RCAs and therefore have the potential for localized, short-term direct and indirect effects to water quality or hydric vegetation that are insignificant and discountable. Treatments would benefit bull trout and bull trout critical habitat in the long-term by

Treatment Method	Potential Direct and Indirect Effects to Jarbidge River Bull Trout and Bull Trout Critical Habitat	Potential Cumulative Effects	Conservation Measures for Avoiding or Reducing Adverse Effects	Effects Determination for Bull Trout and Bull Trout Critical Habitat by Treatment Method	Rationale for the Effects Determination
manual methods) in RCAs.	insignificant and discountable. Treatments would benefit bull trout and bull trout critical habitat in the long-term by removing noxious weeds and invasive plants and improving hydric vegetation in occupied RCAs.	applied on State or private land.			removing noxious weeds and invasive plants and improving hydric vegetation in occupied RCAs.
Larger- scale treatments greater than one acre					
Ground Based Herbicide Treatments: Including Adjuvants, Surfactants, Accidental spills, and Herbicide runoff	See Design Features and Conservation Measures for Aquatic Species (Chapter 2).				
Herbicide treatments in RCAs in upland vegetation types using upland herbicides (spot treatment, hand method only)	Potential for localized, short-term indirect effects to hydric vegetation in occupied RCAs due to herbicide drift. Design features and conservation measures would reduce potential short-term	Potential for cumulative effects to water quality or hydric vegetation from similar on-going and future treatments, or a lack of treatment, on State and/or	Apply the design features, conservation measures, prevention measures, herbicide application criteria, and SOPs for Special Status Species to all treatments (BA Chapter 2; Appendix B, C, D, and E).	NLAA – Short-term BE-Long-term	Treatments using upland herbicides in occupied RCAs may have indirect effects to hydric vegetation due to herbicide drift that are insignificant and discountable. Treatments would

Treatment Method	Potential Direct and Indirect Effects to Jarbidge River Bull Trout and Bull Trout Critical Habitat	Potential Cumulative Effects	Conservation Measures for Avoiding or Reducing Adverse Effects	Effects Determination for Bull Trout and Bull Trout Critical Habitat by Treatment Method	Rationale for the Effects Determination
	indirect effects to insignificant and discountable. Treatments would benefit bull trout and bull trout critical habitat in the long-term by removing noxious weeds and invasive plants from occupied RCAs.	private land. Measures to reduce potential effects to bull trout or bull trout critical habitat may or may not be applied on State or private land.	Upland herbicides would not be broadcast sprayed in RCAs; Upland herbicides would not be used within 15 feet of areas with hydric vegetation.		benefit bull trout and bull trout critical habitat in the long-term by removing noxious weeds and invasive plants from occupied RCAs.
Herbicide treatments in RCAs using low boom methods 100 to 50 feet of hydric vegetation using riparian herbicides	Potential for localized, short-term direct and indirect effects to hydric vegetation or water quality due to herbicide drift. Design features and conservation measures would reduce potential effects to insignificant but may not be discountable. Treatments would benefit bull trout and bull trout critical habitat in the long-term by removing noxious weeds and invasive plants from occupied RCAs.	Potential for cumulative effects to water quality or hydric vegetation from similar on-going and future treatments, or a lack of treatment, on State and/or private land. Measures to reduce potential effects to bull trout or bull trout critical habitat may or may not be applied on State or private land.	Apply the design features, conservation measures, prevention measures, herbicide application criteria, and SOPs for Special Status Species to all treatments (BA Chapter 2; Appendix B, C, D, and E). Herbicide treatments using high boom methods would not be used within 50 feet of hydric vegetation. Only aquatic approved herbicides would be used.	NLAA – Short-term BE-Long-term	Design features and conservation measures would reduce the potential for direct and indirect effects to hydric vegetation and water quality to insignificant, but potential effects may not be discountable. Treatments would benefit bull trout and bull trout critical habitat in the long-term by removing noxious weeds and invasive plants from occupied RCAs.

Treatment Method	Potential Direct and Indirect Effects to Jarbidge River Bull Trout and Bull Trout Critical Habitat	Potential Cumulative Effects	Conservation Measures for Avoiding or Reducing Adverse Effects	Effects Determination for Bull Trout and Bull Trout Critical Habitat by Treatment Method	Rationale for the Effects Determination
Herbicide treatments in RCAs using hand methods (spot spray or direct application) 50 to 15 feet from occupied waters using riparian herbicides	Potential for localized, short-term direct and indirect effects to hydric vegetation or water quality due to accidental direct exposure or herbicide drift (indirect). Design features and conservation measures would reduce the potential for effects to insignificant but may not be discountable. Treatments would benefit bull trout and bull trout critical habitat in the long-term by removing noxious weeds and invasive plants from occupied RCA.	Potential for cumulative effects to water quality or hydric vegetation from similar on-going and future treatments, or a lack of treatment, on State and/or private land. Measures to reduce potential effects to bull trout or bull trout critical habitat may or may not be applied on State or private land.	Apply the design features, conservation measures, prevention measures, herbicide application criteria, and SOPs for Special Status Species to all treatments (BA Chapter 2; Appendix B, C, D, and E). Herbicides would not be broadcast sprayed within 50 feet of areas with hydric vegetation. Spot application may occur. Only aquatic approved herbicides would be used.	NLAA – Short-term BE-Long-term	Design features and conservation measures would reduce the potential for direct and indirect effects to hydric vegetation and water quality to insignificant, but potential effects may not be discountable. Treatments would benefit bull trout and bull trout critical habitat in the long-term by removing noxious weeds and invasive plants from occupied RCAs.
Herbicide treatments in RCAs using hand methods (spot spraying or direct application) within 15 feet of occupied waters using riparian herbicides only	Potential for localized, short-term direct and indirect effects to hydric vegetation or water quality due to accidental direct exposure or herbicide drift (indirect). Design	Potential for cumulative effects to water quality or hydric vegetation from similar on-going and future treatments, or a lack of treatment,	Apply the design features, conservation measures, prevention measures, herbicide application criteria, and SOPs for Special Status Species to all	NLAA – Short-term BE-Long-term	Design features and conservation measures would reduce the potential for direct and indirect effects to hydric vegetation and water quality to insignificant, but potential effects

Treatment Method	Potential Direct and Indirect Effects to Jarbidge River Bull Trout and Bull Trout Critical Habitat	Potential Cumulative Effects	Conservation Measures for Avoiding or Reducing Adverse Effects	Effects Determination for Bull Trout and Bull Trout Critical Habitat by Treatment Method	Rationale for the Effects Determination
(no adjuvants or surfactants)	features and conservation measures would reduce potential effects to insignificant but may not be discountable. Treatments would benefit bull trout and bull trout critical habitat in the long-term by removing noxious weeds and invasive plants from occupied RCAs.	on State and/or private land. Measures to reduce potential effects to bull trout or bull trout critical habitat may or may not be applied on State or private land.	treatments (BA Chapter 2; Appendix B, C, D, and E). Herbicide treatments in RCAs within 15 feet of occupied waters would use hand methods (spot spraying or direct application) using riparian herbicides only (no adjuvants or surfactants).		may not be discountable. Treatments would benefit bull trout and bull trout critical habitat in the long-term by removing noxious weeds and invasive plants from occupied RCAs.
Herbicide Treatments: Aerial Methods	See Design Features and Conservation Measures for Aquatic Species (Chapter 2). Herbicide treatments using aerial methods would not occur within 300 feet of the canyon rim for the Jarbidge and Bruneau Rivers. Aerial herbicide treatments would not occur within 0.5 mile of the lower Bruneau River downstream of the wilderness boundary (Bruneau hot springsnail Recovery Area).				
Herbicide treatments using aerial methods more than 300 feet from the canyon rim of the Bruneau and Jarbidge Rivers (including Dave, Buck, Jack, and Deer creeks) using upland herbicides	Potential for localized, short-term indirect effects to hydric vegetation or water quality due to herbicide drift. Design features and conservation measures would reduce potential effects to insignificant and	None identified	Apply the design features, conservation measures, prevention measures, herbicide application criteria, and SOPs for Special Status Species to all treatments (BA Chapter 2; Appendix B, C, D, and E). Aerial herbicide treatments would be more than 300 feet	NLAA – Short-term BE-Long-term	Design features and conservation measures would reduce the potential for indirect effects to hydric vegetation and water quality to insignificant and discountable. Treatments would benefit bull trout and

Treatment Method	Potential Direct and Indirect Effects to Jarbidge River Bull Trout and Bull Trout Critical Habitat	Potential Cumulative Effects	Conservation Measures for Avoiding or Reducing Adverse Effects	Effects Determination for Bull Trout and Bull Trout Critical Habitat by Treatment Method	Rationale for the Effects Determination
Aerial herbicide treatments would be more than 0.5 mile from the Bruneau River within the Bruneau hot springsnail Recovery Area	discountable. Treatments would benefit bull trout and bull trout critical habitat in the long-term by removing noxious weeds and invasive plants adjacent to occupied RCAs.		from the canyon rim of the Bruneau and Jarbidge Rivers (including Dave, Buck, Jack, and Deer creeks); treatments would be more than 0.5 mile from the Bruneau River in the Bruneau hot springsnail Recovery Area.		bull trout critical habitat in the long-term by removing noxious weeds and invasive plants adjacent to occupied RCAs.
Re-Vegetation Treatments: Seedings					
Ground Seedings; Manual Methods Riparian Areas	No short-term direct or indirect effects to hydric vegetation or water quality from seeding hydric plants using manual methods. Seedings would restore native hydric vegetation and benefit bull trout and bull trout critical habitat in the long-term.	None identified.	Apply the design features, conservation measures, and prevention measures for Special Status Species to all treatments (BA Chapter 2; Appendix B).	NLAA – Short-term; BE – Long-term	Seeding hydric plants using manual methods is not ground disturbing and would not have short-term direct or indirect effects to hydric vegetation and water quality. Treatments would benefit bull trout and bull trout critical habitat in the long-term by restoring native hydric vegetation in occupied RCAs.

Treatment Method	Potential Direct and Indirect Effects to Jarbidge River Bull Trout and Bull Trout Critical Habitat	Potential Cumulative Effects	Conservation Measures for Avoiding or Reducing Adverse Effects	Effects Determination for Bull Trout and Bull Trout Critical Habitat by Treatment Method	Rationale for the Effects Determination
Re-Vegetation Treatments: Seedling Plantings					
Manual Methods; Riparian Areas	Potential for localized, short-term direct and indirect effects to water quality due to sediment from manual plantings in occupied RCAs. Design features and conservation measures would reduce potential effects to insignificant and discountable. Treatments would benefit bull trout and bull trout critical habitat in the long-term by restoring native hydric vegetation in occupied RCAs.	None identified.	Apply the design features, conservation measures, and prevention measures for Special Status Species to all treatments (BA Chapter 2; Appendix B).	NLAA – Short-term; BE – Long-term	Design features and conservation measures would reduce potential effects to water quality to insignificant and discountable. Treatments would benefit bull trout and bull trout critical habitat in the long-term by restoring native hydric vegetation in occupied RCAs.
Summary of Effects:	Potential for localized, short-term direct or indirect effects to hydric vegetation or water quality due to sediment during manual treatments to remove noxious weeds and	Potential for cumulative effects from on-going and future actions, or a lack of actions, to remove noxious weeds and invasive plants from State	Apply the design features, conservation measures, prevention measures, herbicide application criteria, and SOPs for Special Status Species to all	Overall Determination: Noxious weed and invasive plant treatments *may affect, but are not likely to adversely affect* bull trout and bull trout	Design features and conservation measures would reduce the potential for direct or indirect effects to hydric vegetation and water quality to the extent possible but may not

Treatment Method	Potential Direct and Indirect Effects to Jarbidge River Bull Trout and Bull Trout Critical Habitat	Potential Cumulative Effects	Conservation Measures for Avoiding or Reducing Adverse Effects	Effects Determination for Bull Trout and Bull Trout Critical Habitat by Treatment Method	Rationale for the Effects Determination
	invasive plants or for planting hydric vegetation in occupied RCAs. Herbicide treatments in or adjacent to occupied RCAs have the potential for localized, short-term direct or indirect effects to hydric vegetation and water quality due to accidental direct chemical exposure or herbicide drift. Removing noxious weeds and invasive plants in and adjacent to occupied RCAs and restoring hydric vegetation would have a beneficial effect to bull trout and bull trout critical habitat in the long-term.	and private lands using herbicides or prescribed fire. Measures to reduce potential effects to bull trout and bull trout critical habitat may or may not be applied on State or private lands.	treatments (BA Chapter 2; Appendix B, C, D, and E).	critical habitat in the short-term. Treatments that remove noxious weeds and invasive plants and restore native upland and hydric vegetation in and adjacent to occupied RCAs would have a *long-term beneficial effect* to bull trout and bull trout critical habitat.	eliminate all localized, short-term effects to for some treatment methods. Herbicide treatments in or adjacent to bull trout critical habitat may result in localized, short-term direct or indirect effects to water quality or hydric vegetation that are insignificant but may not be discountable. Treatments to remove noxious weeds and invasive plants and restore native hydric vegetation in and adjacent to occupied RCAs would benefit bull trout and bull trout critical habitat in the long-term.

Table M-2 - Summary of Effects and Determinations for Noxious Weed and Invasive Plant Treatments: Bruneau hot springsnail

Treatment Method	Potential Direct and Indirect Effects to Bruneau hot springsnail and its Habitat	Potential Cumulative Effects	Conservation Measures for Avoiding or Reducing Adverse Effects	Effects Determination by Treatment Method	Rationale for the Effects Determination
On-going (small-scale) treatments determined to have No Effect to Bruneau hot springsnail or its habitat: Manual methods (removal) in upland areas; biological controls (upland areas, all methods), riparian areas, domestic goats or sheep), herbicide treatments (upland areas, spot treatments).	No direct or indirect effects identified. Treatment methods would not be used in RCAs which would avoid impacts to water quality or hydric vegetation within occupied RCAs.	Potential for cumulative effects to water quality or hydric vegetation from similar on-going and future treatments, or a lack of treatment, on State and/or private land. Measures to reduce potential effects to Bruneau hot springsnail may or may not be applied on State or private land.	Apply the design features, conservation measures, prevention measures, herbicide application criteria, and SOPs for Special Status Species to all treatments (BA Chapter 2; Appendix B, C, D, and E).	NE- Short and long-term	These treatment methods have no potential for direct or indirect effects to Bruneau hot springsnail or its habitat because they would not occur in occupied RCAs.
Larger-scale Treatments determined to have No Effect to Bruneau hot springsnail or its habitat: Mechanical methods (removal) in upland and riparian areas; prescribed fire (upland and riparian areas);	No direct or indirect effects identified. Treatment methods would not be used in RCAs which would avoid impacts to water quality or hydric vegetation within occupied RCAs	Potential for cumulative effects to water quality or hydric vegetation from similar on-going and future treatments, or a lack of treatment, on State and/or private land. Measures to reduce	Apply the design features, conservation measures, prevention measures, herbicide application criteria, and SOPs for Special Status Species to all treatments (BA Chapter 2; Appendix B, C, D, and E). Aerial herbicide treatments would be more than 0.5 mile	NE- Short and long-term	These treatment methods would have no potential for direct or indirect effects to Bruneau hot springsnail or its habitat because they would not occur in occupied RCAs.

Treatment Method	Potential Direct and Indirect Effects to Bruneau hot springsnail and its Habitat	Potential Cumulative Effects	Conservation Measures for Avoiding or Reducing Adverse Effects	Effects Determination by Treatment Method	Rationale for the Effects Determination
ground-based herbicide treatments (high boom, upland vegetation, within or adjacent to RCAs); aerial herbicide treatments (upland area and riparian areas); re-vegetation treatments (seedings, seedling plantings) in upland areas, all methods.		potential effects to Bruneau hot springsnail may or may not be applied on State or private land.	from the Bruneau River in the Bruneau hot springsnail Recovery Area.		
On-going treatments; small-scale (one plant to one acre), riparian areas Treatments in RCAs using manual methods (removal), biological controls (pathogens), ground based (spot) herbicide treatments, and re-vegetation treatments (seedings, seedling plantings, manual methods) in RCAs.	Potential for localized, short-term direct and indirect effects to water quality due to sediment from manual (removal) and re-vegetation treatments or to hydric vegetation from chemical exposure during spot herbicide treatments in occupied RCAs. Design features and conservation measures would reduce potential effects to insignificant and discountable. Treatments would benefit Bruneau hot springsnail and its	Potential for cumulative effects to water quality or hydric vegetation from similar on-going and future treatments, or a lack of treatment, on State and/or private land. Measures to reduce potential effects to Bruneau hot springsnail may or may not be applied on State or private land.	None identified.	NLAA – Short-term; BE – Long-term	On-going small-scale treatments would occur in occupied RCAs and therefore have the potential for localized, short-term direct and indirect effects to water quality or hydric vegetation that are insignificant and discountable. Treatments would benefit Bruneau hot springsnail and its habitat in the long-term by removing noxious weeds and invasive plants from occupied RCAs and improving

Treatment Method	Potential Direct and Indirect Effects to Bruneau hot springsnail and its Habitat	Potential Cumulative Effects	Conservation Measures for Avoiding or Reducing Adverse Effects	Effects Determination by Treatment Method	Rationale for the Effects Determination
	habitat in the long-term by removing noxious weeds and invasive plants from occupied RCAs and improving hydric vegetation in the Recovery Area.				hydric vegetation in the Recovery Area.
Larger- scale treatments greater than one acre					
Ground Based Herbicide Treatments: Including Adjuvants, Surfactants, Accidental spills, and Herbicide runoff	See Design Features and Conservation Measures for Aquatic Species (Chapter 2).				
Herbicide treatments in RCAs in upland vegetation types using upland herbicides (spot treatment, hand method only)	Potential for localized, short-term indirect effects to hydric vegetation in occupied RCAs due to herbicide drift. Design features and conservation measures would reduce potential effects to insignificant and discountable. Treatments would benefit Bruneau hot springsnail and its	Potential for cumulative effects to water quality or hydric vegetation from similar on-going and future treatments, or a lack of treatment, on State and/or private land. Measures to reduce potential effects to Bruneau hot springsnail may or	Apply the design features, conservation measures, prevention measures, herbicide application criteria, and SOPs for Special Status Species to all treatments (BA Chapter 2; Appendix B, C, D, and E). Upland herbicides would not be broadcast sprayed in RCAs; No spraying of herbicides would occur within 15 feet of geothermal	NLAA – Short-term BE-Long-term	Treatments using upland herbicides in occupied RCAs may have indirect effects to hydric vegetation due to herbicide drift that are insignificant and discountable. Treatments would benefit Bruneau hot springsnail and its habitat in the long-term by removing noxious weeds and invasive

Treatment Method	Potential Direct and Indirect Effects to Bruneau hot springsnail and its Habitat	Potential Cumulative Effects	Conservation Measures for Avoiding or Reducing Adverse Effects	Effects Determination by Treatment Method	Rationale for the Effects Determination
	habitat in the long-term by removing noxious weeds and invasive plants from occupied RCAs.	may not be applied on State or private land.	springs in the Recovery Area.		plants from occupied RCAs.
Herbicide treatments in RCAs using low boom methods 100 to 50 feet of hydric vegetation using riparian herbicides	Potential for localized, short-term direct and indirect effects to hydric vegetation or water quality due to herbicide drift. Design features and conservation measures would reduce potential effects to insignificant but may not be discountable. Treatments would benefit Bruneau hot springsnail and its habitat in the long-term by removing noxious weeds and invasive plants from occupied RCAs.	Potential for cumulative effects to water quality or hydric vegetation from similar on-going and future treatments, or a lack of treatment, on State and/or private land. Measures to reduce potential effects to Bruneau hot springsnail may or may not be applied on State or private land.	Apply the design features, conservation measures, prevention measures, herbicide application criteria, and SOPs for Special Status Species to all treatments (BA Chapter 2; Appendix B, C, D, and E). Herbicide treatments using high boom methods would not be used within 50 feet of hydric vegetation. Only aquatic approved herbicides would be used.	NLAA – Short-term BE-Long-term	Design features and conservation measures would reduce the potential for direct and indirect effects to hydric vegetation and water quality to insignificant, but potential effects may not be discountable. Treatments would benefit Bruneau hot springsnail and its habitat in the long-term by removing noxious weeds and invasive plants from occupied RCAs.
Herbicide treatments in RCAs using hand methods (spot spray or direct application) 50 to 15 feet from occupied	Potential for localized, short-term direct and indirect effects to hydric vegetation or water quality due to accidental direct exposure or	Potential for cumulative effects to water quality or hydric vegetation from similar on-going and future	Apply the design features, conservation measures, prevention measures, herbicide application criteria, and SOPs for Special Status Species to all	NLAA – Short-term BE-Long-term	Design features and conservation measures would reduce the potential for direct and indirect effects to hydric vegetation and water

Treatment Method	Potential Direct and Indirect Effects to Bruneau hot springsnail and its Habitat	Potential Cumulative Effects	Conservation Measures for Avoiding or Reducing Adverse Effects	Effects Determination by Treatment Method	Rationale for the Effects Determination
waters using riparian herbicides	herbicide drift (indirect). Design features and conservation measures would reduce the potential for effects to insignificant but may not be discountable. Treatments would benefit Bruneau hot springsnail and its habitat in the long-term by removing noxious weeds and invasive plants from occupied RCAs.	treatments, or a lack of treatment, on State and/or private land. Measures to reduce potential effects to Bruneau hot springsnail may or may not be applied on State or private land.	treatments (BA Chapter 2; Appendix B, C, D, and E). Herbicides would not be broadcast sprayed within 50 feet of areas with hydric vegetation. Spot application may occur. Only aquatic approved herbicides would be used.		quality to insignificant, but potential effects may not be discountable. Treatments would benefit Bruneau hot springsnail and its habitat in the long-term by removing noxious weeds and invasive plants from occupied RCAs.
Herbicide treatments in RCAs using hand methods only (direct application, no spraying) within 15 feet of occupied geothermal springs using riparian herbicides only (no adjuvants or surfactants)	Potential for localized, short-term direct and indirect effects to hydric vegetation or water quality due to accidental direct exposure. Design features and conservation measures would reduce potential effects to insignificant but may not be discountable. Treatments would benefit Bruneau hot springsnail and its	Potential for cumulative effects to water quality or hydric vegetation from similar on-going and future treatments, or a lack or treatment, on State and/or private land. Measures to reduce potential effects to Bruneau hot springsnail may or may not be applied	Apply the design features, conservation measures, prevention measures, herbicide application criteria, and SOPs for Special Status Species to all treatments (BA Chapter 2; Appendix B, C, D, and E). Herbicide treatments in RCAs within 15 feet of occupied geothermal springs would use direct application (no spraying) and riparian	NLAA – Short-term BE-Long-term	Design features and conservation measures would reduce the potential for direct and indirect effects to hydric vegetation and water quality to insignificant, but potential effects may not be discountable. Treatments would benefit Bruneau hot springsnail and its habitat in the long-term by removing noxious

Treatment Method	Potential Direct and Indirect Effects to Bruneau hot springsnail and its Habitat	Potential Cumulative Effects	Conservation Measures for Avoiding or Reducing Adverse Effects	Effects Determination by Treatment Method	Rationale for the Effects Determination
	habitat in the long-term by removing noxious weeds and invasive plants from occupied RCAs.	on State or private land.	herbicides only (no adjuvants or surfactants).		weeds and invasive plants from occupied RCAs.
Re-vegetation Treatments: Seedings					
Ground Seedings; Manual Methods Riparian Areas	No short-term direct or indirect effects to hydric vegetation or water quality from seeding hydric plants using manual methods. Seedings would restore native hydric vegetation within the Recovery Area and benefit Bruneau hot springsnail and its habitat in the long-term.	None identified.	Apply the design features, conservation measures, and prevention measures for Special Status Species to all treatments (BA Chapter 2; Appendix B).	NLAA – Short-term; BE – Long-term	Seeding hydric plants using manual methods are not ground disturbing and would not have short-term direct or indirect effects to hydric vegetation and water quality. Seeding hydric species would restore native hydric vegetation and benefit Bruneau hot springsnail and its habitat in the long-term.
Re-Vegetation Treatments: Seedling Plantings					
Manual Methods; Riparian Areas	Potential for localized, short-term direct and indirect effects to water	None identified.	Apply the design features, conservation measures, and prevention measures for	NLAA – Short-term; BE – Long-term	Design features and conservation measures would reduce potential

Treatment Method	Potential Direct and Indirect Effects to Bruneau hot springsnail and its Habitat	Potential Cumulative Effects	Conservation Measures for Avoiding or Reducing Adverse Effects	Effects Determination by Treatment Method	Rationale for the Effects Determination
	quality due to sediment from manual plantings in occupied RCAs. Design features and conservation measures would reduce potential effects to insignificant and discountable. Treatments would benefit Bruneau hot springsnail and its habitat by restoring native hydric vegetation within the Recovery Area.		Special Status Species to all treatments (BA Chapter 2; Appendix B).		effects to water quality due to sediment to insignificant and discountable. Treatments would benefit Bruneau hot springsnail and its habitat in the long-term by restoring native hydric vegetation within the Recovery Area.
Summary of Effects:	Potential for localized, short-term direct or indirect effects to hydric vegetation or water quality due to sediment during manual treatments to remove noxious weeds and invasive plants or for planting hydric vegetation in occupied RCAs. Herbicide treatments in or adjacent to occupied RCAs have the potential for localized, short-term	Potential for cumulative effects to water quality or hydric vegetation from similar on-going and future treatments, or a lack or treatment, on State and/or private land. Measures to reduce potential effects to Bruneau hot springsnail may or may not be applied	Apply the design features, conservation measures, prevention measures, herbicide application criteria, and SOPs for Special Status Species to all treatments (BA Chapter 2; Appendix B, C, D, and E).	Overall Determination: Noxious weed and invasive plant treatments *may affect, but are not likely to adversely affect* Bruneau hot springsnail and its habitat in the short-term. Treatments that remove noxious weeds and invasive plants and restore native upland and hydric vegetation within the Bruneau hot	Design features and conservation measures would reduce the potential for direct or indirect effects to hydric vegetation and water quality to the extent possible but may not eliminate all localized, short-term effects due to sediment for some treatment methods. Herbicide treatments in or adjacent to geothermal springs containing Bruneau hot

Treatment Method	Potential Direct and Indirect Effects to Bruneau hot springsnail and its Habitat	Potential Cumulative Effects	Conservation Measures for Avoiding or Reducing Adverse Effects	Effects Determination by Treatment Method	Rationale for the Effects Determination
	direct or indirect effects to hydric vegetation and water quality due to accidental direct exposure or herbicide drift. Removing noxious weeds and invasive plants in and adjacent to occupied RCAs and restoring hydric vegetation would have a beneficial effect to Bruneau hot springsnail its habitat in the long-term.	on State or private land.		springsnail Recovery Area would have a *long-term beneficial effect* to Bruneau hot springsnail and its habitat.	springsnail may result in localized, short-term direct or indirect effects to water quality or hydric vegetation that are insignificant but may not be discountable. Treatments to remove noxious weeds and invasive plants and restore native hydric vegetation in and adjacent to occupied geothermal springs would benefit Bruneau hot springsnail and its habitat in the long-term.

Table M-3 - Summary of Effects and Determinations for Noxious Weed and Invasive Plant Treatments: Snake River Physa Snail, Bliss Rapids Snail, and Banbury Springs Lanx

Treatment Method	Potential Direct and Indirect Effects to Listed Snake River snails and Habitat	Potential Cumulative Effects	Conservation Measures for Avoiding or Reducing Adverse Effects	Effects Determination by Treatment Method	Rationale for the Effects Determination
On-going (small-scale) treatments determined to have No Effect to listed Snake River snails or their habitat: Manual methods (removal) in upland areas; biological controls (upland areas, all methods, riparian areas, (domestic goats or sheep), herbicide treatments (upland areas, spot treatments).	No direct or indirect effects identified. Treatment methods would not be used in RCAs which would avoid impacts to water quality or hydric vegetation within occupied RCAs.	Potential for cumulative effects to water quality or hydric vegetation from similar on-going and future treatments, or a lack of treatments, on State and/or private land. Measures to reduce potential effects to listed Snake River snails may or may not be applied on State or private land.	Apply the design features, conservation measures, prevention measures, herbicide application criteria, and SOPs for Special Status Species to all treatments (BA Chapter 2; Appendix B, C, D, and E).	NE- Short and long-term	These treatment methods have no potential for direct or indirect effects to listed Snake River snails or their habitat because they would not occur in occupied RCAs.
Larger-scale Treatments determined to have No Effect to listed Snake River snails or their habitat: Mechanical methods (removal) in upland or riparian areas (Box Canyon Springs or Briggs Creek),	No direct or indirect effects identified. Treatment methods would not be used in RCAs which would avoid impacts to water quality of hydric vegetation within the occupied RCAs.	Potential for cumulative effects to water quality or hydric vegetation from similar on-going and future treatments, or a lack of treatments, on State and/or private land. Measures to reduce	Apply the design features, conservation measures, prevention measures, herbicide application criteria, and SOPs for Special Status Species to all treatments (BA Chapter 2; Appendix B, C, D, and E).	NE- Short and long-term	These treatment methods would have no potential for direct or indirect effects to listed Snake River snails or their habitat because they would not occur in occupied RCAs.

Treatment Method	Potential Direct and Indirect Effects to Listed Snake River snails and Habitat	Potential Cumulative Effects	Conservation Measures for Avoiding or Reducing Adverse Effects	Effects Determination by Treatment Method	Rationale for the Effects Determination
prescribed fire (upland and riparian areas, ground-based herbicide treatments (outside of RCAs; high boom methods in lanx habitat), aerial herbicide treatments (uplands and riparian areas), re-vegetation treatments (seedings, seedling plantings) in upland areas, all methods; manual seedings and plantings in lanx habitat.		potential effects to listed Snake River snails may or may not be applied on State or private land.	Aerial herbicide treatments would be more than 0.5 mile from the Snake River.		
On-going treatments; small-scale (one plant to one acre), riparian Areas Treatments in RCAs using manual methods (removal), biological controls (pathogens), ground based (spot) herbicide treatments.	Potential for localized, short-term direct and indirect effects to water quality due to sediment from manual (removal) and re-vegetation treatments or to hydric vegetation from chemical exposure during spot herbicide treatments in occupied RCAs. Design features and conservation measures would reduce potential effects to insignificant and	Potential for cumulative effects to water quality or hydric vegetation from similar on-going and future treatments, or a lack of treatments, on State and/or private land. Measures to reduce potential effects to listed Snake River snails may or may not be applied on	Apply the design features, conservation measures, prevention measures, herbicide application criteria, and SOPs for Special Status Aquatic Species to all treatments (BA Chapter 2; Appendix B, C, D, and E).	NLAA – Short-term; BE – Long-term	On-going small-scale treatments would occur in occupied RCAs and therefore have the potential for localized, short-term direct and indirect effects to water quality due or hydric vegetation that are insignificant and discountable. Treatments would benefit listed Snake River snails and their habitat in the long-term by removing noxious

Treatment Method	Potential Direct and Indirect Effects to Listed Snake River snails and Habitat	Potential Cumulative Effects	Conservation Measures for Avoiding or Reducing Adverse Effects	Effects Determination by Treatment Method	Rationale for the Effects Determination
	discountable. Treatments would benefit listed Snake River snails and their habitat in the long-term by removing noxious weeds and invasive plants in occupied RCAs.	State or private land.			weeds and invasive plants in occupied RCAs.
Larger- scale treatments greater than one acre					
Mechanical Methods: Use of tractors with attachments to remove noxious weeds and invasive plants followed by seeding in upland vegetation types in and adjacent to the Snake River RCA	Potential for localized, short-term direct and indirect effects to water quality due to sediment from using mechanical methods in upland vegetation types in and adjacent to the Snake River RCA. Design features and conservation measures would reduce potential effects to insignificant and discountable. Treatments would benefit listed Snake River snails (Bliss Rapid snail and Snake River physa) in the	None identified.	Apply the design features, conservation measures, and prevention measures for Special Status Species to all treatments (BA Chapter 2; Appendix B). Mechanical methods would not be used in areas with hydric vegetation.	NLAA – Short-term and Long-term	Mechanical treatments would cause slight soil disturbance which could affect water quality in the Snake River until seeded upland vegetation becomes established. Potential effects would be insignificant and discountable. Treatments would benefit Bliss Rapid snail and Snake River physa and their habitat in the long-term term by reducing noxious weeds and invasive plants and restoring site-

Treatment Method	Potential Direct and Indirect Effects to Listed Snake River snails and Habitat	Potential Cumulative Effects	Conservation Measures for Avoiding or Reducing Adverse Effects	Effects Determination by Treatment Method	Rationale for the Effects Determination
	long-term by removing noxious weeds and invasive plants in and adjacent to the Snake River.				appropriate upland vegetation in and adjacent to the Snake River RCA.
Ground Based Herbicide Treatments: Including Adjuvants, Surfactants, Accidental spills, and Herbicide runoff	See Design Features and Conservation Measures for Aquatic Species (Chapter 2).				
Herbicide treatments in RCAs in upland vegetation types using upland herbicides (spot treatment, hand method only)	Potential for localized, short-term indirect effects to hydric vegetation in occupied RCAs due to herbicide drift. Design features and conservation measures would reduce potential effects to insignificant and discountable. Treatments would benefit listed Snake River snails and their habitat in the long-term by removing noxious weeds and invasive plants from occupied RCAs.	Potential for cumulative effects to water quality or hydric vegetation from similar on-going and future treatments, or a lack of treatments, on State and/or private land. Measures to reduce potential effects to listed Snake River snails may or may not be applied on State or private land.	Apply the design features, conservation measures, prevention measures, herbicide application criteria, and SOPs for Special Status Species to all treatments (BA Chapter 2; Appendix B, C, D, and E). Upland herbicides would not be broadcast sprayed in RCAs; No spraying of herbicides would occur within 15 feet of the water in Box Canyon and Briggs Creek to protect Banbury Springs lanx.	NLAA – Short-term BE-Long-term	Treatments using upland herbicides in occupied RCAs may have indirect effects to hydric vegetation due to herbicide drift that are insignificant and discountable. Treatments would benefit listed Snake River snails and their habitat in the long-term by removing noxious weeds and invasive plants from occupied RCAs.

Treatment Method	Potential Direct and Indirect Effects to Listed Snake River snails and Habitat	Potential Cumulative Effects	Conservation Measures for Avoiding or Reducing Adverse Effects	Effects Determination by Treatment Method	Rationale for the Effects Determination
Herbicide treatments in RCAs using high boom methods up to 100 feet of hydric vegetation with riparian herbicides	Potential for localized, short-term indirect effects to hydric vegetation or water quality due to herbicide drift. Design features and conservation measures would reduce the potential for effects to insignificant but may not be discountable. Treatments would benefit Bliss Rapids snail and Snake River Physa and their habitat in the long-term by removing noxious weeds and invasive plants in and adjacent to occupied RCAs.	Potential for cumulative effects to water quality or hydric vegetation from similar on-going and future treatments, or a lack of treatments, on State and/or private land. Measures to reduce potential effects to listed Snake River snails may or may not be applied on State or private land.	Apply the design features, conservation measures, herbicide application criteria, and SOPs for Special Status Species to all treatments (BA Chapter 2; Appendix B, C, D, and E). Herbicide treatments using high boom methods would not be used within 100 feet of hydric vegetation. Only aquatic approved herbicides would be used. Treatment method would not be used in lanx habitat.	NLAA – Short-term BE-Long-term	Design features and conservation measures would reduce the potential for direct and indirect effects to hydric vegetation and water quality to insignificant, but potential effects may not be discountable. Treatments would benefit Bliss Rapids snail and Snake River physa and their habitat in the long-term by removing noxious weeds and invasive plants in and adjacent to occupied RCAs.
Herbicide treatments in RCAs using low boom methods 100 to 50 feet of hydric vegetation using riparian herbicides	Potential for localized, short-term direct and indirect effects to hydric vegetation or water quality due to herbicide drift. Design features and conservation measures would reduce the potential for effects to insignificant but may not be discountable.	Potential for cumulative effects to water quality or hydric vegetation from similar on-going and future treatments, or a lack of treatments, on State and/or private land. Measures to reduce	Apply the design features, conservation measures, herbicide application criteria, and SOPs for Special Status Species to all treatments (BA Chapter 2; Appendix B, C, D, and E). Herbicide treatments using high boom methods would not be used within 50 feet of	NLAA – Short-term BE-Long-term	Design features and conservation measures would reduce the potential for direct and indirect effects to hydric vegetation and water quality to insignificant, but potential effects may not be discountable. Treatments would

Treatment Method	Potential Direct and Indirect Effects to Listed Snake River snails and Habitat	Potential Cumulative Effects	Conservation Measures for Avoiding or Reducing Adverse Effects	Effects Determination by Treatment Method	Rationale for the Effects Determination
	Treatments would benefit listed Snake River snails and their habitat in the long-term by removing noxious weeds and invasive plants from occupied RCAs.	potential effects to listed Snake River snails may or may not be applied on State or private land.	hydric vegetation. Only aquatic approved herbicides would be used.		benefit listed Snake River snails and their habitat in the long-term by removing noxious weeds and invasive plants from occupied RCAs.
Herbicide treatments in RCAs using hand methods (spot spray or direct application) 50 to 15 feet from occupied waters using riparian herbicides	Potential for localized, short-term direct and indirect effects to hydric vegetation or water quality in occupied RCAs due to accidental direct exposure or herbicide drift (indirect). Design features and conservation measures would reduce the potential for effects to insignificant but may not be discountable. Treatments would benefit listed Snake River snails and their habitat in the long-term by removing noxious weeds and invasive plants from occupied RCAs.	Potential for cumulative effects to water quality or hydric vegetation from similar on-going and future treatments, or a lack of treatments, on State and/or private land. Measures to reduce potential effects to listed Snake River snails may or may not be applied on State or private land.	Apply the design features, conservation measures, herbicide application criteria, and SOPs for Special Status Species to all treatments (BA Chapter 2; Appendix B, C, D, and E). Herbicides would not be broadcast sprayed within 50 feet of areas with hydric vegetation. Spot application may occur. Only aquatic approved herbicides would be used.	NLAA – Short-term BE-Long-term	Design features and conservation measures would reduce the potential for direct and indirect effects to hydric vegetation and water quality to insignificant, but all potential effects may not be discountable. Treatments would benefit listed Snake River snails and their habitat in the long-term by removing noxious weeds and invasive plants from occupied RCAs.

Treatment Method	Potential Direct and Indirect Effects to Listed Snake River snails and Habitat	Potential Cumulative Effects	Conservation Measures for Avoiding or Reducing Adverse Effects	Effects Determination by Treatment Method	Rationale for the Effects Determination
Herbicide treatments in RCAs using hand methods and riparian herbicides only (no adjuvants or surfactants).	Potential for localized, short-term direct and indirect effects to hydric vegetation or water due to accidental direct exposure. Design features and conservation measures would reduce potential effects to insignificant but may not be discountable. Treatments would benefit listed Snake River snails and their habitat in the long-term by removing noxious weeds and invasive plants from occupied RCAs.	Potential for cumulative effects to water quality or hydric vegetation from similar on-going and future treatments, or a lack of treatments, on State and/or private land. Measures to reduce potential effects to listed Snake River snails may or may not be applied on State or private land.	Apply the design features, conservation measures, herbicide application criteria, and SOPs for Special Status Species to all treatments (BA Chapter 2; Appendix B, C, D, and E). Box Canyon Springs or Briggs Creek: Direct application only (wicking, wiping dipping, painting, or injecting) within 15 feet of occupied waters; riparian herbicides only (no adjuvants or surfactants). Snake River: Spot spraying or direct application within 15 feet of occupied waters using riparian herbicides only (no adjuvants or surfactants).	NLAA – Short-term BE-Long-term	Design features would reduce the potential for direct and indirect effects to hydric vegetation and water quality to insignificant, but potential effects may not be discountable. Treatments would benefit listed Snake River snails and their habitat in the long-term by removing noxious weeds and invasive plants from occupied RCAs.
Re-vegetation Treatments: Seedings					
Ground Seedings; Manual Methods Riparian Areas	No short-term direct or indirect effects to water quality or hydric vegetation from seeding	None identified.	Apply the design features, conservation measures, herbicide application criteria, and SOPs for	NLAA– Short-term; BE – Long-term	Seeding hydric plants using manual methods are not ground disturbing and would

Treatment Method	Potential Direct and Indirect Effects to Listed Snake River snails and Habitat	Potential Cumulative Effects	Conservation Measures for Avoiding or Reducing Adverse Effects	Effects Determination by Treatment Method	Rationale for the Effects Determination
	hydric plants using manual methods. Seedings would restore native hydric vegetation and benefit Bliss Rapids snail and Snake River physa and their habitat in the long-term.		Special Status Species to all treatments (BA Chapter 2; Appendix B, C, D, and E). Treatment method would not be used in lanx habitat.		not have short-term direct or indirect effects to water quality or hydric vegetation. Seeding hydric species would restore native hydric vegetation and benefit Bliss Rapids snail and Snake River physa and their habitat in the long-term.
Re-Vegetation Treatments: Seedling Plantings					
Manual Methods; Riparian Areas	Potential for localized, short-term direct and indirect effects to water quality due to sediment from manual plantings in occupied RCAs. Design features and conservation measures would reduce potential effects to insignificant and discountable. Treatments would benefit Bliss Rapids snail and Snake River physa and their habitat in the long-term by restoring native hydric	None identified.	Apply the design features, conservation measures, herbicide application criteria, and SOPs for Special Status Species to all treatments (BA Chapter 2; Appendix B, C, D, and E). Treatment method would not be used in lanx habitat.	NLAA – Short-term; BE – Long-term	Design features and conservation measures would reduce potential effects to water quality due to sediment to insignificant and discountable. Treatments would benefit Bliss Rapids snail and Snake River physa and their habitat in the long-term by storing native hydric vegetation in occupied RCAs.

Treatment Method	Potential Direct and Indirect Effects to Listed Snake River snails and Habitat	Potential Cumulative Effects	Conservation Measures for Avoiding or Reducing Adverse Effects	Effects Determination by Treatment Method	Rationale for the Effects Determination
	vegetation in occupied RCAs.				
Summary of Effects:	Potential for localized, short-term direct or indirect effects to hydric vegetation or water quality due to sediment during manual treatments to remove noxious weeds and invasive plants or for planting hydric vegetation in occupied RCAs. Herbicide treatments in or adjacent to occupied RCAs have the potential for localized, short-term direct or indirect effects to hydric vegetation and water quality due to accidental direct exposure or herbicide drift. Removing noxious weeds and invasive plants in and adjacent to occupied RCAs and restoring hydric vegetation would have a	Potential for cumulative effects to water quality or hydric vegetation from similar on-going and future treatments, or a lack of treatments, on State and/or private land. Measures to reduce potential effects to listed Snake River snails may or may not be applied on State or private land.	Apply the design features, conservation measures, prevention measures, herbicide application criteria, and SOPs for Special Status Aquatic Species to all treatments (BA Chapter 2; Appendix B, C, D, and E).	Overall Determination: Noxious weed and invasive plant treatments *may affect, but are not likely to adversely affect* listed Snake River snails and their habitat in the short-term. Treatments that remove noxious weeds and invasive plants and restore native upland and hydric vegetation in and adjacent to occupied would have a *long-term beneficial effect* to listed Snake River snails and their habitat.	Design features and conservation measures would reduce the potential for direct or indirect effects to hydric vegetation and water quality to the extent possible but may not eliminate all short-term effects for some treatment methods. Herbicide treatments in or adjacent to listed Snake River snail habitat may result in localized, short-term direct or indirect effects to water quality or hydric vegetation that are insignificant but may not be discountable. Treatments to remove noxious weeds and invasive plants and restore native hydric vegetation in and

Treatment Method	Potential Direct and Indirect Effects to Listed Snake River snails and Habitat	Potential Cumulative Effects	Conservation Measures for Avoiding or Reducing Adverse Effects	Effects Determination by Treatment Method	Rationale for the Effects Determination
	beneficial effect to listed Snake River snails and their habitat in the long-term.				adjacent to occupied RCAs would benefit listed Snake River snails and their habitat in the long-term.

Table M-4 - Yellow-billed Cuckoo (*Coccycus americanus occidentalis*) and Yellow-billed Cuckoo Proposed Critical Habitat: Summary of Effects and Determinations for Noxious Weed and Invasive Plant Treatments

Treatment Method	Potential Direct and Indirect Effects to Yellow-billed Cuckoo and Proposed Critical Habitat	Potential Cumulative Effects	Conservation Measures for Avoiding or Reducing Adverse Effects	Effects Determination by Treatment Method	Rationale for the Effects Determination
On-going Actions: Biological-Goats (Upland, Riparian) **Larger-Scale Vegetation Treatments:** Mechanical (riparian) Prescribed Fire (upland, riparian) Broadcast Herbicide (upland, riparian) Re-vegetation Treatments (upland and riparian)	No direct or indirect effects identified.	Potential for cumulative effects from similar treatments and/or other actions on State and/or private land. Measures to reduce potential effects to yellow-billed cuckoo and habitat may or may not be applied on State and/or private land.	Apply the design features, conservation measures, prevention measures, herbicide application criteria, and SOPs for Special Status Species to all treatments (BA Chapter 2; Appendix B, C, D and E).	NE – Short-term and Long-term	Treatments would not be applied within or adjacent to areas containing yellow-billed cuckoo or their habitat. This would avoid any potential direct or indirect effects to yellow-billed cuckoo and their habitat in the short and long-term. No effects have been identified.
Manual Methods (upland, riparian)	Manual noxious weed and invasive plant control immediately adjacent to potentially suitable yellow-billed cuckoo habitat could result in short-term direct effects to yellow-	Potential for cumulative effects from similar treatments and/or other actions on State and/or private land.	Apply the design features, conservation measures and prevention measures for Special Status Species to all treatments (BA Chapter 2; Appendix B, C, D and E).	LAA – Short-term; BE -Long-term	Conducting manual treatments within yellow-billed cuckoo suitable or occupied habitat could result in adverse impacts to yellow-billed cuckoo. The presence of humans

Treatment Method	Potential Direct and Indirect Effects to Yellow-billed Cuckoo and Proposed Critical Habitat	Potential Cumulative Effects	Conservation Measures for Avoiding or Reducing Adverse Effects	Effects Determination by Treatment Method	Rationale for the Effects Determination
	billed cuckoo by disrupting courtship, breeding, nesting or brood-rearing activities. Design features, conservation measures, site specific mitigations, protective buffers would be applied in an effort to reduce potential short-term direct and indirect adverse effects. These manual treatments would benefit yellow-billed cuckoo and proposed critical habitat in the long-term.	Measures to reduce potential effects to yellow-billed cuckoo and its habitat may or may not be applied on State and/or private land.	Treatments using manual methods would not occur May 1 to August 31 in occupied, proposed critical, or unsurveyed suitable habitats. If treatments using manual methods prior to May 1 or after August 31 would not result in desired outcomes, coordinate with the local biologist to determine measures that would minimize disturbance to potentially nesting birds.		while conducting weed inventory or manual noxious weed control could disturb and disrupt activities such as pair-bonding, breeding, nesting or feeding by yellow-billed cuckoo. Prolonged human presence in the vicinity of active nests could cause nest abandonment resulting in reduced reproductive success. Treatments that remove noxious and invasive plants from yellow-billed cuckoo occupied and suitable habitat would have a beneficial effect to yellow-billed cuckoo and its habitat in the long-term by reducing the potential for noxious and invasive plants to outcompete native vegetation that is essential to maintaining functional riparian areas

Treatment Method	Potential Direct and Indirect Effects to Yellow-billed Cuckoo and Proposed Critical Habitat	Potential Cumulative Effects	Conservation Measures for Avoiding or Reducing Adverse Effects	Effects Determination by Treatment Method	Rationale for the Effects Determination
					and suitable yellow-billed cuckoo habitat.
Mechanical Methods (Mowing) (Upland)	Mechanical mowing treatments to suppress the spread of noxious weeds in uplands adjacent to suitable yellow-billed cuckoo habitat would cause a short-term, localized reduction in abundance and availability of prey for yellow-billed cuckoo. In addition, the increase in noise levels from use of mechanical equipment adjacent to occupied or suitable yellow-billed cuckoo nesting habitat could result in temporary alteration of yellow-billed cuckoo breeding or nesting activities. Design features, conservation measures, site specific mitigations, protective buffers would be applied in an effort to	Potential for cumulative effects from similar treatments and/or other actions on State and/or private land. Measures to reduce potential effects to yellow-billed cuckoo and its habitat may or may not be applied on State and/or private land.	Apply the design features, conservation measures and prevention measures for Special Status Species to all treatments (BA Chapter 2; Appendix B, C, D and E). Mechanical treatments would not occur from May 1 to August 31 within 200 feet of occupied, proposed critical, or unsurveyed suitable yellow-billed cuckoo habitat.	LAA – Short-term; BE -Long-term	Mowing would shorten and reduce the amount of vegetation present. Habitat conditions for yellow-billed cuckoo prey would then be changed in the short-term. Potential prey of yellow-billed cuckoo could be killed during mowing operations in uplands; therefore, yellow-billed cuckoo prey abundance would be reduced in the short-term. The increase in noise levels from use of mechanical equipment adjacent to occupied or suitable yellow-billed cuckoo nesting habitat could result in temporary alteration of yellow-billed cuckoo

Treatment Method	Potential Direct and Indirect Effects to Yellow-billed Cuckoo and Proposed Critical Habitat	Potential Cumulative Effects	Conservation Measures for Avoiding or Reducing Adverse Effects	Effects Determination by Treatment Method	Rationale for the Effects Determination
	reduce potential short-term direct and indirect adverse effects. These mechanical treatments would benefit yellow-billed cuckoo and proposed critical habitat in the long-term.				breeding and nesting activities. Mechanical treatments that assist in the re-establishment of native plant communities within or adjacent to suitable yellow-billed cuckoo habitat would result in beneficial effects to yellow-billed cuckoo and their habitat in the long-term.
Biological Control: Insects; Nematodes; Mites; or Pathogens. (Upland, Riparian)	Potential for direct and indirect effects to yellow-billed cuckoo or their habitat from biological control treatments in riparian and upland areas to remove noxious weeds and invasive plants adjacent to and in occupied and potentially suitable yellow-billed cuckoo habitat. The presence of humans could result in potential disruption of courtship,	Potential for cumulative effects from on-going and future biological treatments to reduce or eliminate noxious weeds and invasive plants in occupied or suitable yellow-billed cuckoo habitat. Measures to reduce potential effects to yellow-billed	Apply the design features, conservation measures and prevention measures for Special Status Species to all treatments (BA Chapter 2; Appendix B, C, D and E). Treatments using biological controls would not occur May 1 to August 31 in occupied, proposed critical, or unsurveyed suitable habitats. If treatments using biological controls prior to May 1 or after August 31	LAA – Short-term; BE – Long-term	The presence of humans while conducting biological noxious weed control and post-release monitoring activities could result in short-term direct effects to yellow-billed cuckoo by disrupting courtship, breeding, nesting and brood-rearing activities by yellow-billed cuckoo. Prolonged human presence in the vicinity

Treatment Method	Potential Direct and Indirect Effects to Yellow-billed Cuckoo and Proposed Critical Habitat	Potential Cumulative Effects	Conservation Measures for Avoiding or Reducing Adverse Effects	Effects Determination by Treatment Method	Rationale for the Effects Determination
	breeding, nesting and brood-rearing activities by yellow-billed cuckoo. Prolonged human presence in the vicinity of active nests could cause nest abandonment resulting in reduced reproductive success. Design features, conservation measures, site specific mitigations, protective buffers would be applied in an effort to reduce potential short-term direct and indirect adverse effects. In the long-term, biological weed and invasive plant control treatments would benefit yellow-billed cuckoo and proposed critical habitat.	cuckoo and its habitat may or may not be applied on State and/or private land.	would not result in desired outcomes, coordinate with the local biologist to determine measures that would minimize disturbance to potentially nesting birds.		of active nests could cause nest abandonment resulting in reduced reproductive success. Treatments that remove noxious and invasive plants from yellow-billed cuckoo occupied and suitable habitat would have a beneficial effect to yellow-billed cuckoo and its habitat in the long-term by providing conditions for the natural re-establishment of the native plant community with its attendant suite of invertebrates and herpetofauna that comprise yellow-billed cuckoo prey.

Treatment Method	Potential Direct and Indirect Effects to Yellow-billed Cuckoo and Proposed Critical Habitat	Potential Cumulative Effects	Conservation Measures for Avoiding or Reducing Adverse Effects	Effects Determination by Treatment Method	Rationale for the Effects Determination
Spot Herbicide Treatments (Upland, Riparian)	Potential direct and indirect effects to yellow-billed cuckoo or their habitat from spot herbicide treatments in riparian and upland areas to remove noxious weeds and invasive plants immediately adjacent to occupied and potentially suitable yellow-billed cuckoo habitat. The presence of humans while conducting spot herbicide treatments could result in short-term direct effects to yellow-billed cuckoo by disrupting courtship, breeding, nesting and brood-rearing activities by yellow-billed cuckoo. Design features, conservation measures, site specific mitigations, protective buffers would be applied in an effort to reduce potential short-	Potential for cumulative effects from spot herbicide treatments to reduce or eliminate noxious weeds and invasive plants on State and/or private land in occupied or suitable yellow-billed cuckoo habitat. Measures to reduce potential effects in occupied or suitable yellow-billed cuckoo habitat may or may not be applied on State and/or private land.	Apply the design features, conservation measures, prevention measures, herbicide application criteria, and SOPs for Special Status Species to all treatments (BA Chapter 2; Appendix B, C, D and E). Spot herbicide treatments would not occur May 1 to August 31 in occupied, proposed critical, or unsurveyed suitable habitats. If spot herbicide treatments prior to May 1 or after August 31 would not result in desired outcomes, coordinate with the local biologist to determine measures that would minimize disturbance to potentially nesting birds. Ground-based broadcast application of herbicides would not occur from May 1 to August 31 within 200 feet of occupied, proposed critical, or unsurveyed	LAA – Short-term; BE – Long-term	Conducting spot herbicide treatments within yellow-billed cuckoo suitable or occupied habitat could result in adverse impacts to yellow-billed cuckoo. The presence of humans while conducting spot herbicide treatments near a yellow-billed cuckoo breeding or nesting area could disturb or disrupt activities such as breeding, nesting or feeding. Prolonged human presence in the vicinity of active nests could cause nest abandonment resulting in reduced reproductive success. Treatments that remove noxious and invasive plants from yellow-billed cuckoo occupied and suitable habitat would have a beneficial

Treatment Method	Potential Direct and Indirect Effects to Yellow-billed Cuckoo and Proposed Critical Habitat	Potential Cumulative Effects	Conservation Measures for Avoiding or Reducing Adverse Effects	Effects Determination by Treatment Method	Rationale for the Effects Determination
	term direct and indirect adverse effects. These spot herbicide treatments would benefit yellow-billed cuckoo and proposed critical habitat in the long-term by protecting and restoring desirable and/or native habitat immediately adjacent to occupied and potentially suitable yellow-billed cuckoo habitat.		suitable yellow-billed cuckoo habitat.		effect to yellow-billed cuckoo and its habitat in the long-term by creating conditions were native hydric vegetation with its attendant diverse assemblage of insects and herpetofauna can establish and reassert dominance in the riparian plant community.
Summary of Effects:	The combined potential for direct and indirect adverse effects from noxious and invasive plant treatments in occupied or suitable yellow-billed cuckoo habitat would be reduced to a degree by application of design features, conservation measures, site specific mitigations and protective buffers. Human disruption of yellow-billed cuckoo	Potential for cumulative effects from on-going and future use of manual, mechanical, biological or herbicide treatments to reduce or eliminate noxious weeds and invasive plants on State and/or private land in occupied or suitable yellow-	Apply the design features, conservation measures, prevention measures, herbicide application criteria, and SOPs for Special Status Species to all treatments (BA Chapter 2; Appendix B, C, D and E).	LAA – Short-term; BE-Long-term	Design features, BMPs, conservation measures, site specific mitigations and protective buffers would be applied to manual, mechanical, biological and spot herbicide treatments to remove noxious weeds and invasive plants and improve micro-site conditions for establishment of native plant species. These features are expected to reduce but not eliminate

Treatment Method	Potential Direct and Indirect Effects to Yellow-billed Cuckoo and Proposed Critical Habitat	Potential Cumulative Effects	Conservation Measures for Avoiding or Reducing Adverse Effects	Effects Determination by Treatment Method	Rationale for the Effects Determination
	courtship, breeding, nesting or foraging activities when performing manual, biological and spot herbicide treatment methods in occupied or suitable yellow-billed cuckoo habitat would result in short-term adverse effects. Mechanical treatment methods would combine human presence with elevated noises from mowing equipment resulting in short-term reductions in yellow-billed cuckoo nesting conditions. Manual, mechanical, biological and spot herbicide treatments would benefit yellow-billed cuckoo and proposed critical habitat in the long-term by protecting and restoring desirable and/or native habitat immediately adjacent to occupied and potentially	billed cuckoo habitat. Measures to reduce potential effects to yellow-billed cuckoo and suitable habitat may or may not be applied on State and/or private land when conducting these activities.			the potential for short-term adverse effects to yellow-billed cuckoo and their habitat. All treatments may result in unavoidable short-term impacts during the treatment but should result in long-term beneficial effects after treatment. Removing noxious weeds and invasive plants from riparian and upland areas in occupied or suitable yellow-billed cuckoo habitat would benefit yellow-billed cuckoo and their habitat in the long-term.

Treatment Method	Potential Direct and Indirect Effects to Yellow-billed Cuckoo and Proposed Critical Habitat	Potential Cumulative Effects	Conservation Measures for Avoiding or Reducing Adverse Effects	Effects Determination by Treatment Method	Rationale for the Effects Determination
	suitable yellow-billed cuckoo habitat.				

Table M-5 - Canada lynx (*Lynx canadensis*): Summary of Effects and Determinations for Noxious Weed and Invasive Plant Treatments

Treatment Method	Potential Direct and Indirect Effects to Canada lynx and Habitat	Potential Cumulative Effects	Conservation Measures for Avoiding or Reducing Adverse Effects	Effects Determination by Treatment Method	Rationale for the Effects Determination
Larger-Scale Vegetation Treatments: Mechanical (boreal, riparian, upland) Prescribed Fire (boreal, riparian, upland) Broadcast Herbicide (boreal, riparian, upland) Re-vegetation Treatments (upland and riparian)	No direct or indirect effects identified.	Potential for cumulative effects from similar treatments and/or other actions on State and/or private land. Measures to reduce potential effects to Canada lynx and habitat may or may not be applied on State and/or private land.	Apply the design features, conservation measures, prevention measures, herbicide application criteria, and SOPs for Special Status Species to all treatments (BA Chapter 2; Appendix B, C, D and E).	NE – Short-term and Long-term	Treatments would not be applied within or adjacent to areas containing Canada lynx or their habitat. This would avoid any potential direct or indirect effects to Canada lynx and their habitat in the short and long-term. No effects have been identified.

Treatment Method	Potential Direct and Indirect Effects to Canada lynx and Habitat	Potential Cumulative Effects	Conservation Measures for Avoiding or Reducing Adverse Effects	Effects Determination by Treatment Method	Rationale for the Effects Determination
Manual Methods (boreal, riparian, upland)	Manual noxious weed and invasive plant control within and immediately adjacent to potentially suitable Canada lynx habitat could result in short-term direct effects to Canada lynx by disrupting denning activities or altering habitat utilized by some Canada lynx prey species. Design features, conservation measures, site specific mitigations, protective buffers would be applied to reduce potential short-term direct and indirect adverse effects. These manual treatments would benefit Canada lynx and their habitat in the long-term by restoring habitat in the LAUs to a more productive and diverse condition.	Potential for cumulative effects from similar treatments and/or other actions on State and/or private land in LAUs. Measures to reduce potential effects to Canada lynx and its habitat may or may not be applied on State and/or private land in LAUs.	Apply the design features, conservation measures and prevention measures, for Special Status Species to all treatments (BA Chapter 2; Appendix B, C, D and E).	NLAA – Short-term; BE -Long-term	Conducting manual treatments within suitable Canada lynx habitat could result in short-term adverse impacts to Canada lynx. The presence of humans while conducting manual noxious weed control could disturb and disrupt Canada lynx hunting or denning activities. Potential prey of Canada lynx could be disturbed or killed during manual treatments causing a localized, short-term reduction of available prey for Canada lynx. The incidental, short-term nature of the human presence in suitable Canada lynx habitat while conducting manual weed control would render these effects insignificant and discountable. Manual methods that remove noxious and invasive plants within

Treatment Method	Potential Direct and Indirect Effects to Canada lynx and Habitat	Potential Cumulative Effects	Conservation Measures for Avoiding or Reducing Adverse Effects	Effects Determination by Treatment Method	Rationale for the Effects Determination
					and adjacent to potentially suitable lynx habitat would have a beneficial effect to Canada lynx and its habitat in the long-term by maintaining the native composition of the habitat and its attendant prey component in the Canada lynx LAUs.
Biological Control: Insects, nematodes, mites, or pathogens; Domestic Animals (i.e., goats or sheep) (boreal, riparian, upland)	Potential short-term direct and indirect adverse effects to boreal, riparian and upland habitat conditions from using insects, nematodes, mites, pathogens or domestic goats or sheep in Canada lynx LAUs. The presence of humans and/or goats or sheep in Canada lynx LAUs could result in potential disruption of denning or foraging activities by Canada lynx. Design features, conservation measures, site specific mitigations, protective	Potential for cumulative effects from on-going and future biological treatments to reduce or eliminate noxious weeds and invasive plants on State and/or private land in Canada lynx LAUs. Measures to reduce potential effects to Canada lynx and its habitat may or may not be applied on	Apply the design features, conservation measures and prevention measures for Special Status Species to all treatments (BA Chapter 2; Appendix B, C, D and E).	NLAA – Short-term; BE – Long-term	The presence of humans and/or goats or sheep while conducting biological noxious weed control and post-release monitoring activities could result in short-term direct effects to Canada lynx by disrupting denning and foraging activities. The limited area that would be directly affected while conducting biological control and effectiveness monitoring activities combined with heavy human presence in areas where goat or sheep use

Treatment Method	Potential Direct and Indirect Effects to Canada lynx and Habitat	Potential Cumulative Effects	Conservation Measures for Avoiding or Reducing Adverse Effects	Effects Determination by Treatment Method	Rationale for the Effects Determination
	buffers would be applied to reduce potential short-term direct and indirect adverse effects to insignificant or discountable levels. The use of biological control methods to reduce or eliminate noxious or invasive plants in boreal, riparian and upland areas in LAUs would benefit Canada lynx and their habitat in the long-term.	State and/or private land in LAUs.			would occur, results in biological control actions causing insignificant and discountable short-term effects to Canada lynx. Biological control treatments would have a long-term beneficial effect to Canada lynx and their habitat by removing noxious and invasive plants from boreal, riparian and upland vegetation communities in LAUs restoring the diversity and productivity of the habitat for Canada lynx and their prey.
Spot Herbicide Treatments: (boreal, riparian and upland)	Potential short-term direct and indirect adverse effects from spot herbicide treatments in boreal, riparian and upland habitats to remove noxious and invasive plants in Canada lynx LAUs. Spot herbicide treatment may result in	Potential for cumulative effects from on-going and future herbicide treatments to reduce or eliminate noxious weeds and invasive plants on State and/or private land in LAUs.	Apply the design features, prevention measures, herbicide application criteria, and SOPs for Special Status Species to all treatments (BA Chapter 2; Appendix B, C, D and E).	NLAA – Short-term; BE – Long-term	Conducting spot herbicide treatments in suitable habitat for Canada lynx could result in short-term direct and indirect impacts to Canada lynx within LAUs. The direct effects to Canada lynx from dermal exposure to vegetation

Treatment Method	Potential Direct and Indirect Effects to Canada lynx and Habitat	Potential Cumulative Effects	Conservation Measures for Avoiding or Reducing Adverse Effects	Effects Determination by Treatment Method	Rationale for the Effects Determination
	a slight short-term indirect effect to Canada lynx from reductions of avian and small mammals used by lynx as prey. Design features, conservation measures, site specific mitigations, protective buffers would be applied in an effort to reduce potential short-term direct and indirect adverse effects. These spot herbicide treatments would benefit Canada lynx and their habitat in the long-term.	Measures to reduce potential effects to Canada lynx and its habitat may or may not be applied on State and/or private land.			treated with herbicides is discountable due to the highly infrequent occurrence by lynx in the area and the low potential for contact with treated vegetation by lynx. Spot herbicide treatments could cause slight, short-term indirect effects to the avian and small mammal populations that comprise the prey base for Canada lynx, but the reduction is not expected to result in a measureable decrease in the health or fitness of Canada lynx. Although there is the potential for short-term localized adverse effects from spot herbicide treatments, these treatments would benefit Canada lynx and their habitat in the long-term by reducing the potential for noxious plants to invade and expand within boreal, riparian and upland

Treatment Method	Potential Direct and Indirect Effects to Canada lynx and Habitat	Potential Cumulative Effects	Conservation Measures for Avoiding or Reducing Adverse Effects	Effects Determination by Treatment Method	Rationale for the Effects Determination
					plant communities in Canada lynx LAUs.
Summary of Effects:	The combined potential for direct and indirect adverse effects from noxious and invasive plant treatments in watersheds containing boreal, riparian and upland habitat in Canada lynx LAUs would be reduced to a degree by application of design features, conservation measures, site specific mitigations and protective buffers. Lynx and the majority of their prey would likely abandon treatment areas when humans are present. Manual, biological and spot herbicide treatment methods would benefit Canada lynx in the long-term by protecting and restoring native habitat in Canada lynx LAUs.	Potential for cumulative effects from on-going and future use of manual, biological or herbicide treatments to reduce or eliminate noxious weeds and invasive plants on State and/or private land in LAUs. Measures to reduce potential effects to Canada lynx and suitable habitat may or may not be applied on State and/or private land when conducting these activities.	Apply the design features, prevention measures, herbicide application criteria, and SOPs for Special Status Species to all treatments (BA Chapter 2; Appendix B, C, D and E).	NLAA – Short-term; BE- Long-term	Design features, BMPs, conservation measures, site specific mitigations and protective buffers would be applied to manual, biological and spot herbicide treatments to remove noxious weeds and invasive plants improving conditions for establishment of native plant species. These features are expected to reduce but not eliminate the potential for short-term negative effects to Canada lynx and their habitat to insignificant or discountable levels. All treatments may result in unavoidable short-term impact during the treatment but result in long-term beneficial effects after treatment. Removing noxious weeds and invasive plants from

Treatment Method	Potential Direct and Indirect Effects to Canada lynx and Habitat	Potential Cumulative Effects	Conservation Measures for Avoiding or Reducing Adverse Effects	Effects Determination by Treatment Method	Rationale for the Effects Determination
					boreal, riparian and upland areas utilized by Canada lynx in the LAUs would benefit Canada lynx and their habitat in the long-term.

Table M-6 - North American Wolverine (*Gulo gulo luscus*): Summary of Effects and Determinations for Noxious Weed and Invasive Plant Treatments

Treatment Method	Potential Direct and Indirect Effects to Wolverine and Habitat	Potential Cumulative Effects	Conservation Measures for Avoiding or Reducing Adverse Effects	Effects Determination by Treatment Method	Rationale for the Effects Determination
Larger-Scale Vegetation Treatments: Mechanical (boreal, riparian, upland) Prescribed Fire (boreal, riparian, upland) Broadcast Herbicide (boreal, riparian, upland) Re-vegetation treatments (upland, riparian, boreal)	No direct or indirect effects identified.	Potential for cumulative effects from similar treatments and/or other actions on State and/or private land. Measures to reduce potential effects to wolverine and its habitat may or may not be applied on State and/or private land.	Apply the design features, conservation measures, prevention measures, herbicide application criteria, and SOPs for Special Status Species to all treatments (BA Chapter 2; Appendix B, C, D and E).	NE – Short-term and Long-term	Treatments would not be applied within or adjacent to areas containing wolverine or their habitat. This would avoid any potential direct or indirect effects to wolverine and their habitat in the short and long-term. No effects have been identified.
Manual Methods (boreal, riparian, upland)	Manual noxious weed and invasive plant control within and immediately adjacent to potentially suitable habitat could result in short-term direct effects to wolverine by disrupting denning or raising of kits. Design features, conservation measures, site specific mitigations, protective buffers would be	Potential for cumulative effects from on-going and future manual treatments to reduce or eliminate noxious weeds and invasive plants on State and private land in suitable wolverine habitat in TFD.	Apply the design features, conservation measures and prevention measures for Special Status Species to all treatments (BA Chapter 2; Appendix B, C, D and E).	NLAA – Short-term; BE -Long-term	Conducting manual treatments within wolverine suitable habitat could result in slight short-term adverse impacts to wolverine. The presence of humans while conducting manual noxious weed control could disturb and disrupt activities such as rearing young or foraging by wolverine.

Treatment Method	Potential Direct and Indirect Effects to Wolverine and Habitat	Potential Cumulative Effects	Conservation Measures for Avoiding or Reducing Adverse Effects	Effects Determination by Treatment Method	Rationale for the Effects Determination
	applied to reduce potential short-term direct and indirect adverse effects. These manual treatments would benefit wolverine and their habitat in the long-term.	Measures to reduce potential effects to wolverine and its habitat may or may not be applied on State and/or private land located in suitable wolverine habitat in the TFD.			The large home range of wolverine combined with its remote location results in manual treatments causing insignificant and discountable impacts to wolverine. Manual methods in boreal, riparian and upland habitats would remove invasive plants from watersheds containing wolverine or their habitat resulting in a long-term benefit by maintaining the native composition of the habitat and its attendant prey component.
Biological Control: Insects, nematodes, mites, or pathogens; Domestic Animals (i.e., goats/sheep) (boreal, riparian, upland)	Biological control treatments using insects, nematodes, mites, pathogens or domestic goats or sheep to suppress the spread of noxious weeds in boreal, riparian and upland plant communities in suitable wolverine habitat would cause a short-term	Potential for cumulative effects from on-going and future biological treatments to reduce or eliminate noxious weeds and invasive plants on State and/or private land in suitable wolverine habitat in TFD.	Apply the design features, conservation measures and prevention measures for Special Status Species to all treatments (BA Chapter 2; Appendix B, C, D and E).	NLAA – Short-term; BE – Long-term	The presence of humans and/or goats or sheep while conducting biological noxious weed control and post-release monitoring activities could result in short-term direct effects to wolverine by disrupting the rearing of kits and foraging activities by wolverine. The small

Treatment Method	Potential Direct and Indirect Effects to Wolverine and Habitat	Potential Cumulative Effects	Conservation Measures for Avoiding or Reducing Adverse Effects	Effects Determination by Treatment Method	Rationale for the Effects Determination
	localized reduction in suitable habitat for wolverine prey. The presence of humans and/or goats or sheep could result in potential disruption of denning or foraging activities by wolverine. Design features, conservation measures, site specific mitigations, protective buffers would be applied in an effort to reduce potential short-term direct and indirect adverse effects. The use of biological control methods would benefit wolverine and their habitat in the long-term.	Measures to reduce potential effects to wolverine and its habitat may or may not be applied on the State or private land located in suitable wolverine habitat in the TFD.			area that would be affected while conducting biological control activities combined with the very low probability of encountering a wolverine while performing the control activities in boreal, riparian and upland habitat would result in the action causing insignificant and discountable short-term effects to wolverine. Biological control treatments would have a long-term beneficial effect to wolverine and their habitat by reducing competition from noxious and invasive plants resulting in an increase in food and cover for wolverine prey.
Spot Herbicide Treatments: (boreal, riparian, upland)	Potential short-term direct and indirect adverse effects to wolverine or their	Potential for cumulative effects from similar treatments and/or	Apply the design features, conservation measures, prevention measures, herbicide application	NLAA – Short-term; BE – Long-term	Conducting spot herbicide treatments within wolverine suitable habitat could

Treatment Method	Potential Direct and Indirect Effects to Wolverine and Habitat	Potential Cumulative Effects	Conservation Measures for Avoiding or Reducing Adverse Effects	Effects Determination by Treatment Method	Rationale for the Effects Determination
	habitat from spot herbicide treatments in boreal, riparian and upland habitats to remove noxious and invasive plants in suitable wolverine habitat. Spot herbicide treatment may result in a slight short-term direct and indirect effect to wolverine from dermal contact with treated vegetation or ingestion of recently treated prey. Design features, conservation measures, site specific mitigations, protective buffers would be applied in an effort to reduce potential short-term direct and indirect adverse effects. These spot herbicide treatments would benefit wolverine and their habitat in the long-term.	other actions on State and/or private land. Measures to reduce potential effects to wolverine and its habitat may or may not be applied on State and/or private land located in suitable wolverine habitat in the TFD.	criteria, and SOPs for Special Status Species to all treatments (BA Chapter 2; Appendix B, C, D and E).		result in short-term localized adverse direct and indirect impacts to wolverine. The wide ranging habits and dispersal activities of wolverine results in the possible use and exposure by wolverine to spot herbicide treatment areas. The use of design features, BMPs, conservation measures, site specific mitigations, and protective buffers specific to chemical applications would reduce potential effects to wolverine and their habitat to insignificant or discountable levels in the short-term. Treatments that remove noxious and invasive plants from wolverine habitat would have a beneficial effect to wolverine and its habitat in the long-term by creating conditions where native plant

Treatment Method	Potential Direct and Indirect Effects to Wolverine and Habitat	Potential Cumulative Effects	Conservation Measures for Avoiding or Reducing Adverse Effects	Effects Determination by Treatment Method	Rationale for the Effects Determination
					species can provide suitable diverse habitat conditions for wolverine prey.
Summary of Effects:	The combined potential for direct and indirect adverse effects from noxious and invasive plant treatments in watersheds containing boreal, riparian and upland habitat used by wolverine would be reduced by application of design features, conservation measures, site specific mitigations and protective buffers. Wolverine and the majority of their prey would likely disperse away from treatment areas when humans are present. The manual, biological and spot herbicide treatment methods in suitable wolverine habitat would be applied in a limited, infrequent, widely dispersed manner. Slight, short-term	Potential for cumulative effects from on-going and future use of manual, biological or herbicide treatment methods to reduce or eliminate noxious weeds and invasive plants on State and/or private land in suitable wolverine habitat in the TFD. Measures to reduce potential effects to wolverine and suitable habitat may or may not be applied on State and/or private land when conducting these activities.	Apply the design features, conservation measures, prevention measures, herbicide application criteria, and SOPs for Special Status Species to all treatments (BA Chapter 2; Appendix B, C, D and E).	NLAA – Short-term; BE- Long-term	Design features, BMPs, conservation measures, site specific mitigations and protective buffers would be applied to manual, biological and spot herbicide treatments to remove noxious weeds and invasive plants providing environmental conditions that are conducive to the establishment of native plant species and vegetation communities. These features are expected to reduce but not eliminate the potential for short-term negative effects to wolverine and their habitat to insignificant or discountable levels. All treatments may result in unavoidable short-term impact

Treatment Method	Potential Direct and Indirect Effects to Wolverine and Habitat	Potential Cumulative Effects	Conservation Measures for Avoiding or Reducing Adverse Effects	Effects Determination by Treatment Method	Rationale for the Effects Determination
	reductions in wolverine prey as a result of manual, biological or spot herbicide treatments are not expected to result in a measureable reduction in the health or fitness of wolverine.				during the treatment but result in long-term beneficial effects after treatment. Removing noxious weeds and invasive plants from boreal, riparian and upland habitat areas utilized by wolverine would benefit wolverine and their habitat in the long-term.

Table M-7 - (Slickspot peppergrass) (*Lepidium papilliferum*): Summary of Effects and Determinations for Noxious Weed and Invasive Plant Treatments

Treatment Method	Potential Direct and Indirect Effects to Slickspot Peppergrass	Potential Cumulative Effects	Conservation Measures for Avoiding or Reducing Adverse Effects (separate Appendix)	Effects Determination for Treatment Method	Rationale for the Effects Determination
Manual Methods (On-going treatments)	Potential for small-scale direct and indirect effects from on-going manual treatments that could dislodge plants or seeds or foot traffic resulting in slight soil surface disturbance. Treatments would result in beneficial effects by reducing noxious weeds and invasive plants that compete with slickspot peppergrass and native vegetation.	Non-federal lands are less likely than federal to be treated for noxious weed and invasive plant control and restoration, or could be treated without the protective measures included in the proposed action. Non-federal lands could be seed sources for noxious weeds and invasive plants that could spread to adjacent federal lands, increasing the need for on-going treatments.	Use of full-size vehicles for treatment site access and equipment staging is limited to existing roads.	NLAA – Short-term; BE – Long-term	Adverse effects would be insignificant and discountable due to small treatment scale, focus on target vegetation, and avoidance of slickspots and slickspot peppergrass plants. Beneficial effects would result from reduced competition from noxious weeds and invasive plants and improved habitat for slickspot peppergrass and other native plants that support pollinator insects.
Mechanical Methods (Larger-scale treatments)	Mechanical methods that result in deep soil surface disturbance could bury seed too deep for germination,	Non-federal lands are less likely than federal to be treated for noxious weed and invasive plant	These treatments would only be used in non-habitat or where the potential for slickspot peppergrass is low. Conservation measures	LAA – Short- and long-term BE – Long-term	While adverse effects are likely, these treatments would be used in habitat identified as having no

Treatment Method	**Potential Direct and Indirect Effects to Slickspot Peppergrass**	**Potential Cumulative Effects**	**Conservation Measures for Avoiding or Reducing Adverse Effects (separate Appendix)**	**Effects Determination for Treatment Method**	**Rationale for the Effects Determination**
Deep soil surface disturbance (tilling, disk plowing, seeding with traditional rangeland drill)	kill plants, and modify slickspot structure, resulting in long-term adverse effects to undetected plants and slickspots. Treatments would indirectly benefit slickspot peppergrass through removal of noxious weed and invasive plant seed sources that could spread to occupied habitat dominated by native vegetation, proposed critical habitat, or potential habitats with medium or high potential for slickspot peppergrass to occur. Restoration of greater vegetation diversity, especially forbs, could result in beneficial indirect effects for slickspot peppergrass through support of pollinator insects. Treatments would also reduce fine fuels in and	control and restoration. These areas could be seed sources for noxious weeds and invasive plants that could spread to adjacent federal lands, increasing the need for larger-scale treatments.	direct use of seeding techniques that minimize soil disturbance such as minimum-till drills and rangeland drills equipped with depth bands. No more than 10 percent of occupied habitat would be treated until treatment effectiveness and impacts to slickspot peppergrass habitat have been determined through monitoring.		or low potential for slickspot peppergrass to occur and would be one of a suite of treatments used for noxious weed and invasive plant control and vegetation restoration. This could result in long-term beneficial effects to intact native or better condition habitats that are occupied by slickspot peppergrass or have the potential for it to occur.

Treatment Method	Potential Direct and Indirect Effects to Slickspot Peppergrass	Potential Cumulative Effects	Conservation Measures for Avoiding or Reducing Adverse Effects (separate Appendix)	Effects Determination for Treatment Method	Rationale for the Effects Determination
	around slickspot peppergrass habitats and the potential for wildfire impacts.				
Mechanical Methods (Larger-scale) Little to no soil surface disturbance (minimum till or no-till drill, rangeland drill with depth bands, harrow, Dixie harrow, Lawson aerator, chaining, mowing)	Treatments could result in small-scale disturbance or burial of plants or seeds by soil, plant debris, or dust but would not likely result in seeds buried too deep for germination. Treatments using lighter weight implements during dry conditions would have the least adverse effect. Treatments would also have the least effect in fall when flowering plants are not present.	Non-federal lands are less likely than federal to be treated for noxious weed and invasive plant control and restoration. These areas could be seed sources for noxious weeds and invasive plants that could spread to adjacent federal lands, increasing the need for larger-scale treatments.	Conservation measures direct use of seeding techniques that minimize soil disturbance such as minimum-till drills and rangeland drills equipped with depth bands. No more than 10 percent of occupied habitat would be treated until treatment effectiveness and impacts to slickspot peppergrass habitat have been determined through monitoring.	LAA – Short-term BE – Long-term	These methods could result in some short-term loss of plants or seeds, but would not cause large-scale or long-term population suppression or habitat loss. Long-term beneficial effects would result from establishment of desirable vegetation.
Prescribed Fire	Prescribed fire would remove above-ground biomass and seeds could be damaged by heat. Impacts of fire line construction would be the same as for mechanical disking	Non-federal lands are less likely than federal to be treated for noxious weed and invasive plant control and restoration. These areas could be seed	Prescribed fire would only be used in non-habitat or where the potential for slickspot peppergrass is low. Prescribed fire will only be used in slickspot peppergrass habitat as a tool for assisting with species	LAA – Short-term BE – Long-term	Prescribed fire could result in damage to plants and seeds and disturbance to slickspot microsites from fire line construction. Habitats restored by prescribed fire in concert with

Treatment Method	Potential Direct and Indirect Effects to Slickspot Peppergrass	Potential Cumulative Effects	Conservation Measures for Avoiding or Reducing Adverse Effects (separate Appendix)	Effects Determination for Treatment Method	Rationale for the Effects Determination
	treatments. Prescribed fire could result in a flush of invasive annuals; however, this is expected to be offset by follow-up treatments and discountable. Prescribed fire could result in deposition of ash or dust in slickspots. This would not be uniform over the entire population area and would be insignificant.	sources for noxious weeds and invasive plants that could spread to adjacent federal lands, increasing the need for larger-scale treatments.	conservation, such as to remove cheatgrass litter prior to herbicide application or to clear fence lines of accumulated windblown weeds.		other treatments would be available for future recruitment of the species.
Biological Control	Biological controls could attack non-target vegetation, including slickspot peppergrass or forbs that are important to pollinator insects. These impacts would be discountable due to regulatory mechanisms and conservation measures. Effects to pollinators would be insignificant, as it unlikely that all target or non-target vegetation that support pollinator species would be	Non-federal lands are less likely than federal to be treated for noxious weed and invasive plant control and restoration. These areas could be seed sources for noxious weeds and invasive plants that could spread to adjacent federal lands, increasing the need for continued on-going treatments.	Conservation measures require consideration of risk to slickspot peppergrass prior to use of biological control agents that target plants in the mustard family. Use of goats or sheep for noxious weed or invasive plant control in slickspot peppergrass occupied habitat will not occur.	NLAA – Short- and long-term BE – Long-term	Regulatory mechanisms and conservation measures would make potential adverse impacts discountable. Indirect impacts resulting from treatment of target or non-target plants that support slickspot peppergrass pollinators would be insignificant. Biological controls could result in beneficial effects due to reduced competition to slickspot peppergrass.

Treatment Method	Potential Direct and Indirect Effects to Slickspot Peppergrass	Potential Cumulative Effects	Conservation Measures for Avoiding or Reducing Adverse Effects (separate Appendix)	Effects Determination for Treatment Method	Rationale for the Effects Determination
	affected. Impacts due to use of goats or sheep in unsurveyed potential habitat would be discountable, as this method of control would not be used in these habitats.				
Herbicide Treatments On-going Spot	Damage or death of slickspot peppergrass plants could occur due to accidental direct spray or drift. Control or containment of noxious weeds and invasive plants due to on-going spot treatments in and adjacent to occupied and potential habitats would reduce competition to slickspot peppergrass and other native vegetation, including plants that support pollinator species. Spot treatments could also reduce the density of noxious weeds and/or invasive plants in slickspot microsites and the	Non-federal lands are less likely than federal to be treated for noxious weed and invasive plant control and restoration. These areas could be seed sources for noxious weeds and invasive plants that could spread to adjacent federal lands, increasing the need for continued on-going treatments. Herbicides used on non-federal lands might not be limited to the 20 active ingredients contained in the proposed action. In	Conservation measures include education of weed treatment personnel regarding slickspot peppergrass identification and methods that avoid drift.	NLAA – Short-term BE – Short- and long-term	Conservation measures, in combination with SOP and small treatment scale, are expected to make the potential for accidental direct spray or drift discountable. Reduced competition to slickspot peppergrass and other native plants, including those that support pollinator species, from noxious weeds and invasive plants would result in short- and long-term beneficial effects to slickspot peppergrass.

Treatment Method	Potential Direct and Indirect Effects to Slickspot Peppergrass	Potential Cumulative Effects	Conservation Measures for Avoiding or Reducing Adverse Effects (separate Appendix)	Effects Determination for Treatment Method	Rationale for the Effects Determination
	potential for sediment entrapment that could modify slickspot structure.	addition, design features, conservation meausres, and other use constraints contained in the proposed action may not be part of treatments applied to non-federal lands. Therefore, damage or destruction of slickspots, plants, or seedbanks could occur as a result of these actions.			
Herbicide Treatments Larger-scale Broadcast	Larger-scale herbicide treatments could result in damage or death to plants and seed banks. Implementation of conservation measures, herbicide application criteria (Appendix D) and SOP (Appendix E), including temporal and spatial adjustments, could result in short-term adverse, but long-term beneficial effects.	Non-federal lands are less likely than federal to be treated for noxious weed and invasive plant control and restoration. These areas could be seed sources for noxious weeds and invasive plants that could spread to adjacent federal lands, increasing the need	Larger-scale herbicide treatments would be used primarily in areas dominated by noxious weeds and invasive plants in non-habitat or where the potential for slickspot peppergrass to occur is low. Conservation measures, including no-treatment buffers (Table 4), would be applied to larger-scale projects adjacent to occupied	LAA – Short-term BE – Long-term	Effects from larger-scale herbicide treatments would occur in areas of non-habitat, areas where the potential for slickspot peppergrass to occur is low, or for EOs C-ranked or lower. Projects would be designed to minimize or eliminate adverse effects to plants, seed banks, and habitats.

Treatment Method	Potential Direct and Indirect Effects to Slickspot Peppergrass	Potential Cumulative Effects	Conservation Measures for Avoiding or Reducing Adverse Effects (separate Appendix)	Effects Determination for Treatment Method	Rationale for the Effects Determination
	These beneficial effects would include reduced competition to slickspot peppergrass and other native plants from noxious weeds and invasive plants. Control or elimination of invasive plants that create fine fuels in and around slickspot peppergrass habitats would reduce the potential for wildfire ignition and spread and habitat degradation that could occur post-fire.	for larger-scale treatments. Herbicides used on non-federal lands might not be limited to the 20 active ingredients contained in the pProposed action. In addition, design features, conservation meausres, and other use constraints contained in the proposed action may not be part of treatments applied to non-federal lands. Therefore, damage or destruction of slickspots, plants, or seedbanks could occur as a result of these actions.	or unsurveyed potential habitat if adverse effects to slickspot peppergrass from herbicide use are anticipated. Treatments could occur in EOs ranked C or lower if treatments would result in a long-term beneficial effect.		Existing populations would benefit from improvement of supporting and adjacent habitats. Reduction of noxious weeds and invasive plants both within and adjacent to populations would reduce threats to slickspot peppergrass. Restoration of unoccupied potential habitat would improve the potential for population recruitment.
Re-vegetation Aerial Seeding	Aerial seeding of sagebrush and small-seeded grasses and forbs would not impact slickspot peppergrass	Non-federal lands are less likely than federal to be treated for noxious weed and invasive plant	Conservation measures direct the use of plant materials that would not compete with slickspot peppergrass, with emphasis	NLAA – Short-term BE – Long-term	Aerial seeding of shrubs, grasses, and forbs would not result in soil surface disturbance and would beneficially

Treatment Method	Potential Direct and Indirect Effects to Slickspot Peppergrass	Potential Cumulative Effects	Conservation Measures for Avoiding or Reducing Adverse Effects (separate Appendix)	Effects Determination for Treatment Method	Rationale for the Effects Determination
	and slickspots due to lack of soil surface disturbance. This treatment would have the beneficial effect of improving plant community structure and increasing species diversity and resilience to disturbance.	control and restoration. This increases the potential for dominance by noxious weeds, invasive plants, or other species that compete with slickspot peppergrass, making treatments on public lands more important for species conservation.	on native species and forbs that benefit pollinators.		affect slickspot peppergrass in the long-term.
Re-vegetation Hand Planting	Hand planting would result in small scale disturbance from trampling or crushing plants by planting crews or dislodging seeds or plants during digging activities. However, slickspots are easily detected and can be avoided during planting projects. Re-establishment of shrubs and other native	Non-federal lands are less likely than federal to be treated for noxious weed and invasive plant control and restoration. This increases the potential for dominance by noxious weeds, invasive plants, or other species that compete with slickspot	Conservation measures direct the use of plant materials that would not compete with slickspot peppergrass, with emphasis on native species and forbs that benefit pollinators. Use of full-size vehicles for site access and equipment staging is limited to existing roads in slickspot peppergrass habitats.	NLAA – Short-term BE – Long-term	Hand planting may affect, but is not likely to adversely affect, slickspot peppergrass due to the small scale of disturbance, ease of avoiding slickspots by project personnel, and vehicle restrictions. Slickspot peppergrass and its pollinators would benefit from re-establishment of native vegetation.

Treatment Method	Potential Direct and Indirect Effects to Slickspot Peppergrass	Potential Cumulative Effects	Conservation Measures for Avoiding or Reducing Adverse Effects (separate Appendix)	Effects Determination for Treatment Method	Rationale for the Effects Determination
	vegetation would enhance plant community structure and diversity. Sagebrush re-establishment may reduce available habitat for Owyhee harvester ants and the potential for slickspot peppergrass fruit and seed predation by that species.	peppergrass, making treatments on public lands more important for species conservation.			
Re-vegetation Mechanical Shrub Planting	Mechanical shrub planting could result in damage or death to plants or due to crushing or scalping and digging activities. This could result in long-term disturbance to slickspot structure and seedbanks if seed is buried too deep for germination. Mechanical methods could have larger-scale beneficial impacts due to shrub establishment as compared to hand planting.	Non-federal lands are less likely than federal to be treated for noxious weed and invasive plant control and restoration. This increases the potential for dominance by noxious weeds, invasive plants, or other species that compete with slickspot peppergrass, making treatments on public lands more important for	Conservation measures discourage the use of methods that result in deep soil surface disturbance. Mechanical shrub planting would typically be used in areas previously treated to control noxious weeds and invasive plants and re-establish perennial vegetation (non-habitat or habitat with low potential for slickspot peppergrass to occur). This method could also be used in previously burned areas dominated by native and/or non-native perennial grasses where grass density is so high that	LAA – Short-term BE – Long-term	Rows are about 12 inches wide and spaced 15 to 30 feet apart, leaving undisturbed areas between rows. Mechanical planting covers larger areas in shorter time periods than hand planting and scalping eliminates competing vegetation that could impede shrub establishment. Mechanical shrub plantings would help restore previously burned and seeded habitats and would result in long-term

Treatment Method	Potential Direct and Indirect Effects to Slickspot Peppergrass	Potential Cumulative Effects	Conservation Measures for Avoiding or Reducing Adverse Effects (separate Appendix)	Effects Determination for Treatment Method	Rationale for the Effects Determination
		species conservation.	scalping is necessary to reduce competition to planted seedlings (non-habitat or habitat with low or medium potential for slickspot peppergrass to occur).		benefits to slickspot peppergrass.
Re-vegetation Ground Seeding – See Mechanical Treatments					
Re-vegetation Seed Mixes	Seed mixes would establish a more native plant community structure (compared to communities dominated by noxious weeds and invasive plants) and would reduce or eliminate noxious weeds and invasive plants that compete with slickspot peppergrass. Increased forb diversity would benefit pollinator insects. Re-establishment of sagebrush in occupied habitats could decrease the potential for	Non-federal lands are less likely than federal to be treated for noxious weed and invasive plant control and restoration with native vegetation. This increases the potential for dominance by noxious weeds, invasive plants, or other species that compete with slickspot peppergrass, making treatments on public lands	Conservation measures direct the use of plant materials that would not compete with slickspot peppergrass, with emphasis on native species and forbs that benefit pollinators.	NLAA – Short-term BE – Long-term	Implementation of conservation measures would reduce or eliminate the potential for adverse effects. Establishment of diverse vegetation communities would result in long-term beneficial effects to slickspot peppergrass and its pollinators.

Treatment Method	Potential Direct and Indirect Effects to Slickspot Peppergrass	Potential Cumulative Effects	Conservation Measures for Avoiding or Reducing Adverse Effects (separate Appendix)	Effects Determination for Treatment Method	Rationale for the Effects Determination
	slickspot peppergrass fruit and seed predation by harvester ants over the long-term.	more important for species conservation.			
Summary of Effects	Treatments to reduce the occurrence and extent of noxious weeds and invasive plants in slickspot peppergrass occupied and potential habitat could have short-term adverse effects to slickspot peppergrass or its habitat. Over the long-term, slickspot peppergrass and its pollinators would benefit from restoration of occupied and potential habitats.	Non-federal lands are less likely than federal to be treated for noxious weed and invasive plant control and restoration. These areas could be seed sources for noxious weeds and invasive plants that could spread to adjacent federal lands, increasing the need for larger-scale treatments. Herbicides used on non-federal lands might not be limited to the 20 active ingredients contained in the proposed action. In addition, design features, conservation meausres, and other	Apply all design features, conservation measures, prevention measures, herbicide application criteria, and SOPs (BA Chapter 2; Appendix B, C, D and E).	LAA - Short-term BE - Long-term	Conservation measures, design features, prevention measures, herbicide application criteria, and SOPs would be applied to all treatments for noxious weeds and invasive plants. These features are expected to reduce but not eliminate the potential for short-term adverse effects to slickspot peppergrass. Treatments may result in unavoidable short-term adverse effects. Removing noxious weeds and invasive plants from slickspot peppergrass habitats and applying re-vegetation treatments would have long-term beneficial effects to slickspot

Treatment Method	Potential Direct and Indirect Effects to Slickspot Peppergrass	Potential Cumulative Effects	Conservation Measures for Avoiding or Reducing Adverse Effects (separate Appendix)	Effects Determination for Treatment Method	Rationale for the Effects Determination
		use constraints contained in the proposed action may not be part of treatments applied to non-federal lands. Therefore, damage or destruction of slickspots, plants, or seedbanks could occur as a result of these actions.			peppergrass and its pollinators.