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Boise District Office
Bruneau-Owyhee Sage-grouse Habitat Project (BOSH)

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U.S. Department of the Interior
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(Bruneau-Owyhee Sage-grouse Habitat Project)

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Bruneau-Owyhee Sage-grouse Habitat (BOSH) Project

1.0 Introduction

The greater sage-grouse (sage-grouse) is a landscape species that requires a variety of habitats over large areas to complete its life cycle (Pyke 2011). Sage-grouse will often use a variety of habitats within the sagebrush steppe ecosystem during annual movements which can span areas greater than 2,700 square kilometers (1,680 square miles) (Knick and Connelly 2011). The Idaho Bureau of Land Management (BLM) currently considers the sage-grouse a designated BLM special status species and manages its habitat in accordance with BLM Special Status Species Policy Manual 6840 Objective .02.B to "…initiate proactive conservation measures that reduce or eliminate threats to Bureau sensitive species to minimize the likelihood of and need for listing of these species under the [Endangered Species Act]."

In March 2010, the U.S. Fish and Wildlife Service (USFWS) found that sage-grouse warranted listing under the Endangered Species Act (ESA), but the bird was precluded from listing at that time due to higher priority listing actions (USFWS 2010). From 2010 to September of 2015, sage-grouse was managed as a candidate species (i.e., candidate for listing). The status of sage-grouse changed on September 22, 2015, when the USFWS announced its determination that the sage-grouse did not warrant listing. The USFWS based its decision on the best available scientific and commercial information, and determined that the threats to sage-grouse are being/will be addressed by ongoing and future conservation efforts by federal, state, and private landowners. The proposed Bruneau-Owyhee Sage-grouse Habitat (BOSH) Project is one such effort to improve and maintain habitat for the sage-grouse.

For many years, researchers have identified sagebrush steppe ecosystems and the wildlife species that depend on them as the most at risk ecosystems in North America due to habitat loss and fragmentation (Knick et al. 2003; Dobkin & Sauder 2004; Meinke et al. 2009; Davies et al. 2011; Miller et al. 2011). While there are many causes for the loss of sagebrush habitat, the degradation and loss of sagebrush-steppe vegetation from juniper encroachment and the resulting threat to sage-grouse has been documented in numerous sources (Roundy et al. 2014; Bates et al. 2014; Miller et al. 2000; USFWS 2010; Davies et al. 2011; Baruch-Mordo et al. 2013; Miller et al. 2011; Farzan et al. 2015). As junipers encroach, sagebrush-steppe vegetation eventually dies off because junipers are able to out-compete other vegetation for water, nutrients, space, and sunlight (Bates et al. 2000).

In its 2010 Findings for Petitions to List the Greater Sage-Grouse, the USFWS stated that, regardless of the cause of conifer woodland encroachment, the rate of expansion is increasing and is resulting in the loss and fragmentation of sagebrush habitats (USFWS 2010). Miller et al. (2008) estimated that without intervention, 75% of encroachment in the western portion of the sage-grouse range may transition into juniper woodlands within the next 30-50 years. Development of juniper woodlands has the potential to impede sage-grouse migration routes and leave the species more susceptible to predation due to the increased availability of raptor perches.

Moreover, impacts to sage-grouse populations from the presence of juniper are occurring before major shifts in vegetation composition are observed. Baruch-Mordo et al. (2013) found that even a low level presence of juniper in sagebrush steppe habitat can cause population-level impacts to sage-grouse; no leks remained active when the conifer (e.g., juniper) canopy exceeded 4% cover within 1 kilometer (0.62 miles) of a lek. The spread of juniper is also degrading other important sage-grouse habitat (e.g., late brood-rearing habitat, migration corridors, etc.). Casazza et al. (2011) reported strong evidence that brood-rearing sage-grouse avoided areas of pinyon–juniper encroachment at larger spatial scales (19.5 acres and 560 acres). Doherty (2008) found that sage-grouse generally maintained a distance of 0.65 kilometers^2 (0.25 miles^2) from conifer habitats.

Juniper readily establishes in wet or moist sites (i.e., springs and meadows) and is often found in dense stands in these sites. Functioning springs and meadows are crucial for sage-grouse hens with broods because they provide an abundance of forbs and insects (Connelly et al. 2000; Connelly et al. 2004; Drut et al 1994). Donnelly et al. (2016) documented a strong correlation between wet sites and the distribution of leks. Their study showed that of the 1,277 active lek sites they examined, 85% were within 10 kilometers (6.2 miles) of wet sites, with the highest densities of breeding birds within 2.8 kilometers (1.8 miles) of wet sites (Donnelly et al. 2016).

Studies of large-scale juniper control in eastern Oregon and southwestern Idaho have shown relatively rapid vegetation recovery (i.e., two to three years after juniper cutting) (Burkhardt and Tisdale 1969; Bates and Miller 1998; Bates et al. 2000; Miller et al. 2000; Bates et al. 2005). Several recent studies indicate that treatment of juniper encroaching into sagebrush steppe habitat at the early stages is important to maintain sage-grouse populations and suitable habitat (Baruch-Mordo et al. 2013; Roundy et al. 2014a; Roundy et al. 2014b; Bates et al. 2013; Bates et al. 2011; Miller et al. 2014; Miller et al. 2013; and Pyke 2011). Treating juniper in the early stages of encroachment while there is still a viable and diverse understory of sagebrush and herbaceous native plant species increases the likelihood of maintaining a resistant and resilient sagebrush steppe ecosystem.

If juniper treatment is not completed during the early stages of woodland development, the sagebrush steppe plant community runs the risk of crossing a threshold from which the sagebrush community may not be able to recover (Bates et al. 2013; Miller et al. 2013; Miller et al. 2000). Sagebrush steppe restoration on mid- to late stage juniper encroachment can be difficult due to reduced understory plants and depleted seed banks (Pierson et al. 2014; Koniak and Everett 1982; and Miller et al. 2000). However, the BLM recognizes that there are situations when treatment of juniper in the later stages of encroachment would be prudent.

For example, when otherwise important sage-grouse habitats like springs and wet meadows (summer/late brood-rearing habitat) are limited in a given area, but are unsuitable due to high densities of juniper, juniper removal would be beneficial. Pierson et al. (2007) have shown that Phase III juniper systems have the capacity to recover to a sagebrush steppe functional state depending on the time spent in the woodland phase and presence of residual plant species, seeds, and the degree of soil degradation (Briske et al. 2006; Petersen et al. 2009). Therefore, mesic areas that are within the range we identify as late stage encroachment with stands comprised of

trees in various age classes (as seen in Fig. 2) would be expected to respond in a similar manner. Conditions following juniper treatment in these areas would likely not immediately meet the 2015 Sage-grouse Habitat Assessment Framework (HAF) attributes for functioning habitat, but removal of juniper would provide an opportunity to improve riparian habitat for sage-grouse and other species (e.g., improve access to water, remove raptor perches, and allow for recovery of vegetation).

1.1 Need for and Purpose of Action

The lands in southwest Idaho managed by the BLM's Bruneau and Owyhee field offices include some of the most productive greater sage-grouse habitat in Idaho. While there are several causes of habitat loss and fragmentation across the range of sage-grouse, the main threats in southwest Idaho include wildfire, invasive annual grasses, and conversion of sagebrush steppe to western juniper woodlands (FIAT 2014). In southwest Idaho, loss of suitable sage-grouse habitat from conversion of sagebrush steppe to juniper woodlands is a major threat to the species.

The 2006 Idaho Sage-Grouse Plan, as amended in 2009 (ISAC 2006, Section 4.3.10), Fire and Invasives Assessment Team (FIAT 2014) and the Owyhee County Sage-grouse Local Working Group Plan, as amended in 2013 (OLWG 2000), identify conifer encroachment in southwest Idaho as a major threat to the species and its habitat. The continued expansion of juniper into sage-grouse habitat needs to be addressed through appropriate management actions. The management of conifer encroachment is also consistent with the Idaho and Southwestern Montana Greater Sage-Grouse Approved Resource Management Plan Amendment and Final Environmental Impact Statement (USDI BLM & USDA FS 2015) and the FIAT assessment (2014).

In the recent past, juniper treatments have typically been local and reactive rather than regional and strategic (Wisdom and Chambers 2009). Many acres of juniper have been treated since 2004, but treatments are not keeping pace with the current rate of juniper encroachment, at least in parts of the range including southwest Idaho (USFWS 2010 and Wisdom and Chambers 2009). In order to make effective, measurable, and long-term changes beneficial to sage-grouse, juniper treatments must be completed at the landscape scale and target early-stage encroachment (Baruch-Mordo et al. 2013; Wisdom and Chambers 2009). Past treatments have tended to focus on areas of late stage encroachment that may not benefit sage-grouse for many years but targeting early stage encroachment would provide immediate benefits.

The purpose of the BOSH project is to improve and maintain suitable sage-grouse habitat at a landscape scale on BLM-managed lands within the Bruneau and Owyhee field office boundaries by removing encroaching juniper from such habitat. The goal is to treat encroaching juniper in areas that would provide the greatest benefit to existing habitat and improve the long-term viability and persistence of sage-grouse in the area. The BOSH project would mainly target early-stage juniper encroachment at a landscape level at a rate exceeding the current rate of juniper spread and woodland development. The proposed juniper treatment would provide immediate benefits to sage-grouse in the most efficient manner (Baruch-Mordo et al. 2013).

1.2 Location and Setting

The project area includes approximately 1.5 million acres within the Boise District BLM. The majority of those acres (1,020,000) are within the Owyhee Field Office and the remaining acres (518,000) are within the Bruneau Field Office (Figure 1). Approximately 47,000 acres of the proposed project area lies within designated wilderness (Figure 1). The project area is situated south of Boise, Idaho within the following boundaries:

- South of State Highway 78,
- East of State Highway 95 and the Oregon border,
- West of State Highway 51, and
- North of the Nevada border.

Elevations in the project area range from 762 meters (2,500 feet) to 1,829 meters (6,000 feet). The project area lies within two Level III Ecoregions as described by McGrath (2002): the Northern Basin and Range and the Snake River Plain. Of the area identified for treatment, approximately 96% is within the Northern Basin and Range and the remaining 4% is in the Snake River Plain. The Northern Basin and Range Ecoregion consists of dissected lava plains, rolling hills, alluvial fans, valleys, and scattered mountains and is higher and cooler than the Snake River Plain.

The Northern Basin and Range Ecoregion, Basins support sagebrush-grassland or saltbush-greasewood vegetation and cool season grasses (e.g., Sandberg bluegrass and bottlebrush squirreltail). Ranges are typified by sagebrush steppe covered in mountain sagebrush, mountain brush (e.g., bitterbrush, snowberry, and serviceberry), Idaho fescue, Douglas-fir, or aspen; low sagebrush and bluebunch wheatgrass are also common. Juniper woodlands normally occur on rugged, and more fire-safe stony uplands within this Ecoregion, but have extended well beyond these sites and into the surrounding sagebrush steppe communities. The Snake River Plain Ecoregion consists of plains and low hills in the xeric intermontane west. Potential natural vegetation is mostly sagebrush steppe, but barren lava fields and saltbush-greasewood communities also occur. There are many streams and rivers that flow through the project area and several have cut deep, narrow canyons that are often bordered by cliffs for many miles.

1. Project Area Overview

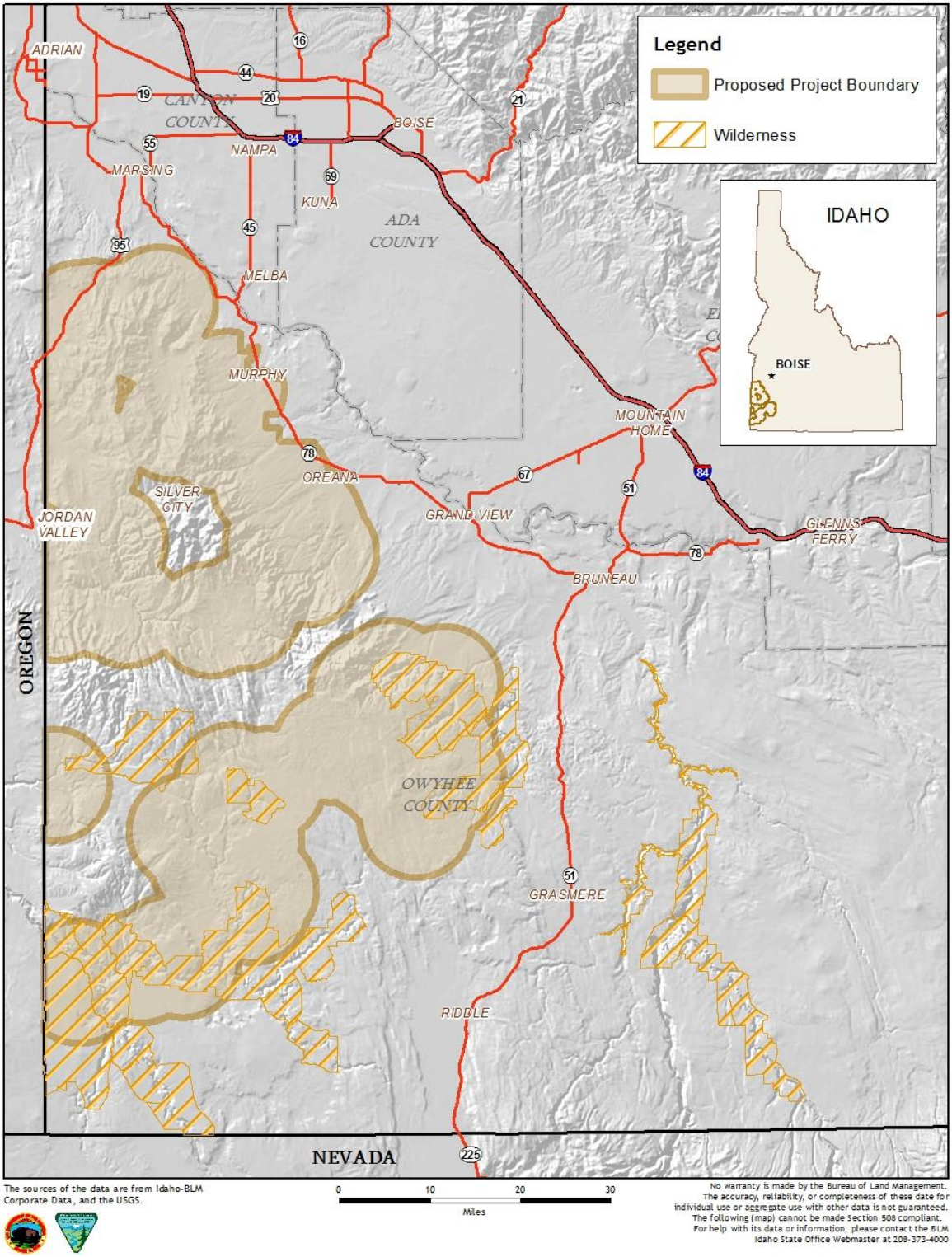

Figure 1 – BOSH Project Area and Focal Treatment Area Map.

1.3 Scoping and Development of Issues

Internal meetings and meetings with collaborators to discuss and develop the project proposal began in 2013. In January 2014, the Boise District BLM issued a scoping package to solicit comments regarding this proposal and potential issues and effects to the human environment. The BLM received several comments. Due to the landscape scale of the project and the uncertainty regarding effects to the human environment the BLM decided to complete an Environmental Impact Statement (EIS). BLM published a Notice of Intent to complete an EIS in the Federal Register on January 20, 2015. Several comments that BLM received in 2014 were sent again by interested public and cooperating agencies. BLM hosted Public Meetings in Boise and Murphy, Idaho on February 4 and 5, 2015, respectively.

BLM has carried the following issues, raised in scoping, forward for analysis:

- How will wildlife habitat, especially for sage-grouse and migratory birds, be affected at the project level?
- What are the effects to the native plant communities as a result of removing early-stage encroaching juniper?
- What are the effects to riparian areas and vegetation?
- How will the proposed action affect soils and biological crusts?
- How will the proposed action affect visual resources?
- How will the proposed action affect the spread of noxious weeds and invasive annual grasses?
- What are the effects to recreational experiences and other social values in the area?
- How will the proposed action affect wilderness values?
- What are the effects to cultural resources as a result of the proposed action?

Issues raised during scoping that BLM did not carry forward for analysis are as follows:

- What effects to wild horses and herd management areas (HMAs) might be expected?
    - Effects to wild horses and HMAs were not carried forward for further analysis because treatment areas within the HMAs would be minimal. Wild horses are accustomed to visitors and would easily move out of treatment areas until people have left.

- How will livestock management affect the success of the proposed action and will there be any effects to this use?
    - Forage manipulation is not part of the proposed action or alternatives, and BLM does not expect livestock management to affect the success of these actions.

1.4 Conformance with Applicable Land Use Plan(s)

Bruneau Management Framework Plan (1983)

The project area is under the jurisdiction of the 1983 Bruneau Management Framework Plan (MFP) and the 1999 Owyhee Resource Management Plan (RMP). Objective WL-4.4 of the

Bruneau MFP is to improve sage-grouse nesting, brood rearing, and winter habitats across 520,000 acres.

Owyhee Resource Management Plan (1999)
Management direction in the Owyhee RMP includes the following to improve the ecological condition of native plant communities: implementation of juniper abatement on appropriate sites where juniper is invading; vegetation treatments to improve habitat where juniper density is contributing to unsatisfactory habitat conditions; and prescribed burns to reduce juniper encroachment. Additionally, the Owyhee RMP provides direction to identify, protect, and enhance key sage-grouse habitats and populations (Objective SPSS 1). Objective WNES 2 directs the BLM to "…manage designated wilderness in accordance with enabling legislation and other applicable federal legislation and policies."

Idaho and Southwestern Montana Greater Sage-grouse Approved Resource Management Plan Amendment (2015)
The purpose of the Approved Resource Management Plan (ARMPA) is to identify and incorporate appropriate conservation measures into Land Use Plans to conserve, enhance, and restore greater sage-grouse habitat by avoiding, minimizing or compensating for unavoidable impacts to sage-grouse habitat. Two important goals of the ARMPA are to

- "maintain and/or increase the abundance, distribution and connectivity of GRSG by conserving, enhancing and restoring GRSG habitat to maintain resilient populations by reducing, eliminating or minimizing threats to GRSG habitats" (Goal SSS 1), and
- "conserve, enhance, and restore the sagebrush ecosystem upon which GRSG populations depend in an effort to maintain and/or increase their abundance and distribution, in cooperation with other conservation partners" (Goal SSS 5).

The proposed action would also fulfill ARMPA management direction for habitat objectives to maintain and improve lek habitat, nesting and early brood rearing habitat, and late brood rearing habitat (USDI BLM & USDA FS 2015). The Boise District completed a specific review to ensure this proposed action and alternatives comply with the Management Decisions and objectives of the ARMPA (Appendix C)

Owyhee Canyonlands Wilderness and Wild & Scenic River Management Plan (2015)
The BOSH project meets the objective identified in the Plan (1.5.1.1.1 Objectives) to "Protect and preserve wildlife habitat to support healthy, viable, and naturally distributed wildlife populations to retain the wilderness areas' natural and undeveloped character." The Plan also states, "Future unforeseen activities and proposals will be evaluated through a MRA [minimum requirements analysis] to ensure they utilize the minimum tools needed to protect or enhance wilderness character and WSR [wild and scenic river] values."

1.5 Relationship to Statutes, Regulations, and Other Requirements

Wildlife

The Migratory Bird Treaty Act of 1918, as amended, and Executive Order 13186 (2001)
Executive Order 13186 identifies the responsibilities of Federal agencies to protect migratory birds. Federal agencies were ordered to develop a Memorandum of Understanding (MOU) with

the USFWS. The Order directs that pursuant to its MOU, each agency shall, in harmony with agency missions:

- Avoid or minimize, to the extent practicable, adverse impacts on migratory bird resources when conducting agency actions;
- Restore and enhance the habitat of migratory birds, as practicable;
- Prevent or abate the pollution or detrimental alteration of the environment for the benefit of migratory birds, as practicable;
- Ensure that environmental analyses of Federal actions required by the National Environmental Policy Act (NEPA) or other established environmental review processes evaluate the effects of actions and agency plans on migratory birds, with emphasis on species of concern.
- Identify where unintentional take reasonably attributable to agency actions is having, or is likely to have, a measurable negative effect on migratory bird populations.
- Develop and use principles, standards, and practices that will lessen the amount of unintentional take.
- Develop conservation efforts in cooperation with the Service.

BLM and FWS Migratory Bird Memorandum of Understanding (MOU WO-230-2010-04)
In accordance with Executive Order 13186, in 2010, BLM and USFWS signed BLM MOU-WO-230-2010-04 to promote the conservation of migratory birds. Specifically, the purpose is to strengthen migratory bird conservation by implementing strategies that promote conservation and avoid or minimize adverse impacts on migratory birds through enhanced collaboration between the parties: state, tribal and local governments. Among other commitments, BLM shall, "At the project level evaluate the effects of the BLM's actions on migratory birds during the NEPA process, if any, and identify where take reasonably attributable to agency actions may have a measurable negative effect on migratory bird populations, focusing first on species of concern, priority habitats, and key risk factors". Where BLM finds negative effects, it will implement approaches lessening such take.

BLM Manual 6840
Manual 6840 directs the BLM to "carry out management activities consistent with the principles of multiple-use while conserving proposed, candidate, BLM sensitive and state species of special concern and their habitat."

Wilderness
Wilderness Act (1964), Wild and Scenic Rivers Act (1968), and Omnibus Public Land Management Act (2009)
The BOSH project would be conducted in a manner consistent with Section 4(d) of the Wilderness Act, Section 10(a & b) of the Wild and Scenic Rivers Act, and Section 1503(b)(8)(B) of the Omnibus Public Lands Management Act.

BLM Manual 6340
This EIS ensures "…that potential impacts to wilderness areas are appropriately analyzed in conformance with NEPA." The manual states that eight of the Prohibited Uses (commercial enterprises and permanent roads are not included) may be allowed if they are "necessary to meet

minimum requirements for the administration of the area for the purpose of the [Wilderness] Act." Additionally, "An analysis [minimum requirements analysis] using the MRDG [minimum requirements decision guide] must be made in non-urgent situations to determine whether or not…action within a wilderness is warranted." An MRDG (Appendix D) was prepared for the BOSH project to "…determine the most appropriate method to use in order to minimize impacts to wilderness qualities." The BOSH project also meets Section 4(c)(v) of the manual wherein a management action "…benefits the natural conditions and the natural function of ecological processes in wilderness."

Cultural Resources

National Historic Preservation Act of 1966, as amended

The 2014 State Protocol Agreement between the BLM Idaho State Director and the Idaho State Historic Preservation Office (SHPO) describes the manner in which the BLM will meet its responsibilities under Section 106 of the National Historic Preservation Act (NHPA) as provided for in the 2012 national Programmatic Agreement between BLM, the Advisory Council on Historic Preservation (ACHP) and the National Conference of State Historic Preservation Officers (NCSHPO).

Section 106 of the National Historic Preservation Act (NHPA)

Section 106 of the NHPA, and the implementing regulations found at 36 CFR 800, requires federal agencies to take into account the effects of their undertakings on historic properties and afford the tribes, SHPO, ACHP, public and consulting parties (consulting parties) a reasonable opportunity to comment on such undertakings. Historic property means any prehistoric or historic district, site, building, structure, or object included in, or eligible for inclusion in, the National Register of Historic Places (NRHP) maintained by the Secretary of the Interior (36 CFR 800.16(l)(1).

Following consultation, federal undertakings can be conducted within these NRHP districts or sites provided they do not have an adverse effect on the resources present. However, if the federal agency chooses to adopt any course of action that will adversely affect a significant cultural resource they must allow the consulting parties the opportunity to comment per Section 106 of the National Historic Preservation Act and prepare a memorandum of agreement (MOA) pursuant to 36 CFR 800.6 to mitigate for adverse effects.

Other Laws, Regulations and Policies

The BLM is required to consult with Native American tribes to "help assure (1) that federally recognized tribal governments and Native American individuals, whose traditional uses of public land might be affected by a proposed action, will have sufficient opportunity to contribute to the decision, and (2) that the decision maker will give tribal concerns proper consideration" (U.S. Department of the Interior, BLM Manual Handbook H-8120-1). Tribal coordination and consultation responsibilities are implemented under laws and executive orders that are specific to cultural resources which are referred to as "cultural resource authorities," and under regulations that are not specific which are termed "general authorities." Cultural resource authorities include: the National Historic Preservation Act of 1966, as amended (NHPA); the Archaeological Resources Protection Act of 1979 (ARPA); and the Native American Graves Protection and Repatriation Act of 1990, as amended (NAGPRA). General authorities include:

the American Indian Religious Freedom Act of 1979 (AIRFA); the National Environmental Policy Act of 1969 (NEPA); the Federal Land Policy and Management Act of 1976 (FLPMA); Executive Order (E.O.) 13007, "Indian Sacred Sites"; and E.O. 13175, "Consultation and Coordination with Indian Tribal Governments." The BLM is in compliance with the aforementioned authorities as it has consulted with the tribes of this area as well as SHIPO, regarding this project.

Aboriginal Rights and Treaties

Southwest Idaho is the homeland of two culturally and linguistically related tribes: the Northern Shoshone and the Northern Paiute. In the latter half of the 19th century, a reservation was established at Duck Valley on the Nevada/Idaho border west of the Bruneau River. The Shoshone-Paiute Tribes residing on the Duck Valley Reservation today actively practice their culture and retain aboriginal rights and/or interests in this area. The Shoshone-Paiute Tribes assert aboriginal title to their traditional homelands as their treaties with the United States, the Boise Valley Treaty of 1864 and the Bruneau Valley Treaty of 1866, which would have extinguished aboriginal title to the lands now federally administered, were never ratified.

Other tribes that have ties to southwest Idaho include the Bannock Tribe and the Nez Perce Tribe. Southeast Idaho is the homeland of the Northern Shoshone Tribe and the Bannock Tribe. In 1867 a reservation was established at Fort Hall in southeastern Idaho. The Fort Bridger Treaty of 1868 applies to BLM's relationship with the Shoshone-Bannock Tribes. The northern part of the BLM's Boise District was also inhabited by the Nez Perce Tribe. The Nez Perce signed treaties in 1855, 1863 and 1868. BLM considers off-reservation treaty-reserved fishing, hunting, gathering, and similar rights of access and resource use on the public lands it administers for all tribes that may be affected by a proposed action.

Paleontological Resources

Protection of paleontological resources on BLM lands fall under a number of legislative, regulatory and policy mandates. Principal laws include the NEPA, FLPMA and BLM regulations found in Title 43 of the Code of Federal Regulations (CFR). More recently, the Paleontological Resources Preservation subtitle of the Omnibus Public Land Management Act of 2009, also known as the Paleontological Resources Preservation Act (PRPA), directs land managers within the Department of the Interior Agencies and the U.S. Department of Agriculture to manage and protect fossils located on public lands using scientific principles and expertise. PRPA does not make a distinction between the types of organism preserved; therefore, all fossil resources, plants, invertebrates, and vertebrates that are determined to be scientifically significant are to be actively managed and protected.

Air Quality

The Federal Clean Air Act is administered in Idaho by the Idaho Department of Environmental Quality. Rules to control air pollution in the state of Idaho are set by the Idaho Administrative Procedures Act. The EPA's policy describes elements of a smoke management program including: "(1) a process for granting approval to conduct prescribed burns; (2) methods for minimizing air pollutant emissions by considering alternative treatments and/or reducing fuel levels before burning; (3) outlining smoke management considerations for each burn, such as burning only during favorable weather conditions to minimize smoke intrusions; (4) plans to

notify public and reduce exposure should smoke intrusions occur; (5) public education and awareness programs; (6) surveillance and enforcement procedures that smoke management programs are effective; and (7) procedures for periodically evaluating smoke management programs."

2.0 Description of the Alternatives

2.1 Alternatives Considered But Not Analyzed in Detail

The following alternatives were considered, but not analyzed in detail:

All Juniper Treatment

Described as the treatment of all western juniper trees except old growth and juniper growing in rocky outcroppings. However, treatment of late stage encroachment would not provide timely benefits to sage-grouse because it would take several years for suitable habitat to develop. Treatment of late stage encroachment also requires more intensive management actions with greater likelihood of impacts to resources. Recent research identifies that the most beneficial juniper treatments for sage-grouse and ecosystem function are derived from targeting early stage encroachment (Baruch-Mordo et al. 2013; Roundy et al. 2014a; Roundy et al. 2014b; Bates et al. 2013; Bates et al. 2011; Miller et al. 2014; Miller et al. 2013; and Pyke 2011). Targeting early stage encroachment is less costly and in most cases, provides immediate benefits to sage-grouse.

Targeted Treatment: Very Young and Small Tree Alternative

It was suggested during scoping that the BLM should include an alternative that targets removal of only very young and small trees. This alternative was considered but not analyzed further because most areas of encroachment consist of various ages and sizes of juniper. Removing only very young and small trees growing in areas with older and bigger trees provides little to no benefit to sage-grouse because the remaining trees would continue to reduce sagebrush steppe vegetation and provide perches for predators. Removing only very young/small juniper would leave over 600,000 acres of sage-grouse habitat as marginal or unsuitable, and in a downward trend. This alternative would not meet the objective of a treatment that would provide long-term benefits to sage-grouse.

Livestock Management Alternatives

Three proposed alternatives suggested changes to livestock management:

- End livestock grazing where use is likely to cause weed invasion.
- Greatly decrease livestock disturbance/use or remove livestock from the project area.
- Remove livestock from sensitive habitats.

The proposed alternatives regarding livestock grazing do not meet the purpose and need of the project, which is to respond to juniper encroachment into sage-grouse habitat. Moreover, changes to livestock operations must be made during the livestock grazing permit renewal process per Title 43 of the Code of Federal Regulations (CFR), Part 4100, Subpart 4130. The removal or decrease in the use of livestock would also do nothing to reduce the current cover and distribution of western juniper on the landscape that has encroached into sagebrush steppe. This alternative would therefore not meet the objective of providing long-term benefits to the species.

2.2 Description of Proposed Action and Alternatives

2.2.1 Alternative A - No Action/Continue Present Management

The BLM would not authorize landscape scale treatment of encroaching juniper within sage-grouse habitat in Owyhee County, Idaho.

2.2.2 Features Common to Action Alternatives

2.2.2.1 Project Area Development

The proposed 1.5 million-acre project area was developed based on input from collaborators, current distribution of sage-grouse, and occupied leks where juniper encroachment is occurring. Numerous occupied leks (where at least two or more male sage-grouse have attended during at least one breeding season in the previous five years) are within and adjacent to the proposed project area (Idaho Fish and Game (IDFG) sage-grouse unpublished statewide lek database). Leks are breeding areas where males perform courtship displays. They are typically located in open areas surrounded by sagebrush such as low sagebrush flats, ridge tops, playas, and roads (Connelly et al. 2000). Leks are usually within or adjacent to suitable nesting habitat. In Idaho, approximately 80% of hens nest within 10 kilometers (6.2 miles) of their lek of capture (Connelly et al. 2013). Based on this information, BLM identified 63 leks and then buffered by 10 kilometers (6.2 miles) to determine the project area boundary.

2.2.2.2 Focal Treatment Area Development

The focal treatment area within the proposed project area boundary was developed using the classifications of juniper/woodland succession (Miller et al. 2005) and GIS modeling. The level of juniper encroachment (or stage of woodland succession) is commonly identified as phase I, II, or III (Miller et al. 2005) (Table 1). In phase I, shrubs and herbaceous plants are the dominant vegetation types influencing ecological processes on the site. In phase II, juniper is co-dominant with shrubs and herbaceous vegetation and all three vegetation types influence ecological processes on the site. In phase III, juniper is the dominant vegetation and the primary plant layer influencing ecological processes on the site (Miller et al. 2005).

Table 1 – Tree (Juniper) Canopy and Shrub Layer Characteristics for Encroachment Phases.

Characteristics	Phase I	Phase II	Phase III
Tree Canopy	Open, actively expanding <10%	Actively expanding 10- 30%	Expansion nearly stabilized >30%
Shrub Layer	Intact	Nearly intact to significant thinning/suppression	≧75% die-off

Areas of phase I and early phase II juniper encroachment were selected as the primary targets for treatment because they would provide suitable sage-grouse habitat immediately following treatment (i.e., there would be adequate levels of sagebrush and herbaceous plant cover following juniper removal). For the purpose of this project, the BLM concluded that the mid-point of phase II (20% canopy cover of juniper) represented the point where sagebrush and juniper are equally driving ecosystem function. By treating juniper at less-than or equal-to 20% canopy cover, there would be sufficient understory of desirable vegetation to immediately

benefit sage-grouse. In contrast, sites with denser juniper cover typically have considerably less shrub and herbaceous cover and may not provide sage-grouse habitat for several years after treatment. Treatment of denser stands often require follow up seeding or seedling planting depending on location, site conditions, and treatment method utilized. (see 2.3.2.6 Design Features and description of the proposed action 2.3.3 below).

To develop the GIS model, an automated analysis of aerial imagery was used to estimate juniper canopy cover and the most recent vegetation data[1] for the Boise District was used to determine presence of sagebrush. Tree canopy cover for Owyhee County was obtained from the USDA-NRCS Sage Grouse Initiative for Idaho. The model utilized a 1-kilometer moving window to identify areas with greater than 50% of the landscape in sagebrush that also had at least 1% of landscape with juniper canopy cover from 1% to 20%.

The GIS model detected approximately 600,000 acres that meet these criteria. However, due to smoothing effect of the moving window neighborhood analysis, some areas with juniper canopy cover greater than 20% (late phase II to phase III) were likely included in the focal area. Conversely, the model did not detect some areas with very small or widely scattered juniper and these areas may not have been delineated as part of the focal area, even though they meet the treatment criteria. BLM would identify these areas during treatment unit development (see 2.3.2.3 below) and address accordingly.

In general, juniper treatments would be focused within the 600,000 acres. However, treatments would not occur in some sections of the focal area because it would be infeasible to do so (e.g., due to steep topography), or treatment criteria are not met. Conversely, locations outside of the focal area not detected by the model that meet the treatment criteria would be treated (mainly small, young juniper in the very early stages of encroachment) (refer section 2.3.3 Alternative B for details). Additionally, the 2015 Soda Fire burned approximately 182,000 acres of the project area (Map 2). The burned area may warrant treatment during the latter part of the project if/as juniper recolonizes this area; therefore, these acres are still included in the project area total. Further, maintenance of treatment areas would occur overtime when juniper begins to re-establish in treatment areas.

2.2.2.3 **Annual Treatment Unit Development**

Treatment units would be approximately 40,000 to 60,000 acres in size depending on annual budget. Initially, treatment units would be delineated using aerial photography, GIS data (lek locations, riparian locations, vegetation mapping) and site information garnered from previous field visits. Units would be further refined based on information collected from on-the-ground assessments, clearance surveys, sage-grouse monitoring, and project layout efforts.

[1] A classified vegetation dataset was developed for the Boise District from 2000-2001 Landsat imagery and was used to portray sagebrush distribution within the project area. All sagebrush cover types were extracted and reclassified to create a simple sagebrush occurrence layer. Recent fire history (2001-2014) polygons were used to erase sagebrush pixels with those polygons to reflect vegetation changes since the satellite imagery was acquired.

The BLM would coordinate with IDFG, NRCS, and FWS biologists to determine the priority of treatment areas. Priorities and treatment areas may be adjusted based on information gathered from project-associated research, areas burned by wildfires, input from collaborators, or other factors over the life of the project.

2.2.2.4 Monitoring

Implementation and effectiveness monitoring would be used to inform management whether treatments are achieving desired goals and/or whether changes (e.g., to design features, techniques, treatment target areas, etc.) are necessary. See Appendix A, Monitoring Plan, for details.

Implementation Monitoring

Implementation monitoring documents resource conditions during implementation (e.g., disturbance or lack of disturbance to a resource), equipment issues, and/or resolutions, and any necessary adjustments to the prescribed designs. Completed treatment areas would be GPS'd to allow for evaluation of the project's progress over time. The BLM would conduct inspections during project operations to document adherence to design features and best management practices, and to ensure proper implementation of the treatment plan (e.g., number of acres and methods employed). Information derived through implementation monitoring would be used to correct ongoing operations as necessary and to improve future annual treatment unit development and design.

Effectiveness Monitoring

Monitoring would be conducted to determine treatment effectiveness. If monitoring detects undesired impacts (e.g., a downward trend) to a resource or resources, adjustments would be made to address and alleviate these impacts/issues, and to avoid them in the future.

Sage-grouse

Project implementation would take approximately 10 to 15 years, providing the opportunity for long-term monitoring and scientific studies. To document sage-grouse response to juniper treatments, the BLM plans to work with a university or other agencies in a long-term radio telemetry project. Monitoring of sage-grouse would focus on, but would not be limited to, the following:

- Response to and use of treated areas
- Migration or other movement patterns
- Seasonal habitat availability and use
- Lek attendance
- Use of spring sites for brood rearing
- Changes in nesting areas
- Survival

Sage-grouse Habitat

Sage-grouse habitat would be monitored by documenting vegetation trend utilizing the Site Scale habitat assessment and monitoring protocols identified in the Sage-Grouse Habitat Assessment Framework or HAF (2015).

Other Resources
The BLM would monitor ongoing treatment response for other resources of concern. Types of monitoring may include, but not be limited to, the following:

- Hydrologic response
- Riparian vegetation response
- Water temperature
- Migratory bird species

Monitoring plans would be designed and included for each treatment unit (see Annual Treatment Unit Development, section 2.3.2.4 above). For example, if a treatment unit includes juniper removal from a stream bank, the monitoring plan may include installation of a thermograph prior to treatment followed by post-treatment water temperature data collection and/or before- and after- treatment monitoring of water flows from springs would be implemented. Inventories of and surveys for noxious weeds, special status and other plants, wildlife, and cultural sites would be ongoing.

2.2.2.5 **Methods**

Treatment methods would include cutting juniper[2] with handsaws or chainsaws, lopping with pruning shears, and using heavy equipment such as a track-hoe fitted with a grinding implement (masticator) or a shearing implement (large, powerful pruning shears). Material may be scattered on site and left, or the material may be piled and burned or jackpot burned. Pile burning consists of piling cut juniper material before burning it. Jackpot burning consists of burning cut juniper where they were felled without further concentrating fuel loads by piling.

Burning would be utilized in areas where scattering cut juniper is not feasible or desirable (e.g., where there would be too much material to scatter). Figure 2 illustrates where jackpot or pile burning would be suitable to deal with high levels of juniper biomass (fuels). Jackpot and pile burning would take place once the juniper biomass has dried sufficiently, live fuel moisture is greater than 150% (i.e., low fire behavior), and soils are moist, frozen, or covered by snow. Burning under such conditions reduces the risk of mortality of adjacent vegetation and leads to faster vegetation recovery (Bates et al. 2014; Roundy et al. 2014; Bates and Svejcar 2009).

Mastication and shearing machinery would be used within 60 meters (200 feet) of existing roads where practical and allowable (based on design features, etc.). Felled juniper near roads could pose a safety hazard to the public and firefighters as the needles dry and become highly combustible. Juniper trees within 60 meters (200 feet) of roads that are felled or sheared would be jackpot or pile burned to reduce hazardous fuel loading. Mastication of juniper trees along roads would also greatly reduce the potential fire behavior because the chips and needles would be at ground level.

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[2]Old growth juniper would not be treated regardless of encroachment phase, proximity to leks, or proximity to sage-grouse migration corridors.

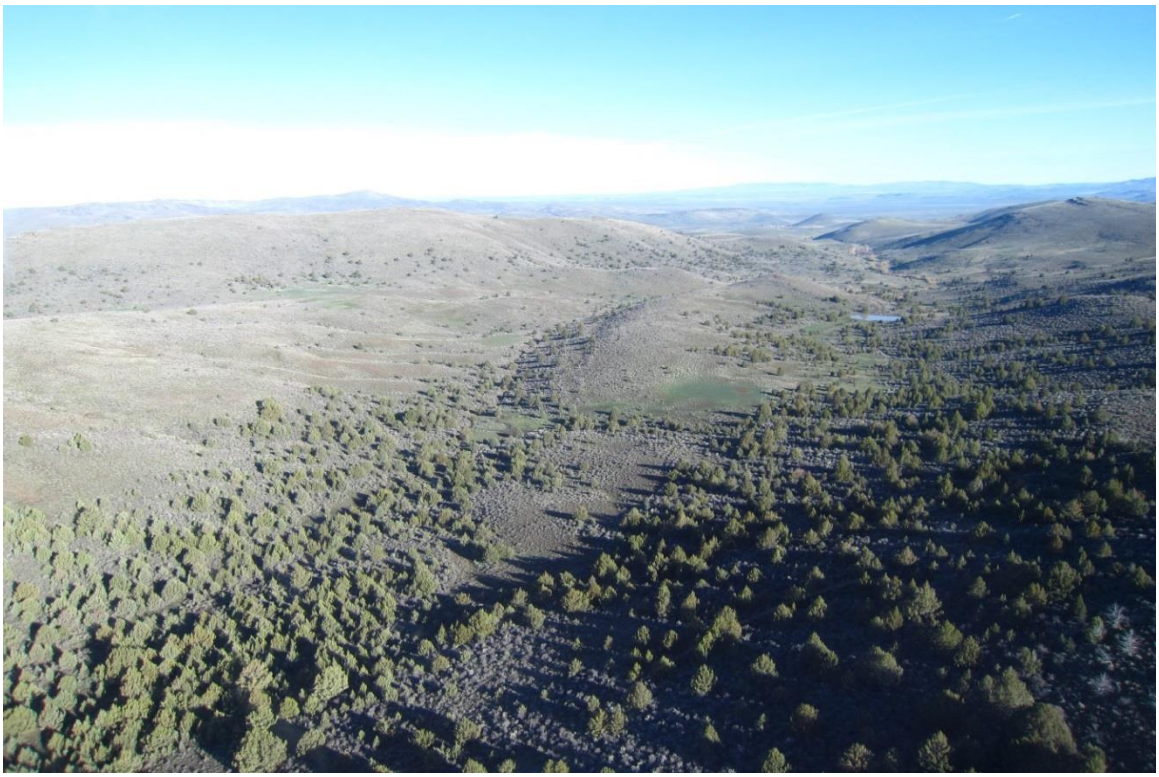


Figure 2 - An example of where jackpot or pile burning of juniper debris would be used to reduce the level of biomass in a given area.

In areas where soils are exposed post-treatment (e.g., following pile burning in uplands or juniper removal in riparian areas), small scale, hand broadcast seeding and/or seedling planting may be used to facilitate vegetation recovery in those areas.

In some locations treatments may be completed in multiple phases to minimize resource concerns. For example, treatments in riparian areas may be implemented incrementally to ensure that adequate shade remains as riparian vegetation becomes established. Treatments in a viewshed may also be implemented in phases. Removing juniper gradually would make visual changes to the viewshed less noticeable.

Different methods may be introduced over the life of the project as new technologies for juniper treatment and disposal are developed, and to integrate results of ongoing research. Appropriate NEPA analysis of new or different methods would occur as needed.

Project implementation would be completed in accordance with the following standard operating procedures:

Vehicle Use

- Pickups and support vehicles would be restricted to established roads and trails.
- Except in wilderness, rubber-tired all-terrain vehicles (ATVs) and utility task vehicles (UTVs) may travel off-road to access trees.

- ATV/UTV use would be restricted where necessary to protect sensitive plant and animal populations and cultural resources, or avoid noxious weed locations.
- Only single-pass cross-country travel by ATVs would be allowed to avoid creation of trails or visible tracks.
- Cross-country travel by ATVs would not be permitted when soils are saturated; travel would only occur when soils are firm.

Juniper Cutting

- Trees would be cut to a stump height of eight inches or less.
- No live branches would remain on the stump.
- Camping areas for cutting crews would be pre-approved by authorized officer.
- Branches would be lopped from felled juniper to a height of no more than 1.83 meters (4 feet).
- Juniper trees that **would not** be cut include:
    - old growth juniper (as characterized by Miller et al. 1999):
        - rounded canopy/top
        - deeply furrowed bark
        - twisted trunks or branches
        - dead branches and spike tops
        - large lower limbs
        - large trunk diameter relative to tree height
        - yellow-green lichen-covered branches
    - trees on shallow sites dominated by exposed bedrock and/or large pieces of rock rubble; and
    - culturally significant trees (i.e., trees with arborglyphs/carvings and bow stave trees).

Pile and Jackpot Burning

- Burning operations would only be completed with the approval of the Idaho/Montana Airshed Group, and when there are no restrictions from local regulatory authorities (e.g., Regional DEQ Office, Boise, ID).
- Burning of cut juniper materials and debris would take place only when soils are moist, frozen, or snow covered.

Mastication and Shearing

- Mastication and shearing of juniper would be used where it would be the most effective tool within 60 meters (200 feet) from either side of designated roads, for example:
- To reduce fuel loading along roadways;
- Trees may be masticated where viewsheds are a concern.
- Track hoes with mastication and shearing equipment would not be permitted beyond the 60-meter (200-foot) corridor along roadways.

Resource Clearances

- Resource inventories in each treatment unit would be conducted prior to treatment implementation. Specialists would determine precise locations of avoidance areas and/or where to apply other design features to protect resources during the clearance phase.

2.2.2.6 Design Features

The following design features were developed to minimize or eliminate adverse impacts by the proposed action to identified resources:

Cultural and Paleontological Resources

- All cultural resource inventories would be conducted in accordance with the Idaho State Protocol Agreement between the Idaho State Director of the Bureau of Land Management and the Idaho State Historic Preservation Officer (herein after called ID State Protocol) dated 2014.
- Tree cutting within sites will be determined on a site by site basis.
- No slash pile burning or jackpot burning will occur in any unevaluated or National Register of Historic Places (NRHP) eligible archeological site or in a paleontological site.
- Limbs and trunks of phase II and Phase III juniper must be removed and piled outside any paleontological, cultural or archaeological site before burning is initiated. No dragging of limbs or trunks through the site would be permitted.
- Juniper debris removed from paleontological, cultural or archaeological sites will be piled at least 10 meters (33 feet) from the site boundary.
- Camping areas for cutting crews would be identified and surveyed for cultural resources prior to use of that camp location.
- Track-hoe equipment will not be allowed to drive through any unevaluated or eligible archeological site or a paleontological site.
- Turning any vehicle within a paleontological, cultural or archaeological site will not be allowed.
- Cross-country travel will only be allowed by rubber-tired vehicles (under 10,000 pounds GVW) and may only make a single pass in areas where inventory is completed and appropriate site avoidance measures are in-place (ID State Protocol Exemption C.37).
- Treatments in paleontological sites would be evaluated on an individual basis.

Wilderness (per the minimum requirements decision guide [MRDG] minimum requirements analysis [MRA]):

- BLM would use handsaws to implement treatment within designated wilderness as determined through a minimum requirements analysis (applies to Alternative B only; Alternative C excludes juniper treatments in wilderness).

- All motorized travel would be restricted to designated roads; juniper treatments would be done on foot.
- Only trees ≤ 20cm (8 inches) diameter at breast height (DBH) would be treated.

Wildlife

- No juniper cutting activities would occur from March 1 through July 15 to prevent disturbance and impacts to breeding activity and nesting of sage-grouse and migratory birds. This timing restriction would also prevent disturbance and impacts to large ungulate fawning, calving, and lambing.
- No mechanized treatment of juniper during from November through February in sage-grouse winter habitat. However, these dates may be altered by recommendation of a wildlife biologist.
- Surveys for raptor nesting activity would be completed from January 1 through May 31 according to the nesting period and habitat availability of various raptor species. Surveys would be completed within treatment units and extend outward from unit boundaries to a radius of 1.6-kilometers (1-mile). Active ferruginous hawk and golden eagle nests would be protected by establishing a 1.6-kilometer (1-mile) buffer. Active nests of other raptor species that may occur in the project area would extend for 800 meters (0.5 miles). All raptor nest buffers would remain in effect from time of active nest identification through July 31, unless the nest is abandoned, destroyed (wind, lightning, wildfire), or the young fledge before July 31.
- No heavy equipment use in occupied pygmy rabbit habitat.

Hydrology and Fisheries

- Fueling of chainsaws would be done outside of riparian areas (streams, wetlands, wet meadows, springs, etc.).
- Sediment control measures would be implemented where necessary when juniper cutting activities occur adjacent to redband trout streams.
- Willows may be planted to facilitate recovery of riparian systems and stabilize banks.
- Where willows are planted, plastic sheaths or felled juniper may be positioned to protect the willows from livestock and big game.
- When juniper treatment occurs in riparian areas with low vegetative cover or bare soil, branches and boles would be left on site to minimize erosion potential and protect recovering vegetation from livestock and big game.
- If juniper treatment occurs adjacent to unstable banks (e.g., collapsing or steep unvegetated banks), the felled trees would be used to stabilize banks (Matney et al. 2005).
- Burning of juniper materials would not within the riparian greenline of streams, meadows, and seeps.

Vegetation

- Native forb and grass seed (adapted to the site) may be hand broadcast at jackpot and/or pile burn sites to facilitate establishment of vegetation.

Special Status Plants

- All known Special Status Plant (SSP) Element Occurrence (EO) "avoidance areas/buffers" would be mapped (hard copy and/or on GPS devices) and/or marked with flagging prior to and during treatment operations where impacts to SSP species may occur (See section 3.3.1 for a description SSP EOs).
- ATVs/UTVs would avoid SSP EOs during cross-country travel.
- Machinery used to pile juniper debris (e.g., track hoe) for burning would avoid SSP EOs when traveling to and from treatment areas.
- Mastication and shearing operations would not occur within 15 meters (50 feet) of SSP EOs; buffer may be increased based on site conditions (TBD by botanist)
- Pile burning of juniper debris would not occur within 60 meters (200 feet) of SSP EOs; buffer distance may be increased based on site conditions (TBD by botanist)
- Jackpot burning would not be allowed within 150 meters (500 feet) of SSP EOs

Noxious Weeds and Invasive Plants

- Juniper treatment areas would be inventoried (and previous weed treatments monitored) for noxious weeds prior to implementation in areas of concern (per consultation with the District Weeds Specialist).
- Areas considered susceptible to noxious weed spread would be monitored and treated (chemically or otherwise) post-juniper treatment.
- Noxious weeds may be treated before or after juniper treatment depending on the target species and type of herbicide, or be avoided to the extent possible to reduce the risk of spread.
- Chemical treatment of noxious weeds would adhere to the Boise District Noxious Weed EA (EA#ID100-2005-EA-265) and the Vegetation Treatments Using Herbicides on Bureau of Land Management Lands in 17 Western States Programmatic EIS (USDI BLM 2007).
- Juniper treatment equipment (masticators, trailers), including vehicles (trucks and ATVs/UTVs) would be washed prior to use in the project area to reduce the potential for noxious weed or invasive species spread.

Air Quality

- To ensure Clean Air Act compliance, burning would be conducted in accordance with the Montana/Idaho State Airshed Group Operating Guide (August 2003).
- Jackpot and pile burning would be conducted only when weather and wind conditions are appropriate and with approval from the Montana/Idaho State Airshed Group.

2.2.3 Alternative B – Proposed Action

The Boise District BLM in collaboration with the Natural Resources Conservation Service, Idaho Department of Fish and Game (IDFG), U.S. Fish and Wildlife Service, the Idaho Governor's Office of Species Conservation, Idaho Department of Lands, Owyhee County Commissioners, Owyhee Local Working Group, Trout Unlimited, University of Idaho, Pheasants Forever, and The Nature Conservancy is proposing a landscape level project to

improve and maintain functioning sage-grouse habitat in Owyhee County, Idaho. The proposal is to treat juniper on approximately 600,000 acres (focal area); 553,000 acres of non-wilderness and 47,000 acres designated as wilderness within an approximately 1.5 million acre project area (Map 3).

Sage-grouse habitat in the BOSH project area was classified using the Idaho and Southwestern Montana Greater Sage-Grouse Approved Land Use Plan Amendment and Final Environmental Impact Statement's three-tier habitat classification system. Acres for each of the three habitat types including Priority Habitat Management Areas (PHMAs), Important Habitat Management Areas (IHMAs) and General Habitat Management Areas (GHMAs) are provided in Table 2. These three designations are secondarily linked to existing sage-grouse habitat; the designations are designed to direct management to maintain and improve habitat conditions. The 2015 Soda Fire burned approximately 37,000 acres of the PHMA and 144,852 of the IHMA. There are 55 active/occupied leks mapped within the 600,000-acre focal treatment area; 9 of those leks were within the perimeter of the Soda Fire.

Table 2 – Acres of sage-grouse habitat by type and for the project area and focal treatment area before and after the 2015 Soda Fire.

Sage-grouse habitat type	Project area acres pre Soda Fire	Project area acres burned in Soda Fire	Focal area acres pre Soda Fire	Focal area acres burned in Soda Fire
PHMA	870,000	37,000 (4%)	362,000	23,000 (6%)
IHMA	434,000	145,000 (33%)	166,000	55,000 (33%)
GHMA	140,000	0	53,000	0

Wilderness is included in the proposed action because it contains 43,000 acres of PHMA, and 4,000 acres of GHMA for sage-grouse. In other words, 92% of wilderness in the focal treatment area is PHMA and 8% is GHMA. Additionally, there are approximately 16 occupied/active sage-grouse leks within the wilderness and approximately 23 occupied/active leks within nesting distance of the proposed wilderness treatment area. In wilderness areas, only areas with juniper canopy cover of <10% and only juniper <8 inches DBH would be treated. Juniper in wilderness would be cut using handsaws and branches would be scattered. No mechanized equipment or burning would be permitted in wilderness. All methods would be implemented according to BLM standard operating procedures and the design features outlined in section 2.3.2.6.

With the exception of old growth trees and treatment area of late stage encroachment not exceeding 5 acres, the BLM would treat western juniper with <20% canopy cover juniper within 10 km (6.21 miles) of leks. The proposed 10 km (6.2 mile) treatment area surrounding leks meets the ARMPA seasonal habitat objectives for lek security, nesting/early brood rearing habitat, and late brood rearing/summer habitat where it is present within the treatment area. A 10 km radius surrounding leks was selected as the treatment area based on research completed in Idaho (Connelly et al. 2013). Results of this study indicated around 80% of sage-grouse nests are within 10 km of a lek (Connelly et al. 2013), but other research indicates that up to 95% of sage-grouse nests are found within 10 km of leks (Holloran and Anderson 2005; Doherty et al. 2010). Juniper killed by wildfire in the project area would also be removed. Juniper skeletons could remain standing for decades and sage-grouse may avoid the area, even after sagebrush has re-established.

While areas with greater than20% canopy cover (late stage encroachment or late phase II and phase III) are not the primary target, there are circumstances where these areas would warrant treatment (Figure 3). The decision to treat areas in the later stages (greater than 20% canopy cover) of encroachment would be based on the following criteria:

- Juxtaposition to important sage-grouse habitat (e.g., leks, migration corridors, nesting habitat, spring sites important for brood rearing), and
- Late stage treatment area would not exceed 5 acres, and
- In plant communities considered moderate or high Resistance and Resilience (refer to section 3.2 for a description); Mapped R&R is coarse in scale, therefore determination would be made through on site examinations.

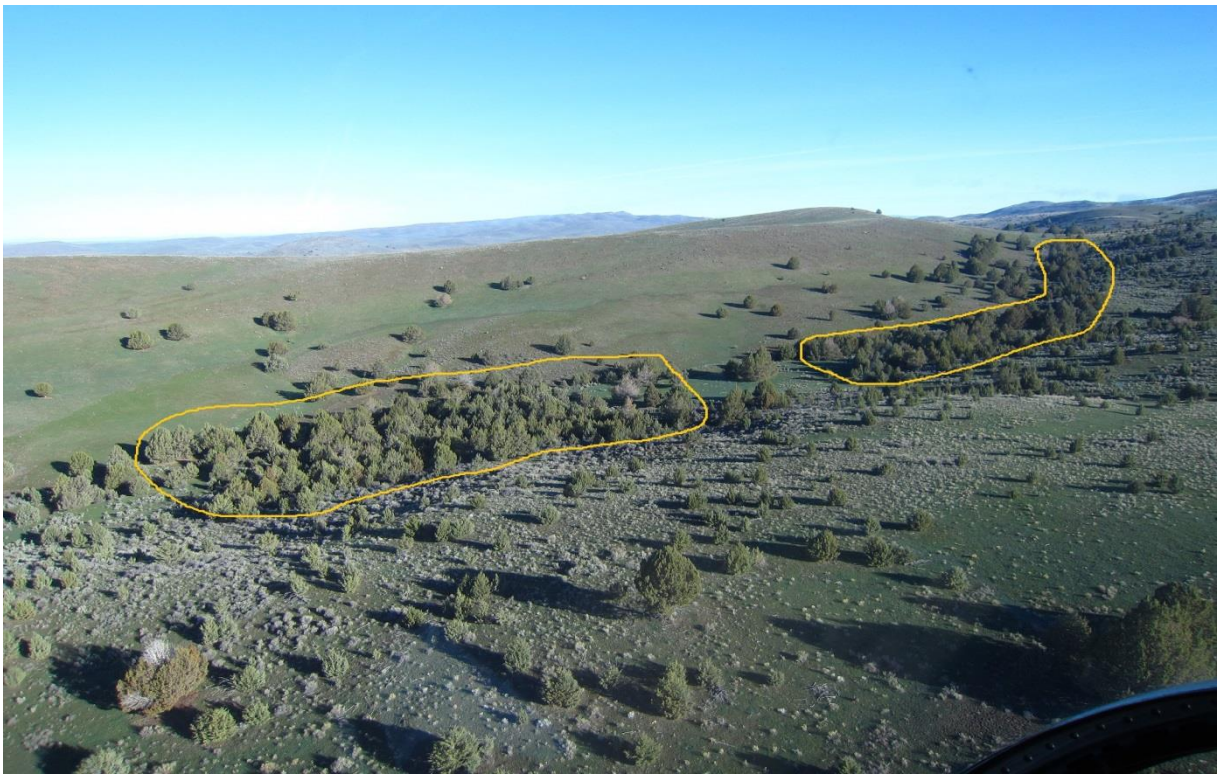


Figure 3 - Areas of late Phase II and Phase III juniper that would be treated. Figure 3 illustrates areas of late phase II and phase III juniper that are less than five acres that could also be targeted when they are present near xeric areas that would provide suitable brood rearing habitat or improve conditions along migration routes between seasonal habitats.

Juniper treatments would generally occur within the 600,000-acre focal treatment area delineated with the GIS model; however, there would be sections within the focal area where treatments would not occur because it would not be feasible to do so or the areas do not meet the treatment criteria (e.g., patch size in phase III is too large or would not directly benefit sage-grouse). Likewise, there would be locations with small and sparse juniper not identified in the tree cover analysis that would be targeted for treatment (i.e., outside the identified focal treatment area, but within the project area boundary). These areas would be identified during unit layout. BLM acknowledges that maintenance of treatments areas would need to occur across the project area. Based on growth rates published by Miller et al. (2005), retreatment would likely be required in

10-15 years. Retreatment would be far less costly than the proposed initial treatment because trees would be small and require less post cut handling (e.g., removal of large branches).

2.2.4 Alternative C – No Treatment in Wilderness

Juniper removal treatments would be identical to the proposed action, except there would be no treatment in wilderness (47,000 acres) (Map 4). The BLM would treat juniper on approximately 553,000 acres using the same methods and applying the same design features in non-wilderness as Alternative B. The approximate acres of sage-grouse habitat treated with Alternative C include 282,000 acres of PHMA, 21,000 acres of IHMA, and 49,000 acres of GHMA. Juniper treatments would include areas surrounding 47 active/occupied leks.

3.0 Affected Environment and Environmental Consequences

This section provides an evaluation of the baseline condition of the environment (i.e., resources identified during internal and external scoping as requiring analysis) potentially affected by implementation of the alternatives. The evaluation is a description of the current condition (affected environment) of identified resources and consequences or effects expected from implementing each alternative (environmental consequences). Direct and indirect impacts of the proposed actions will be discussed for BLM-administered lands.

Analyses of cumulative impacts and the scope for each resource are also presented. Cumulative effects describe impacts of the alternatives when added with other past, present, and reasonably foreseeable future actions (40 CFR 1508.7). It is difficult to quantify effects across the landscape as much of the cumulative actions and effects are reasonably speculative and somewhat immeasurable at this point. However, cumulative impacts for these other actions are discussed for all ownerships to the best of our ability using the best available data in the cumulative impacts analysis area (CIAA) identified for each resource. Cumulative actions impact resources differently (to different degrees and/or extents). Some of these actions may have no impact on a particular resource; only cumulative actions having a potential effect on a resource are presented in the analyses for a given resource.

In general, cumulative actions that have occurred in the vicinity and are likely to continue into the foreseeable future are as follows.

Wildfires – Fire history data in the project area indicate about 316,000 acres have burned at least once in the past 25 years (since 1991); however, only around 22,000 acres (7%) of these involved juniper. The 2007 Tongue Complex, for example, burned approximately 47,000 acres and the 2012 Jacks Fire burned approximately 49,000 acres. More recently, the 2015 Soda Fire burned roughly 182,000 acres of the project area.

Livestock Grazing – There are 143 allotments permitted for livestock grazing in the proposed project area. Livestock grazing is expected to continue into the foreseeable future. Allotted use levels may change in the future based on rangeland conditions and application of the Idaho Standards for Rangeland Health (Standards) and Guidelines for Livestock Management (Guidelines). The BLM requires that rangelands permitted for livestock grazing must meet or make significant progress toward meeting the Standards and Guidelines. Any changes to

grazing management would be made through the permit renewal process per Title 43 of the Code of Federal Regulations (CFR), Part 4100, Subpart 4130.

Exurban Development – Development for energy, agriculture, housing, etc., is expected to continue within the project area, most of which would occur along the Owyhee Front, which is the area south of the Snake River to the base of the Owyhee Mountains.

Fuel Breaks – The Bruneau Fuel Breaks Project is currently being implemented in the Bruneau Field Office. It includes mowing roadside shrubs and seeding approximately 85 kilometers (53 miles) of seeded fuel breaks along approximately 148 kilometer (92 miles) of roads. Mowed strips are 15-meters (50-feet) wide on each side of a road or 30-meters (100-feet) wide on one side of a road. Seeded fuel breaks would be up to 46-meters (150-feet) wide on each side of a road or 91-meters (300-feet) wide on one side of a road.

The proposed Tri-state Fuel Breaks Project would create a network of fuel breaks in southwest Idaho and eastern Oregon, connecting to existing fuel breaks developed by BLM Elko and Winnemucca, Nevada districts. An EIS is being prepared collaboratively with Idaho's Boise District and Oregon's Vale District. The BLM is proposing development of several hundred miles (to be determined) of fuel breaks within a 3.5 million-acre area along established roads using various techniques.

Juniper Treatments – Pole Creek and Trout Springs juniper treatments are located on Juniper Mountain in southwest Owyhee County. The Pole Creek project is to be implemented over a 10-year period to maintain and restore existing sagebrush steppe, aspen, and riparian vegetation communities. Two types of treatment will be utilized; hand cut/girdle followed by broadcast burning and hand cut/girdle followed by jackpot burning. The Pole Creek treatment area encompasses approximately 21,000 acres (approximately 10,000 acres fall within the BOSH Treatment Area); 5,500-7,700 acres of broadcast burning; 4,950-6,930 acres of jackpot burning, and juniper will be cut and left (scattered) on the remaining acres. Approximately 10,000 acres of the Pole Creek Project and the BOSH Project overlap. The BOSH treatments would occur in the overlap area if there are juniper trees remaining that meet the criteria for treatment still present after the Pole Creek Project has been completed. Treatments for Trout Springs include 19,500 acres of broadcast burning and 3,800 acres of jackpot burning.

South Mountain (730 acres) and Johnston Draw (2,309 acres) are research projects being implemented in Owyhee County by the Agricultural Research Service (ARS) to study the hydrologic impacts of juniper removal from areas with well-established stands of juniper. Treatments include cutting followed by broadcast burning to be completed by fall of 2015. The Johnston Draw project falls entirely within the BOSH project area boundary; the South Mountain project area is outside but within one mile of the BOSH project area boundary.

Juniper treatments are also being conducted on private lands within the project area. These projects consist of cut and scatter and mastication of juniper. Juniper treatment on private land is expected to continue for several years.

Dispersed Recreation –Dispersed recreation includes activities such as off-highway vehicle (OHV) use, camping, hunting, bird watching, hiking, backpacking, and sightseeing. Typically, OHV use is high on the trail system south of Murphy. The trail system is along the Owyhee Front and covers approximately 203,000 acres.

Impact Descriptors

Effects can be temporary (short-term) or long lasting/permanent (long-term). These terms may vary somewhat depending on the resource; therefore, each will be quantified by resource where applicable. Generally speaking:

- **Short-term** effects are changes to the environment during and following ground-disturbing activities that revert to pre-disturbance conditions, or nearly so, immediately to within a few years following the disturbance.
- **Long-term** effects are those that would remain beyond short-term ground disturbing activities.

The magnitude of potential effects is described as being major, moderate, minor, negligible, or no effect and is interpreted as follows:

- **Major** effects have the potential to cause substantial change or stress to an environmental resource or resource use. Effects generally would be long-term and/or extend over a wide area.
- **Moderate** effects are apparent and/or would be detectable by casual observers, ranging from insubstantial to substantial. Potential changes to or effects on the resource or resource use would generally be localized and short-term.
- **Minor** effects could be slight but detectable and/or would result in small but measurable changes to an environmental resource or resource use.
- **Negligible** effects have the potential to cause an immeasurable and/or insignificant change or stress to an environmental resource or use.
- **No effect** means an action would produce no discernable effect.

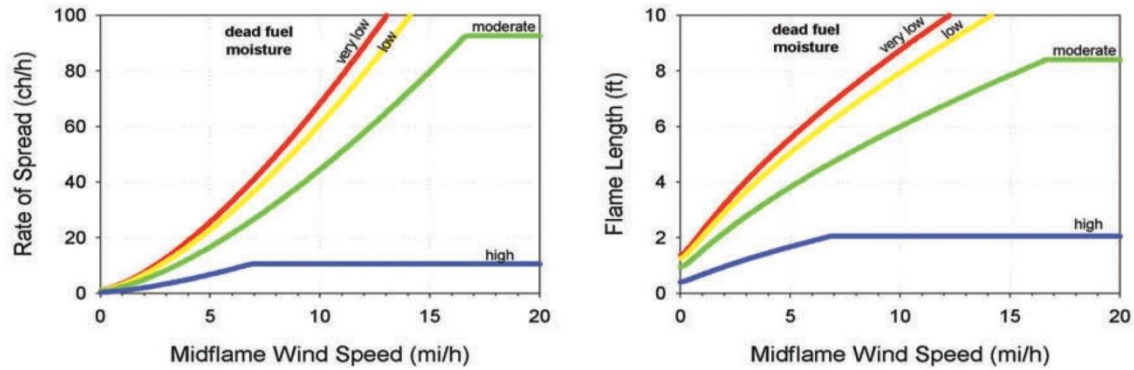
3.1 Fire Behavior

3.1.1 Affected Environment – Fire Behavior

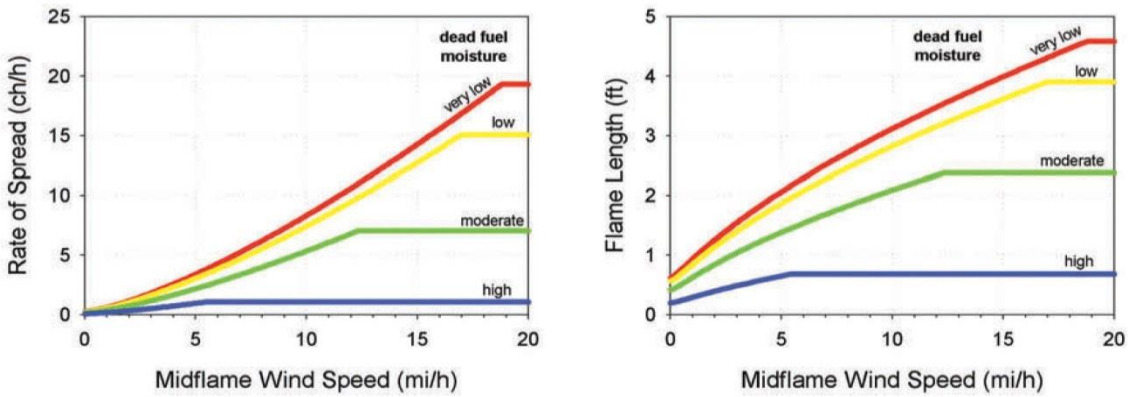
The vast majority of the of the project area and focal treatment area (early stage juniper encroachment/phase I – early phase II) fits the GS2 fire behavior fuel model: dry climate, mixture of grasses and shrubs (up to 50% shrub cover) where shrubs are 1 to 3 feet high with a moderate grass load, and fire spread rate and flame length are moderate (Scott and Burgan 2005). Areas where juniper has encroached to late phase II or phase III fit the TU1 fuel model: dry climate, timber understory where the fuel bed is a low load of grasses and/or shrubs with litter, and fire spread rate and flame length are low (Scott and Burgan 2005). The graphs[3] for the GS2 and TU1fuel models depicted below illustrate the potential rates of spread and flame lengths that may occur given certain wind and fuel moisture scenarios (Figure 4).

[3] The SB3 fuel model is also depicted because areas where juniper densities are greater (late phase II/phase III) could transition from a TU1 fuel model to an SB3 fuel model (see section 3.1.2 Environmental Consequences below).

GS2 – Moderate Load Dry Climate Grass-Shrub



TU1 – Low Load Dry Climate Timber-Grass-Shrub



SB3 – High Load Activity Fuel

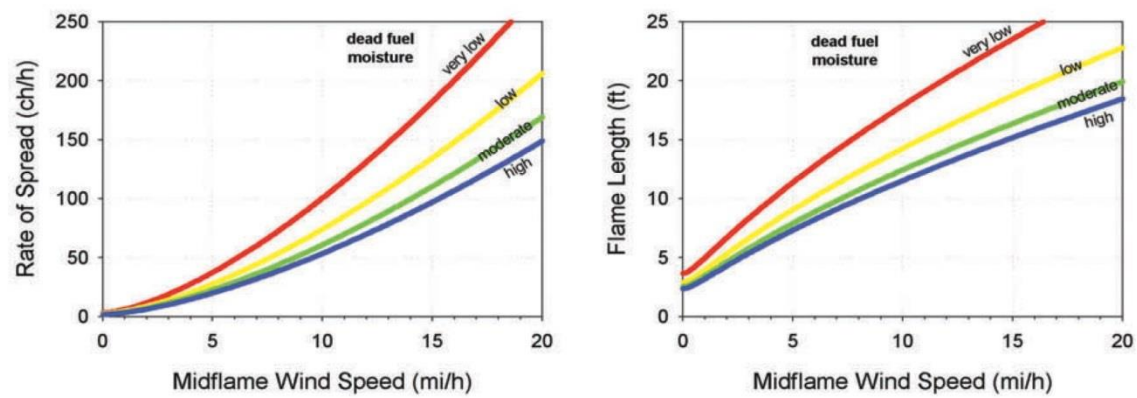


Figure 4 – Rates of spread and flame lengths predicted for the GS2, TU1, and SB3 fuel models.

3.1.2 Environmental Consequences – Fire Behavior

Residual biomass from mastication of juniper would not inherently increase the likelihood of natural fire ignition and will not be carried forward for further analysis. However, fire behavior may be influenced by the proposed juniper treatments, but the overall influence would be minor.

3.1.2.1 Alternative A – No Action

Fire behavior in the project area would remain characteristic of the GS2 fuel model with pockets of woodlands characteristic of the TU1 fuel model. However, over the long term (10+ years), as juniper increase in density, areas characteristic of the GS2 fuel model would gradually transition to the TU1 fuel model. With the die off of ladder fuels (grasses and shrubs) due to juniper encroachment, fire behavior would moderate with lower flame lengths and rates of spread. Wildfire would be less frequent or likely in the TU1 fuel types, but could be more catastrophic (i.e., higher intensity and severity) to resources (e.g., soils, vegetation, and wildlife habitat) if it does burn (Miller et al. 2008, Miller et al. 2005, Miller and Tausch 2001).

3.1.2.2 Alternative B – Proposed Action

Juniper treatments proposed in the vast majority of the focal treatment area (and greater project area) include cutting, lopping, and scattering low densities of juniper within the GS2 fuel model. Treating areas where juniper are sparsely distributed would have negligible or no effect on fire behavior where the primary carriers of fire are grasses and shrubs, and spread rates are generally high and flame lengths are moderate.

In areas with dense pockets of juniper (greater than 20% cover), the TU1 fuel model represents potential fire behavior where the spread rate is low, flame length is low, and the primary carrier of fire is a low load of grass and/or shrub with litter. If a cut and leave treatment is used, these small pockets would likely transition into an SB3 fuel model: slash-blowdown where spread rates are high, flame lengths are high, and the primary carrier of fire is a heavy dead and down activity fuel (Figure 4; Scott and Burgan 2005). This would pose a short-term (≤1 year) risk of higher intensity and higher severity fire. The risk of intensified fire behavior is of particular concern along transportation corridors.

To mitigate fire risk, mastication, piling and burning, or jackpot burning would be utilized to minimize or remove fuels (refer to section 2.3.2.5 for treatment methods). Mastication and machine piling would be accomplished with heavy equipment up to 200 feet on each side of the road corridor, and jackpot burning would be used as necessary across the project area. Pile burning and jackpot burning wouldn't occur until approximately 1 year post-treatment posing a short-term risk of increased fire behavior until the juniper material (fuels) are expended.

Currently no fuel models exist for predicting fire behavior in areas where mastication has been utilized as a fuels treatment. If a mastication treatment is utilized, there could be a significant increase in fuel loading of 1-hour and 10-hour fuels; however, masticated fuels are generally expected to reduce the intensity and rate of spread of fire (Kreye et al. 2014).

Juniper treatments would occur primarily in early stage juniper encroachment and would have little to no effect on fire behavior. In areas where dense pockets of juniper are treated, there is a

short period of time when fire risk would be elevated, but this would be mitigated through the use of mastication, pile burning, or jackpot burning to reduce the levels of the hazardous fuels.

3.1.2.3 Alternative C – No Treatment in Wilderness

Fire behavior would be identical in wilderness areas (47,000 acres) to what was described for Alternative A and identical to Alternative B in non-wilderness areas (553,000 acres).

3.1.3 Cumulative Impacts – Fire Behavior

There would be no additive impacts to fire behavior because overall effects from the proposed project would be negligible when considered with other past, present, and future actions.

3.2 Soils

3.2.1 Affected Environment – Soils

Soils information is derived from the Soil Survey of Elmore County Area, Idaho, Parts of Elmore and Owyhee Counties and from the Soil Survey of Owyhee County Area, Idaho (USDA NRCS 2015). A wide array of major landforms, soil characteristics, and ecological sites occurs in the project area and are summarized in Table 3. More detailed information regarding major land forms and their soil characteristics is presented below.

Table 3 – Major Land Forms, General Soil Information, and Ecological Sites in the Focal Treatment Area[1]

Major Land Form	General Soil Characteristics	Associated Ecological Site(s)	% of Analysis Area
Fan remnants	Well drained gravelly loams, mixed alluvium, sand	Calcareous Loam Sandy Loam	16
Stream terraces	Mixed alluvium; sand/gravel loams	Loamy Loamy Bottom	19
Mountain slopes, ridges, and structural benches	Igneous and volcanic soils, volcanic ash, loams	Claypan Douglas Fir-Snowberry Loamy Very Shallow Stony Loam	21
Escarpments	Volcanic rock and ash alluvium	Claypan Shallow Claypan Loamy	10
Volcanic plains and pyroclastic flows	Gravelly coarse sandy loams, volcanic rock/ash	Very Shallow Stony Loam Claypan Loamy Clayey	19
Volcanic domes	Igneous rock, volcanic rock and ash alluvium and colluvium	Claypan Mahogany Savanna Loamy	11
Bedrock, rubble land and badland	Solid rock, coarse rock fragments	None (support no or very sparse vegetation)	4

[1] Due to the large number of soil map units comprising the focal treatment area (greater than 1,200), only soil complexes and associations made up of 10,000 acres or more were analyzed for this section (totaling approximately 263,000 acres); the remaining smaller map units have similar features to those addressed here, so the analysis area can be extrapolated to the extent of the focal treatment area.

Fan Remnants

Fan remnants include well-drained gravelly loam consisting of mixed alluvium derived from volcanic rock and are correlated to a Calcareous Loam ecological site. Other soils occurring on fan remnants include the somewhat excessively and well drained mixed alluvium with some eolian (wind formed) sand influence and have been correlated to a Sandy Loam ecological site. This area includes approximately 41,600 acres or 16% of the area analyzed.

Stream Terraces

Common soils on stream terraces consist of mixed alluvium and may be underlain by sand and gravel at a depth of 40 to 60 inches. Loamy alluvium with some loess influence is well drained and has been correlated to a Loamy ecological site. Other stream terrace soils vary from moderately well or somewhat poorly drained, with a seasonal high water table ranging from 42 to 60 inches and have been correlated to a Loamy Bottom ecological site. These areas include approximately 49,500 acres or 19% of the area analyzed.

Mountain Slopes, Ridges, and Structural Benches

Soil on mountain slopes and ridges commonly consists of alluvium and colluvium derived from igneous rock and/or volcanic rock with bedrock at a depth of 20 to 60 inches. This substrate has been correlated to a Claypan ecological site and Douglas Fir-Snowberry ecological site. All other soils on mountain slopes and ridges have been correlated to a Loamy ecological site. Common soils on structural benches include volcanic ash influenced loamy alluvium and loess with bedrock from volcanic rock at a depth of 4 to 40 inches. Correlated ecological sites on these soils include Claypan, Loamy, and Very Shallow Stony Loam. All soils occurring on mountain slopes, ridges, and structural benches are somewhat excessively or well drained. These areas include approximately 54,900 acres or 21% of the analysis area.

Escarpments

Escarpments consist of well drained alluvium derived from volcanic rock with some influence from volcanic ash. Escarpments are associated with the Claypan, Shallow Claypan, or Loamy ecological sites. These areas include approximately 26,300 acres or 10% of the area analyzed.

Volcanic Plains and Pyroclastic Flows

All soils occurring on these landforms are somewhat excessively or well drained and consist of alluvium and colluvium derived from volcanic rock with some areas influenced by volcanic ash. Soils found in volcanic plains and pyroclastic flows can vary from very gravelly coarse sandy loam associated with Very Shallow Stony Loam ecological site with bedrock at a depth of 4 to 10 inches, to soils with bedrock at 10 to 40 inches that are correlated to a Claypan, Loamy, and Clayey ecological sites. These areas include approximately 50,700 acres or 19% of the area analyzed.

Volcanic Domes
The volcanic domes consist of colluvium derived from igneous rock with bedrock at a depth of 14 to 20 inches as well as soils that consist of ash-influenced alluvium and colluvium derived primarily from volcanic rock with bedrock at a depth of 20 to 60 inches. Correlated ecological sites on these soils include Claypan, Mahogany Savanna, and Loamy. Western juniper is associated with some of these soil types. All soils occurring on this landform are well drained. These areas include approximately 28,700 acres or 11% of the analysis area.

Bedrock, Rubble Land, and Badland
There are scattered areas of bedrock, rubble land, and badland ranging in size from less than one acre to several acres. Bedrock consists of solid rock that is exposed at the surface. Rubble land consists of course, angular rock fragments of any size lying at the base of a cliff or very steep rock slope. Gravity is the primary transport mechanism. Badlands are highly dissected areas that occur on short, steep slopes with little or no vegetative cover. These areas include approximately 11,700 acres or 4% of the area analyzed.

Erosion Potential

Wind Erodibility
The majority of soils are considered moderately susceptible to erosion by wind. Wind Erodibility Group (WEG) designations range from 2 through 8 and are based on soil properties of the surface horizon. Soils assigned to Group 2 are the most susceptible to wind erosion and those assigned to Group 8 are the least susceptible. Approximately 91% of soils are moderately susceptible to wind erosion, 8% of the soils are highly susceptible to wind erosion, and 1% of the soils have low susceptibility to erosion by wind (Table 4).

Table 4 – Potential for Erosion by Wind.

Erosion Susceptibility	WEG	Portion of Analysis Area
Low	8	1%
Moderate	3-7	91%
High	2	8%

Water Erodibility
Most of the soils present are also considered moderately susceptible to water erosion. Water erosion potential (Kw) is a numerical expression of the potential of a soil; the lower the K value, the more resistant to erosion. Approximately 31% of the soils have a low susceptibility to erosion by water, 66% of soils are moderately susceptible, and 3% of soils are highly susceptible (Table 5).

Table 5 – Potential for Erosion by Water.

Erosion Susceptibility	Kw Factor Range	Portion of Analysis Area
Low	0.0 to 0.016	31%
Moderate	0.17 to 0.40	66%
High	0.41 and above	3%

Soil Properties

Organic matter helps retain soil moisture, aggregates soil providing structure and stability, and provides nutrients (e.g., nitrogen). Organic matter content across the project area ranges from less than 1% to about 3%, although some moderate or somewhat poorly drained soils occurring

on stream terraces can range up to 6% organic matter content. Approximately half of the project area consists of soils that have stones on the surface. Stoniness classes range from stony to extremely stony in these areas. Soils with a high content of silt or very fine sand and impervious soil layers (i.e., rock fragments) are at higher risk of erosion than soils that are well drained.

3.2.2 Environmental Consequences – Soils

Impacts of Juniper Encroachment

Junipers compete for available water and nutrients in the soil and out-compete other native species. As the juniper canopy increases shrubs and herbaceous vegetation are suppressed and die off, and the amount of bare and exposed soils increases. As a result, soil organic matter decreases which affects soil structure and stability. Soil erosion increases in intensity from rain impacts in early stage encroachment to concentrated flows in the later stages of encroachment (Miller et al. 2014).

Impacts Common to Action Alternatives

The extent of adverse impacts to soils would depend on the amount and type of disturbance associated with a particular activity, as well as the erosion risk of a given area. As slopes become steeper, the risk of soil instability increases. Actions that alter soil characteristics such as plant cover and composition (amount and species), soil structure, permeability, and compaction may increase erosion potential.

Direct impacts from soil disturbing activities during juniper treatments include mixing and breaking down soil components, compaction, and removal of soils in the short term (0-3 years) and long term (10+ years). Compaction alters soil structure (e.g., reduced porosity, increased bulk density) and, therefore, affects its ability to support healthy vegetation communities and to properly cycle water and nutrients over the long term (USDA and USFS 2006). Indirect impacts to soils would include removal of ground cover (e.g., vegetation, microbiotic crusts, and litter) in the short term, thus exposing the soil surface to wind and water erosion and colonization by weedy, invasive, disturbance related vegetation (e.g., cheatgrass) and or noxious weeds (e.g., leafy spurge).

Research has shown that juniper removal improves water infiltration and reduces soil erosion on woodland-encroached sites over the long term (Pierson et al. 2007, 2013; Williams et al. 2013). Pierson et al. (2007) found tree cutting increased intercanopy herbaceous cover within 10 years and that the enhanced intercanopy vegetation and ground cover resulted in negligible intercanopy runoff and erosion from simulated high intensity rainfall. In contrast, the bare intercanopy in uncut woodlands yield high rates of soil loss from simulated rainfall (Pierson et al. 2007).

Lop and Scatter

Lop and scatter techniques would be carried out using hand tools which would limit soil disturbance. Leaving and/or scattering material (branches, boughs, etc.) would further minimize bare soil exposure and help stabilize disturbed soil surface.

Mastication
Heavy machinery could produce direct impacts to soils including damage to structure (e.g., mixing or compaction) and removal of soil. Erosion risk would increase to a minor degree where soil is disturbed. However, mastication would be done on a limited basis and limited to roadsides within the designated 60-meter (200-foot) buffer, and chips created from mastication would offset this disturbance by limiting erosion and increasing soil organic matter.

Jackpot and Pile Burning
Jackpot or pile burning could produce direct impacts to soils depending on fire intensity. Burning when soils are frozen or snow covered would limit direct impacts such as combustion of soil organic matter. Jackpot and pile burning would create areas of bare soil in the short term. Indirect impacts include erosion by wind and water in bare areas until re-vegetation occurs within one to a few growing seasons.

3.2.2.1 **Alternative A – No Action**

There would be no direct effect to soils. Indirect effects to soils would include increased soil erosion and decreased soil quality by reducing soil moisture and organic matter over the long term. Soil organic matter would continue to decline as juniper encroachment continues. Water infiltration would be reduced increasing sheet erosion and rill formation. Sedimentation would increase in surface water as run off increases in amount and intensity and soil moisture would decline with the lack of infiltration.

3.2.2.2 **Alternative B – Proposed Action**

Treatment of juniper would generally cause short-term minor disturbance to soils. Exposed soils would be minimized where juniper materials are left in place or scattered on the soil surface. Lopping trees and scattering material would produce negligible short-term soil disturbance. Over the long term, soils with a high content of silt or very fine sand and impervious soil layers would experience less erosion compared to the no action alternative due to an increase in soil surface litter expected with lop and scattering.

Erosion risk would be limited to soils within the mastication buffer (60 meters/200 feet). Where heavy machinery is used (e.g., for mastication), well drained soils would be at lower risk of compaction than poorly drained, saturated soils. Erosion potential would be minimized by scattering wood chips onto the soil surface. Chips created from mastication would offset this disturbance, reducing erosion in the short term and increasing soil organic matter over the long term. Direct impacts to soils from burning would be minor at most because fires would be conducted when soils are least vulnerable; erosion risk would be short term and dissipate as vegetation repopulates these areas.

Overall, water infiltration would increase in the short term and long term where herbaceous plants and shrubs recolonize areas previously occupied by juniper, also reducing sheet and rill erosion. A decrease in juniper canopy cover would increase soil water availability in the long-term (McIver et al. 2014). Removal of juniper, particularly in the early phases of encroachment, would reduce soil erosion and increase soil quality over the long term by increasing water infiltration, soil organic matter, and litter on the soil surface. The long-term benefits to soils would be greatest with implementation of this alternative.

3.2.2.3 Alternative C – No Treatment in Wilderness

The environmental consequences would be the same as described for Alternative A in the wilderness areas (47,000 acres). Impacts to soils would be similar to Alternative B in the treatment areas (553,000 acres). Overall magnitude of adverse impacts would be less to a minor extent. Long-term soil benefits would be slightly less than Alternative B and more than Alternative A.

3.2.3 Cumulative Impacts – Soils

3.2.3.1 Scope of Analysis

The approximately 1.5 million-acre project area serves as the cumulative impact analysis area. The project area spans portions of six watersheds: Middle Snake-Succor, Jordan, Middle Owyhee, Upper Owyhee, Bruneau and South Fork Owyhee. The cumulative impact analysis area was chosen because direct effects to soils are mostly localized in nature and cumulative effects to soils due to other activities would also be localized. The temporal frame for cumulative impacts is defined by the continued presence of the effects of past actions and the anticipated longevity of reasonably foreseeable future actions. The proposed action is anticipated to take approximately 10 to15 years to complete. Direct and indirect effects to soils would dissipate once the area has been treated. Re-vegetation to a later seral state (i.e., a mature plant community that includes recolonization by shrubs) in areas where mastication, shearing and/or jackpot burning have occurred would take 10 to 15 years, so the direct and indirect effects to soils would dissipate within 30 years of initial project implementation; therefore, cumulative effects are considered through 2045.

3.2.3.2 Current Conditions and Past, Present, and Reasonably Foreseeable Future Actions

Soil erosion in the project area occurs by wind and water and may indirectly affect adjacent areas through sediment deposition. The primary concerns are sheet and rill erosion, particularly on disturbed areas with steeper slopes or areas where the vegetative cover has been disturbed or removed. Past, present, and reasonably foreseeable future actions and events that could result in similar indirect impacts on a large scale include fire, livestock grazing, dispersed recreation (OHV, hunting, etc.), exurban development, and juniper treatments (refer to section 3.0 for a detailed description of these actions). The collective effect of past actions has contributed to the existing condition of soils described in the Affected Environment above (section 3.2.1).

Wildfire – Although the majority of the area analyzed is unburned, wildfire history indicates fire will continue to affect areas within the project area. Within the project area roughly 316,000 acres have burned at least once over the last 25 years (since 1991). Impacts to soils from wildfire depend on fire severity, which is dictated by several factors including fuel type, fuel moisture, temperature, relative humidity and wind speed. Low or moderate severity fires may burn ground cover including litter and biological soil crusts, but the soil surface and subsurface (e.g., organic matter) remain largely intact; erosion by wind and water is a short-term threat until re-vegetation occurs within one to a few growing seasons (depending on precipitation levels and fire severity). High severity fires may result in hydrophobic (water repellent) soils, reducing soil organic matter and productivity, and exposing soils to erosion by wind and water over the long term.

Wildfire suppression operations (e.g., burnout of fuels) can also lead to the additional loss of sagebrush and fine fuels in the understory of earlier phase juniper, or in adjacent sagebrush cover types, exposing these areas to additional wind or water erosion. Fire suppression activities will vary temporally and spatially depending on annual fire severity and extent. Suppression related disturbances affecting soils are generally restricted to bulldozer constructed fire lines, or hand lines to a lesser extent, which also remove vegetation and expose soils to wind and water erosion. Soil compaction may occur from heavy machinery if soils are saturated or if multiple passes are made.

Livestock grazing – Livestock have the potential to damage soils via compaction and alteration or destruction of biological crusts, particularly where they tend to congregate. Livestock grazing can also alter vegetative species composition. Historic and recent grazing management in these allotments have contributed to overall soil condition which varies across the project area. Soils in areas where livestock tend to congregate (e.g., water sources, fence lines) or trail are more heavily disturbed (e.g., compacted) than areas where livestock are dispersed. The BLM requires that rangelands meet or make significant progress toward meeting rangeland health standards (e.g., Standard 1 – Watersheds) by adjusting the timing, frequency, intensity, and/or duration of grazing as part of the permitting process.

Dispersed Recreation – Dispersed recreation can alter or destroy biological crusts, compact soil surfaces, and increasing gaps between vegetation. Areas with higher levels of OHV use, such as along the Owyhee Front, have greater levels of soil erosion than more remote areas of the project area. Trails, especially on steep slopes often concentrate overland flow leading to increased levels of erosion and trenching. Susceptibility to erosion would increase in these areas and can cause moderate effects.

Exurban Development – Pressure to subdivide or expand infrastructure (power lines etc.) is relatively low in the project area. However in areas where development does occur, such as within inholdings of private lands, impacts to soil resources are the result of activities that expose the soil and increase exposure to wind and water erosion.

Fuel Breaks – Several fuel break projects are currently being planned and implemented. Fuel breaks disrupt fuel continuity by creating areas devoid of or greatly reduced vegetation (i.e., fuels). Fuel breaks are designed to reduce fire intensity (i.e., flame lengths), slow the spread of fire, and provide firefighters an increased margin of safety to engage in suppression actions. Moderate direct effects are expected due to reducing organic matter, soil surface litter, increasing potential for compaction and exposing soil to wind and water erosion.

Juniper Treatments – Juniper removal has resulted and would result in similar effects as those described for Alternative B, section 3.2.2.2 above. However, if treatments include removal of Phase III juniper, or methods such as chaining (on state or private lands), the magnitude of direct effects would be greater.

3.2.3.3 Alternative A – Cumulative Impacts

Past, present and foreseeable future actions within the project area are having and would continue to have moderate impacts on soil resources increased soil erosion, decrease in soil

moisture and organic matter. Minor to moderate sheet and rill erosion will continue and soil quality will continue to degrade. Wildfires could produce minor to major direct and indirect impacts to soils depending on their size and frequency. During years of high wildfire activity, the extent of exposed soils could dramatically increase. Sedimentation in surface water will continue to occur. Soil compaction would continue to occur in those areas of frequent use by livestock or vehicles especially if use occurs on saturated soils. Over the long term, adverse cumulative impacts to soils would be greater than for Alternative B or C.

3.2.3.4 Alternatives B & C – Cumulative Impacts

Alternatives B and C have been combined because there would be no measurable difference between the two when combined with ongoing and future land uses, activities, and disturbances. There would be a negligible short-term increase in adverse cumulative impacts to soil resources from implementation of action alternatives (B or C) compared to Alternative A. However, implementation of alternatives B or C would produce minor to moderate long-term benefits to soils (i.e., improve water infiltration and availability and reduce sheet and rill erosion) when considered with all additive impacts compared to Alternative A.

3.3 Vegetation

3.3.1 Affected Environment – Vegetation

Climate, weather, soils, and disturbance regimes influence vegetation within the project area. Plant communities move through different phases from a reference state – pre-settlement conditions described in ecological site descriptions (USDA NRCS 2015) – to states in transition due to natural (e.g., flooding, fire, and drought) and man-made forces (e.g., fire suppression and livestock grazing management) over time. Fire ecology plays an important role in plant community composition. Fire suppression and other anthropogenic influences alter vegetative communities from grass, forb, and shrub communities to juniper dominated states with shallow rooted grasses and few shrubs. The majority of the vegetative communities within the proposed focal treatment area have juniper in the early stages of encroachment (phase I and early phase II). Low sagebrush, Wyoming big sagebrush, and mountain big sagebrush communities with native (or seeded to a small degree) herbaceous understories are the main vegetative communities across the project area and focal treatment area. In areas that have been previously and/or repeatedly disturbed, cheatgrass and medusahead, non-native invasive annual grasses, and/or early seral plants are present.

Climate and Weather Influence

Climate in the project area is characterized by hot summers and cold, snowy winters with an average of approximately 14 inches of precipitation annually. Precipitation is typically lower at elevations below 1,372 meters (4,500 feet) and higher at elevations above 1,372 meters (4,500 feet), which influences the vegetation a given area will support. For example, Wyoming big sagebrush is common below 1,372 meters (4,500 feet) and mountain big sagebrush is common above 1,524 meters (5,000 feet) in the project area. The mean annual temperature for the area is 7.7ºC (45.9ºF) with an average 91 days frost free days. Above normal precipitation in the spring (March-May) can increase the total annual production of vegetation and viable seed production within the plant communities. Late freezes, below normal precipitation, or temperatures (regardless of moisture quantity) can have an adverse impact on total plant production.

Ecological Sites (Soil Influence)
An ecological site includes specific soil and physical characteristics that differ from other land in its ability to produce a distinctive composition and quantity of vegetation, and in its ability to respond similarly to management actions and natural disturbances (NRCS 2015). Refer to section 3.1 for details regarding soils in the project area and their associated soil characteristics and ecological sites.

Loamy Sites
Approximately 42% of the focal treatment area is associated with various Loamy ecological sites. Plant community reference states in the lower elevations/lower precipitation zones are characterized by Wyoming big sagebrush, bluebunch wheatgrass, Thurber needlegrass, Sandberg bluegrass, bottlebrush squirreltail, arrowleaf balsamroot, tapertip hawksbeard and lupine. In the higher elevations/higher precipitation zones, plant community reference states are characterized by mountain big sagebrush, antelope bitterbrush, basin wildrye, Idaho fescue, Columbia needlegrass, mountain brome, prairie junegrass, snowberry, serviceberry, and horsemint. Approximately 8% of the focal treatment area is associated with the loamy bottom ecological site. The reference state is characterized by basin big sage, basin wildrye, Nevada bluegrass, and bottlebrush squirreltail. Western juniper is not associated with any of these sites, but can encroach into these areas if there is lack of fire and a seed source for the species nearby.

Claypan, Clayey, and Very Shallow Stony Loam Sites
Claypan, Clayey, or Very Shallow Stony Loam ecological sites are associated with approximately 48% of the focal treatment area. The reference state is characterized by black sagebrush, low sagebrush, Wyoming big sagebrush, alkali sagebrush, bluebunch wheatgrass, Thurber needlegrass, spiny hopsage, Nevada bluegrass, Indian ricegrass, Idaho fescue, Sandberg bluegrass, bottlebrush squirreltail, arrowleaf balsamroot and Hooker's balsamroot, Indian ricegrass and tapertip hawksbeard. Western juniper is not associated with majority these sites but can encroach into these areas if there is lack of fire and a seed source for the species nearby.

Mahogany Savanna Sites
The Mahogany Savanna ecological site is associated with two percent of the project area where the reference state is characterized by curlleaf mountain mahogany, mountain snowberry, Idaho fescue, bulbous oniongrass, mountain brome, Columbia needlegrass and western needlegrass. Western juniper is frequently associated with this site.

Plant Community Resilience and Resistance
Resilience is a plant community's ability to regain its functional processes and components following a disturbance, and resistance is the capacity of a plant community to retain functional processes and components after a disturbance (Chambers et al. 2014). The ability of plant communities to be resilient to disturbance and resistant to annual grass invasion increases with moisture, productivity and elevation (Miller et al. 2014, Chambers et al. 2014). Conversely, plant communities in lower elevation areas with lower annual precipitation tend to be less resilient to disturbance and less resistant to invasive annual plants; these areas commonly include cheatgrass or other invasive annual plants in the plant community.

Vegetation in the proposed 600,000-acre focal treatment area has been classified into High, Moderate, Low resistance and resilience (R&R) categories (Table 6, Map 5). According to the R&R modeling data presented by Chambers et al. (2014), plant communities in 63% of the focal treatment area are highly resilient to disturbance and resistant to invasive plants and 15% are moderately resilient and resistant; these communities are mainly at or above 1,524 meters (5,000 feet). Approximately 21% of plant communities exhibit low resistance and resilience and are mainly present below 1,524 meters (5,000 feet).

Table 6 - Resilience and Resistance (R&R) for Focal Treatment Area Vegetation

R&R Category	Acres in Focal Treatment Area[1]	Percent of Focal Treatment Area
High	377,600	63%
Moderate	93,200	15%
Low	124,114	21%

[1]There are approximately 437 acres (< 1% of focal treatment area) of Wetland/Riparian vegetation identified in the resilience/resistance spatial data. These areas are not assigned a resistance/resilience value; however, riparian areas and wetlands tend to be resilient (recover quickly) due moisture availability.

3.3.2 Environmental Consequences – Vegetation

Impacts of Juniper Encroachment

As juniper density increases and the trees mature, canopy cover increases restricting sunlight and rainfall to understory plants (shrubs, grasses, and forbs). Over the long term (10+ years), vigor and viability of understory plants is reduced; eventually mortality of the shrub and herbaceous understory occurs due to shading and the lack of available water. The loss of understory plants decreases plant community diversity, leaves these areas more susceptible to invasion by weedy species, and moves plant communities farther from reference state. The loss of diversity among native plant communities reduces, and eventually eliminates, seed sources necessary for natural recovery which limits the potential for restoration after disturbance.

Impacts Common to Action Alternatives

Juniper treatments directly impact vegetation by removing, damaging (i.e., breaking), or burying plants in the short term (0-3 years). When vegetation is removed and soil is exposed, early successional species colonize the site; invasive species may establish and spread if there is a seed source nearby and degrade the overall condition of plant communities. Surface disturbing activities could also indirectly affect vegetation over the long term by disrupting seed banks and mixing, eroding, or compacting soils. Soil erosion would reduce the substrate available for plants and soil compaction could limit seed germination. Impacts to plants occurring after germination but prior to seed set could be particularly harmful as both current and future generations would be affected. Methods (e.g., scattering of juniper materials), design features, and best management practices would minimize these risks (section 2.3.2). Over the long term, removal of juniper would allow shrubs and herbaceous vegetation to reoccupy sites improving plant community composition, structure, and function.

Lop and Scatter

Lopping and scattering of juniper would be executed using hand tools producing negligible direct impacts to plants occupying the juniper understory or interspaces (intercanopy). Juniper material (branches, boughs, etc.) left in place or scattered would cover and help stabilize

exposed soils, improving soil productivity over the long term which would promote vegetation recovery.

Mastication
Heavy machinery could directly impact vegetation in the short term by breaking or uprooting plants in the 200-foot treatment buffer along road corridors (see Methods section 2.3.2.5). The extent to which vegetation is disturbed would dictate the magnitude of indirect impacts to vegetation (i.e., above and below-ground productivity) over the long term. Disturbance or damage to soils could also impact plant communities (e.g., by seed bank disruption). However, mastication would be done on a limited basis and be limited to roadsides within the designated buffer where vegetation is often previously disturbed by road maintenance, etc. Similar to lop and scatter, materials created from mastication (wood chips) would reduce erosion, increase soil organic matter, and promote vegetation recovery over the long term. Annual and perennial grass production would increase in areas where mastication takes place due to increased inorganic nitrogen available in the soil (Young et al. 2014).

Jackpot and Pile Burning
Jackpot or pile burning could damage adjacent vegetation (shrubs, grasses, and forbs) depending on the intensity of the fire. Methods and best management practices (e.g., juniper materials or piles would be dry, adjacent plants would largely be dormant, ambient temperature would be low, soil moisture content would be high) would limit or eliminate the risk of fire spreading outside the target area.

3.3.2.1 **Alternative A – No Action**

Vegetation in the focal treatment area or greater project area would not be directly affected by the proposed juniper treatments. Continued juniper expansion (increasing juniper density and canopy) would result in moderate to major indirect effects to vegetation including reduced plant production, health, vigor, and diversity over the long term.

3.3.2.2 **Alternative B – Proposed Action**

Direct impacts for the implementation of the proposed action (approximately 600,000 acres of juniper treatment) include trampling, breaking, and removing the grass and forb understory and shrub component, particularly in areas where heavy machinery is used. Direct impacts would be higher than Alternative A (no treatment) and lower to a minor extent for Alternative C (approximately 553,000 acres of juniper treatment). Methods and best management practices (i.e., mastication only occurring along designated roadways and jackpot burning only in designated areas and only under specific conditions) would minimize the amount of vegetation impacted across the treatment area. Impacts to vegetation would also be minimized in areas where design features for other resources are applied (e.g., avoidance buffers for cultural, wildlife, or special status plant resources).

Mastication, jackpot burning, and pile burning would result in site-specific, moderate indirect effects by creating areas devoid of vegetation in the short term. These bare areas would be susceptible to weed invasion until re-vegetation occurs, within one to a few growing seasons for early seral grasses and forbs and several years (5 to 10) for shrub species to begin to recolonize the area. Mastication could take place within 60 meters (200 feet) along designated roads to

reduce fire hazard and would have a minor to major, short-term, site specific impact on vegetation, especially where heavy machinery mobilizes.

A reduction in juniper canopy cover would increase soil water availability and increase herbaceous cover in the long term (McIver et al 2014). Removal of juniper would reduce wildfire hazard, increase plant (shrubs and native, herbaceous perennial) production, and increase the understory plant community. The majority of the proposed project area has a moderate to high resilience to change and resistance to weed invasions after a disturbance; therefore, the long-term impacts would be minimal. Implementation of this alternative would shift the vegetative community to more closely resemble the reference state over the long term. Recovery of native herbaceous plants and shrubs would also be greater here than the other alternatives.

The wilderness Minimum Requirements Decision Guide for Alternative B would ensure that juniper treatment methods employed in the wilderness areas would cause the least possible disturbance, so impacts to vegetative resources in wilderness areas would be negligible.

3.3.2.3 Alternative C – No Treatment in Wilderness

The environmental consequences would be the same as described for Alternative A in the wilderness areas. Impacts to vegetation would be similar to Alternative B in the treatment areas, but the overall magnitude of impacts would be slightly less, as approximately 47,000 fewer acres would be treated. Long-term benefits to vegetation would be slightly less than Alternative B because of the reduced treatment area, and more than Alternative A.

3.3.3 Cumulative Impacts – Vegetation

3.3.3.1 Scope of Analysis

The CIAA for vegetation encompasses the proposed project area totaling approximately 1.5 million acres. This area was selected because it contains similar ecological sites and plant community components, conditions are similar, and land uses are comparable. Direct effects to vegetation are mostly localized in nature and cumulative effects to vegetation due to other activities would also be localized. The primary concern is loss of vegetation, particularly in areas with low resilience and resistance.

The temporal frame for cumulative impacts is identical to that described in the soils section above (3.2.3.1). Direct and indirect effects to vegetation would dissipate once the area has been treated. The proposed action is expected to take 10-15 years to complete. Re-vegetation with mid or late seral species in areas where mastication and/or burning occur is expected to take 10 to 15 years. Therefore, the direct and indirect effects would dissipate within 30 years of initial project implementation; as a result cumulative effects will be considered through 2045.

3.3.3.2 Current Conditions and Past, Present, and Reasonably Foreseeable Future Actions

Past actions to be considered include livestock grazing, dispersed recreation OHV use, hunting, etc.), exurban development, vegetation treatment and fire suppression activities. The collective effect of past actions has contributed to the existing condition of the vegetation described in the

affected environment section 3.3.1. The effects of past, current and foreseeable future activities to vegetation include fire, livestock grazing, dispersed recreation (OHV, hunting, etc.), exurban development, juniper treatment and fuel breaks.

Wildfire – Wildfire history indicates that fire will continue to affect areas within the project area. Several fires have influenced the vegetative communities in portions of the proposed project area including the 2007 Tongue Complex and 2012 Jacks fires, and most recently, the 2015 Soda Fire which burned nearly all of the vegetation in the perimeter with the exception of some small islands of sagebrush and portions of riparian areas. Monitoring information for the Crutcher Fire portion of the Tongue Complex documented that in areas with low to moderate fire severity the understory species were relatively undamaged and exhibited a high degree of recovery. Areas that burned more severely had heavy damage to perennial understory species and those areas were subsequently dominated by annual forbs and maintained fewer perennials. Monitoring information for the Jacks fire noted good perennial grass vigor; perennial grasses have increased in size since 2013 and were producing seed heads. Overall site assessments indicated that the perennial grasses were recovering in both Tongue and Jacks fires.

Intense/severe fires can effectively reset vegetative communities from mature/late successional plant communities (e.g., shrubs and perennial grass dominated communities) to early seral plant communities (e.g., annual and perennial forb and grass dominated communities). Future wildfire suppression activities will vary temporally and spatially depending on annual fire severity and extent. Suppression related disturbances are generally restricted to bulldozer constructed fire lines (dozer lines). Both wildfire and suppression activities may increase the risk of invasive annual species into vegetation communities. Species composition in areas burned by wildfire and in dozer lines will depend on the success of rehabilitation treatments and/or natural vegetation recovery following fire.

Livestock grazing – Permitted livestock grazing has the potential to affect vegetation by altering biomass and species composition. There are 143 grazing allotments within the BOSH project boundary. As public land grazing permits are renewed, BLM is required to adjust management of allotments not currently meeting rangeland health standards by changing the timing, frequency, intensity, and/or duration of grazing. Livestock grazing is expected to continue at current levels into the foreseeable future.

Dispersed recreation – It is difficult to quantify the spatial and temporal extent of OHV, camping, hunting, bird watching, hiking, backpacking and sightseeing. These activities can affect vegetation by harming individual plants, impacting communities and increasing gaps between vegetation. Susceptibility to weed invasion would increase in these areas and can cause moderate effects.

Exurban Development – Habitat fragmentation and pressure to subdivide is relatively low in the project area however in areas where it does occur can have moderate effects on vegetative resources by creating new construction sites and roads which removes vegetation and increase the potential for invasive weeds to establish.

Fuel Breaks – Several fuel break projects are currently being implemented and planned in an effort to create safe, defensible space for fire fighters. The Bruneau Fuel Breaks Project consists of vegetation alteration via 92 miles of mowing and 52 miles of seeding to create fuel breaks. The Tri-state Fuel Breaks Project is still in the planning phase. These projects include planting short statured native and/or introduced species, or creating areas devoid of or greatly reduced vegetation (i.e., fuels) to improve access for fire suppression in and around the project areas. Moderate site-specific direct effects are expected due to removal of vegetation. Long-term indirect effects include increased potential for weed invasion; however, best management practices (BMPs), project design features and ongoing weed treatments is expected to offset these impacts.

Juniper Treatments –The Pole Creek and Trout Springs juniper treatments overlap the project area. Juniper removal that occurs in the project area will result in similar effects as those described under Alternative B, section 3.3.2.2 above. However, effects on private or state lands may be more severe if treatments include removal of juniper in late stages of encroachment or include methods such as chaining; private land owners are not required to follow BLM's (or other) BMPs, and BMPs may vary for projects on state lands. The Agricultural Research Service is currently studying the effects to hydrology by removing juniper in and near the BOSH project area on private lands; however, it is not known at this time when the studies will be completed.

3.3.3.3 Alternative A – Cumulative Impacts

Past, present and foreseeable future actions within the project area are having and would continue to have moderate impacts on vegetative resources via disturbance of individual plants, decreasing productivity and moving plant communities away from the reference state. Fewer juniper treatments would occur under Alternative A, resulting in sagebrush steppe plant communities being gradually replaced by juniper woodland communities on more acres over the long term. A corresponding change in fuel loads would also occur. Impacts to vegetation from fire could be negligible to major depending on the size and intensity of future wildfires. Burned areas would be more susceptible to invasion by invasive annual grasses. Overall cumulative effects would be moderate and include loss of sagebrush steppe plant communities from continued juniper encroachment, wildfire, and invasive annual grasses. In the long term, the cumulative loss of sagebrush communities under Alternative A would be greater than under Alternative B or Alternative C.

3.3.3.4 Alternatives B and C – Cumulative Impacts

Alternatives B and C have been combined due to no measureable difference between them when considering all cumulative impacts. Similar to Alternative A, past, present and foreseeable future actions within the project area are having and would continue to have moderate impacts on vegetative resources by disturbing individual plants, altering plant communities away from the reference state, and decreasing productivity. Alternatives B and C would have negligible short-term increases in negative impacts to the vegetative resources due to the implementation of juniper treatments when considered with other past, present and foreseeable future actions.

Over the 10-15 year life of the project, encroaching juniper would be treated in sagebrush steppe communities on up to 600,000 acres, preventing conversion of sagebrush steppe to juniper

woodlands in those areas. This would represent a reduction in fuel loads that would be expected in the long-term under Alternative A. The spread and intensity of wildfire and associated impacts of fire suppression activities would be reduced compared to Alternative A. Therefore, the cumulative adverse impacts of Alternative B and Alternative C on vegetation in the project area would be moderately less than those under the No Action alternative.

3.4 Special Status Plants

3.4.1 Affected Environment – Special Status Plants

Special status plants (SSPs) include those species listed or proposed for listing under the Endangered Species Act (ESA) and species designated as sensitive by the BLM State Director. The BLM SSPs are assigned a numeric ranking (Type 1 to 4) according to scarcity and risk of extinction as follows:

- Type 1 = Federally Threatened, Endangered, Proposed and Candidate Species
- Type 2 = Range-wide/Globally Imperiled Species – High Endangerment
- Type 3 = Range-wide/Globally Imperiled Species – Moderate Endangerment
- Type 4 = Species of Concern

The IDFG Natural Heritage Program maintains records for these sensitive species in terms of Elemental Occurrences (EO). An EO is a specific geographic location where a species or natural community is, or was, present. Populations of a species located greater than 1 kilometer (0.62 miles) apart are identified as separate EOs. For the purpose of this project, only SSP that met the following criteria[4] were considered for analysis:

- EO location precision was S (high precision location data) or M (good precision location data to within 1.25 miles); G (vague locality data) was not included
- Last EO observations (and reports) were within the past 30 years (≥1985)
- Location was within the Project Area and habitat could be associated with juniper, or location could be associated with treatment access (even though habitat not associated with juniper)

Special status plant species occur in a variety of plant communities and physical habitats, many of which have distinctive soil types, and several species often occur together (Table 7 and Table 8). The general habitat types that support special status plants in the project area are lake-bed sediments, cindery soils, clay soils, sagebrush steppe, sandy soils, lithic soils, and wetland areas. Eleven SSP habitats containing 91 EOs (or portions, thereof) are in the project area where juniper are present or are likely to encroach (Table 7, Maps 6 and 7). Nine SSP habitats containing 77 EOs (or portions, thereof) do not include juniper due to highly specific soil characteristics; however, associated EOs are located along or near roads that could potentially be used as access routes for juniper treatments (Table 8, Maps 6 and 7).

[4] G is the lowest precision and is typically applied by the Idaho Fish and Game's Idaho Natural Heritage program to historic observations and/or observations lacking GPS data. A large buffer (e.g., 5 to 10-mile diameter) is created around a centroid, indicating that the location of the EO likely occurs/occurred somewhere within the polygon, but confidence is low as to its precise location. EOs with G precision and/or EOs where the most recent observation was before 1985 (≥30 years ago) are not included because the certainty of their presence is low. EOs ranked X (extirpated) are also not included.

Tables 7 and 8 also present the range of estimated viability rankings for each SSP. Estimated viability is categorized by the IDFG Natural Heritage Program as follows: A = excellent; B = good; C = fair; D = poor; and E = confirmed extant but population size, condition, and landscape context has not been assessed. Occasionally, combinations of these are used to indicate the differences in rank specifications. For example, the condition of a population itself might be good (rank B), but the landscape context (e.g., overall plant community or habitat condition) might be fair (rank C); hence, an overall ranking of BC. Most of the EOs have been rated in good condition. Excellent or good estimated viability correlates to healthy, often numerous plants and little or no disturbance or disturbance-related vegetation (e.g., cheatgrass and/or weedy annual forbs) in the surrounding plant community. Poor estimated viability, on the other hand, correlates to stressed, often few plants and heavy disturbance and/or disturbance-related vegetation.

The Soda Fire boundary contains 66 of the 186 EOs in the project area. The 2015 Soda Fire Emergency Stabilization and Rehabilitation (ESR) Plan indicated that due the open, sandy or ash soils with low vegetative cover where these 66 EOs tend to occur, they were often unburned or burned at a lower intensity than the surrounding area vegetation. The ESR Plan also indicated that surrounding area vegetation (i.e., sagebrush and perennial grasses) experienced high mortality, overall. Although the estimated viability rankings presented in the tables below do not account for the Soda Fire, we can deduce that population conditions for the 66 EOs are likely similar to conditions prior to the fire because they were relatively unharmed, but overall habitat conditions have degraded due to the high mortality of nearby vegetation (i.e., plant communities). Extensive treatments are underway to rehabilitate these and other habitats burned by the Soda Fire.

Table 7 – Special status plants potentially associated with western juniper in project area boundary.

Plant Name	Type #	Number of EOs	Estimated Viability	General Habitat Characteristics
Bacigalupi's downingia	4	8	AB-C	edges of wet meadows, vernal pools
Barren milkvetch	3	5	B/BC	Ash outcrops on bluffs, knolls, and slopes in sagebrush and bitterbrush communities; near Dry and McBride creeks
Dimeresia	3	5	B/BC	dry, rocky cinder or gravelly soils
Harlequin calicoflower	3	1	E	edges of wet meadows, vernal pools
Least phacelia	2	12	A-C	moist understory of California false hellebore, willow/tall forb communities in meadows
Mud Flat milkvetch	3	31	A-C	fine loamy soils in low sagebrush and Wyoming big sagebrush communities

Plant Name	Type #	Number of EOs	Estimated Viability	General Habitat Characteristics
Newberry's milkvetch	4	1	B	coarse, gravelly-sandy soil; erosive, loose gentle to steep slopes; near Simpson's hedgehog cactus
One-flowered goldenweed	4	1	C	On terraces along water courses
Simpson's hedgehog cactus	4	8	AB-C	rocky or sandy benches and canyon rims in low sagebrush or bud sagebrush communities
Snake River milkvetch	4	9	B-C	loosely aggregated, frequently moving sand and gravelly sand deposits on bluffs/talus/dunes, often with sagebrush
stiff milkvetch	4	10	A-C	rocky hilltops, hillsides and canyon benches of sagebrush communities to lower edge of pine forest; on volcanic, basalt

Table 8 – Special status plants not associated with western juniper, but potentially associated with access roads in project area boundary.

Plant Name	Type #	Number of EOs	Estimated Viability	General Habitat Characteristics
Malheur prince's plume	2	3	B (1D)	dry plains on sparsely vegetated clay soils w/shadscale; 1 EO along possible access road
Malheur yellow phacelia	3	15	A-C	Volcanic ash clay soils typically on open, barren slopes
Owyhee clover	2	2	B-C	barren slopes, yellow-green ash & tuff soils; 1 EO along possible access road
Packard's buckwheat	3	3	A-B	gravelly benches on lakebed sediments often w/ shadscale/mixed desert shrub
Packard's desertparsley	2	9	B-CD	gravelly benches on lakebed sediments often w/ shadscale/mixed desert shrub
rigid thread bush	4	4	BC-BD	sandy, cindery soils in salt desert shrub zone
smooth stickleaf	2	16	A-C (1D)	brown, green, or grey volcanic ash
white eatonella	4	9	B-C	dry, sandy or volcanic soils
White-margined waxplant	4	16	B-C (1D)	dry sandy-gravelly or loose ash soils in shadscale/greasewood/salt desert shrub communities

3.4.2 Environmental Consequences – Special Status Plants

Direct Impacts of Project Implementation

Direct impacts to SPPs include trampling, breakage, and removal of plants via treatment activities. Impact magnitude would depend on the number of plants affected within an EO. Trampling and breakage of SSPs would be short term (0-3 years); individual plants would recover within that timeframe providing the damage is not major, there are no additional or repeated impacts, and precipitation is within normal range (compared to 10-year average). Impacts to an EO or population from removal of plants would be longer term (3-10 years); recovery would depend on preponderance of annual and noxious invasives, on-going anthropogenic disturbances, and SSP seed bank extent and viability.

Indirect Impacts of Project Implementation

Adverse indirect impacts to SSPs include habitat degradation, reduced habitat productivity, and decreased estimated viability by both treatment activities and by juniper encroachment. Impact magnitude would depend on the extent of the area of disturbance. Disturbance from juniper treatment-related activities would produce short-term impacts to SSPs and habitat. Juniper encroachment (increases in distribution and density) would degrade SSP habitat over the long term by suppression of understory growth (shrubs and herbaceous plants), leaving areas open to soil erosion and invasion by noxious or weedy species (Allen and Nowak 2008). Suppression of understory growth and shifts in plant community composition would impact ecological processes (i.e., water and nutrient capture and cycling) degrading SSP habitat over the long term (10+ years). Conversely, juniper abatement in SSP habitat would release understory herbaceous (grasses and forbs) and shrub species previously suppressed by juniper. Recovery of these life forms would improve SSP habitat condition, productivity, estimated viability, and bolster pollinator populations over the long term.

Resilience/Resistance Considerations

In general, most of the SSP EOs have good estimated viability and most of the vegetation communities in the focal treatment area are in the high category for resistance and resilience (63%) (See Vegetation section 3.3.1 and Map 4). Special status plant EOs with high or good estimated viability, particularly in areas of high resistance and resilience, would recover more readily from direct impacts of project implementation and be less likely to incur indirect impacts (e.g., reductions in plant productivity) than EOs with fair or poor estimated viability in areas of low resistance and resilience.

3.4.2.1 **Alternative A – No Action**

No direct adverse impacts to special status plant EOs would take place if juniper is not treated in the proposed treatment and/or greater project area. Over the long term, the 91 SSP EOs that occupy habitats where juniper can survive and thrive (Table 7) would be displaced by encroaching juniper and/or experience habitat degradation due to ecological changes. Long-term indirect impacts to these 91 EOs could be minor to major depending on the rate that juniper density increases or juniper becomes established.

3.4.2.2 **Alternative B – Proposed Action**

Up to 168 SSP EOs could be directly or indirectly negatively affected by juniper treatments, 91 in habitats commonly occupied by juniper in the focal treatment area and 77 associated with

possible treatment access in the treatment and/or project area. Duration of direct impacts would depend on the degree of damage to plants in an EO or population (i.e., trampling and breakage = short term, removal = longer term). Impact magnitude would depend on the number of plants damaged and the disturbance footprint within EOs or populations (the greater the number of plants or area of habitat disturbed, the greater the impact).

However, methods and design features detailed in section 2.2.2.6 (clearances, avoidance buffers, timing restrictions, and travel/road use requirements) would limit these impacts, and the overall good estimated viability and moderate to high resistance/resilience would encourage recovery. The wilderness Minimum Requirements Analysis (MRA) prepared for the proposed action would also ensure that juniper treatment methods employed in wilderness (i.e., hand tools only, foot traffic only) would cause the least possible disturbance. Overall adverse impacts to SSPs would be minor at most.

Long-term vegetation community recovery following juniper treatments would benefit habitat and estimated viability for the 91 EOs commonly occupied by juniper. Long-term, site specific benefits could be minor to major depending on the extent of juniper encroachment associated with EOs. Overall benefits to SSP habitat (i.e., habitat integrity) would be greatest in this scenario.

3.4.2.3 Alternative C – No Treatment in Wilderness

Adverse and favorable impacts would be nearly identical to those described for Alternative B. Wilderness areas (approximately 47,000 acres) would be excluded from juniper treatments, so up to 152 EOs (16 fewer EOs than Alternative B) could be directly and/or indirectly impacted. Long-term benefits of vegetation community recovery would be slightly less than Alternative B and more than Alternative A.

3.4.3 Cumulative Impacts – Special Status Plants

3.4.3.1 Scope of Analysis

The geographic scope for the cumulative impact analysis area (CIAA) is the 1.5 million-acre proposed project area (Map 1). The CIAA contains private, state, and BLM-administered lands. This area was selected because it has similar plant community and SSP habitat attributes, and land uses are similar across the CIAA. The temporal scope is 30 years for effects from past actions and 15 years for future actions (the timeframe for this project).

3.4.3.2 Current Conditions and Past, Present, and Reasonably Foreseeable Future Actions

Current condition of SSPs in the CIAA is as described in the Affected Environment above (section 3.4.1). Past, ongoing, and reasonably foreseeable future actions contributing to current conditions of SSPs in the CIAA include livestock grazing, wildfire, road and right-of-way maintenance, fuel break development, and juniper treatments. See section 3.0 for a detailed description of the actions and projects identified here.

Wildfire

Many wildfires have burned within the CIAA (approximately 316,000 acres, 21% of the CIAA) since 1991 with some overlap, though the majority remains unburned. The larger fires include the 2007 Tongue Complex (47,000 acres), the Jacks Fire (49,000 acres), and the 2015 Soda Fire (285,000 acres). Fires have shaped/are shaping the vegetation communities in the project area where they occurred. Resistant and resilient plant communities remain abundant in the CIAA, and SSP habitat is largely in good condition, overall. Vegetation and special status plant recovery (66 EOs) in the Soda Fire will depend on the extent to which rehabilitation efforts are successful and the site's resistance and resiliency.

Livestock Grazing

There are 143 grazing allotments that intersect the CIAA. Livestock grazing can damage and remove vegetation and disturb soils, especially where the animals tend to congregate (e.g., fences, gates, troughs and supplement sites). These areas tend to be dominated by invasive and weedy vegetation. Special status plant EOs located in or near these areas are likely in poor condition. The BLM applies Idaho Standards and Guidelines, so current and future livestock grazing is projected to maintain or improve vegetation community condition on the whole. However, livestock grazing would likely continue to alter plant communities, particularly in localized areas adjacent to fences, gates and livestock facilities (e.g. troughs and supplement sites) perpetuating disturbance and disturbance-related vegetation in those areas.

Roads and Rights-of-Way

Ongoing maintenance (e.g., blading, grading, and/or spraying) along these features will continue to negatively affect vegetation and SSP habitat within and adjacent to maintained buffers. Blading and grading disturbs soils and vegetation which degrades nearby SSP habitat, or has removed it entirely from the maintenance footprint.

Fuel Breaks

The Bruneau Fuel Break Project (145 miles) and the proposed Tri-state Fuel Break Project (3.5 million acre boundary) would create fuel breaks along established roads in Owyhee County over the next several years. Direct effects include removal of vegetation in the project area. Indirect effects include alterations in species composition (i.e., from current vegetation to seeded species, or reductions in vegetation from mowing and chemical treatments), and reduction in fire size and fire return intervals. Fuel break development and maintenance could degrade or eliminate SSPs and habitat directly associated with the fuel break footprint, but could protect and maintain SSPs and habitat across the landscape by enhancing wildfire suppression. The magnitude and extent of adverse impacts depends on number/acres of plants disturbed. However, application BLM standard operating procedures and other stipulations or design features outlined in the plans are designed to limit these impacts.

Juniper Treatments

Juniper treatments would have minor, short-term, indirect adverse impacts and minor to moderate long-term benefits as described for Alternative B above. Best management practices and project design features would limit impacts to SSPs and habitat. Long-term recovery of vegetation in response to removal of juniper would, in turn, improve SSP habitat in treatment areas.

3.4.3.3 Alternative A – Cumulative Impacts

Special status plants and habitat would be affected in the same manner and to the same degree by the factors listed above, with the exception of future wildfire which is difficult to predict. Cumulative impacts would, overall, be minor. The absence of juniper treatments would result in minor reductions in overall adverse impacts compared to alternatives B and C. Wildfires could produce minor to major direct and indirect impacts to SSPs and habitat depending on fire size and frequency. Future vegetation rehabilitation treatments (e.g., drill and/or aerial seedings and shrub seedling planting) would offset the impacts of fire to the degree that they are successful.

3.4.3.4 Alternatives B and C – Cumulative Impacts

Alternatives B and C have been combined because there would be no measurable difference between them when addressed with all cumulative actions. Juniper treatments proposed for the BOSH project could produce minor negative additive impacts in the CIAA. Design features, such as avoidance buffers, to minimize disturbance to SSPs and habitat and long term improvements to habitat condition would mitigate these risks.

3.5 Noxious Weeds

3.5.1 Affected Environment – Noxious Weeds

Noxious is a legal designation given by the Director of the Idaho State Department of Agriculture (ISDA) to any plant having the potential to cause injury to public health, crops, livestock, land or other property (Idaho Statute 22-2402). A noxious weed is commonly defined as a plant that grows out of place and is competitive, persistent, and pernicious (James, et al, 1991). The ISDA is responsible for administering the State Noxious Weed Law in Idaho and maintains a list of noxious weeds.

The Boise District BLM has an active weed control program that tracks the locations of noxious weeds and treats known weed infestations using chemical, mechanical, and biological control techniques, or a combination of these. Infestations of noxious weeds are treated contingent upon the BLM annual weed budget, employee availability, and noxious weed priority. The BLM also collaborates with Cooperative Weed Management Areas (CWMAs) that include federal, state, county, and private entities to combat noxious weeds across ownership boundaries. The Eastern Owyhee, Jordan Valley, and Northwest Owyhee CWMAs fall within the project area.

There are nine primary noxious species at risk of encounter and/or spread during juniper treatment activities (Table 9, Map 8[5]). These species vary in density and distribution in the project area. Most of the recorded weed occurrences are located along/near roads (i.e., disturbed areas along major roads and two-track roads) and are largely associated with mesic (moist) or seasonably wet sites, though many may expand into and occupy drier sites. The vast majority of mapped sites have been chemically treated one or more times in the last 10 years; some biological control has also been implemented for Canada thistle and leafy spurge.

[5] Map 8 depicts polygons combining noxious weed occurrences buffered by 0.5 mile; often there are many points (occurrences with various spatial extents - 0.1 acre, 1 acre, 5 acres, etc.) clustered in an area. Buffering weed occurrences makes them easier to visualize and provides a picture of the likely area of expansion for analysis purposes.

Table 9 – The primary noxious weeds[1] found in the focal treatment area, their abundance and risk of spread.

Species	Distribution[2]	Risk[3]
Canada thistle	Common in riparian areas, not present in uplands	High in riparian areas
Diffuse knapweed	Limited occurrences in uplands	Medium throughout
Leafy spurge	Extensive near Jordan Creek and tributaries, scattered in uplands	High throughout
Puncturevine	Scattered along roadsides only	Medium-High roadsides
Rush skeletonweed	Limited	High throughout
Russian knapweed	Limited	Medium throughout
Scotch thistle	Common in heavily disturbed sites (e.g., reservoirs), limited elsewhere	Medium throughout
Spotted knapweed	Limited along roadsides	Medium throughout
Whitetop	Common on roadsides, disturbed sites, and near riparian areas	High throughout

[1] A few occurrences of perennial pepperweed, poison hemlock, musk thistle, purple loosestrife, and tamarisk, noxious weeds, and Russian olive, an invasive exotic species, were also mapped in the focal treatment area. However, these species are found in areas (e.g., river corridors, steep water courses, willow and aspen groves were there are no juniper) that do not meet the juniper treatment criteria and were included erroneously as a function of the GIS model; therefore, these species were not included in the table or included in the effects analysis.
[2] Limited – present in only a few locations, individual occurrences generally small (<1 acre); Scattered – sporadically distributed, individual occurrences vary in size (<0.1 acre to 5 acres); Common – widespread, individual occurrences vary in size (<0.1 acre to 5 acres).
[3] Risk of expansion (under current circumstances – i.e., current actions, conditions, uses)

Noxious weeds spread by dispersal of seeds or plant parts in a variety of ways; wind, water, animals, machinery, and people transport seed and plant parts from one location to another. They produce abundant seeds, and many have attaching devices (e.g. hooks, barbs, sticky resins) that facilitate their transport and dispersal. Highways, roads, trails, and river corridors serve as routes of initial establishment and weeds may advance from these corridors into new areas (ISDA 2005). Noxious weeds are capable of invading and dominating disturbed areas (roadsides, areas burned by wildfire, etc.) over a wide range of precipitation regimes and habitats (Sheley and Petroff 1999).

3.5.2 Environmental Impacts – Noxious Weeds

Direct Impacts of Project Implementation

Transport and deposition of noxious weed seeds via machinery during treatment implementation would be the primary direct impact. Direct impacts also include breakage, trampling, or removal of noxious weeds during juniper treatment activities (i.e., by stepping on, driving over, mastication/shearing operations, or burning); however, these impacts would be inconsequential to the spread or control of noxious weed populations.

Indirect Impacts of Project Implementation

Ground disturbance creating open niches where noxious weed seeds could germinate would be the primary indirect impact. Access roads for juniper treatment, particularly where mastication

or shearing machinery is used in the 200-foot juniper treatment footprint adjacent to roads, could become corridors and seed sources for noxious weed establishment and spread. Damage to native plants and soils may reduce plants' overall productivity and competitiveness, creating niches for noxious weeds to occupy. Conversely, short-term (less than 3 years) and long-term (10+ years) recovery of native vegetation (i.e., herbaceous perennials and shrubs, respectively) following juniper removal combined with noxious weed treatments (i.e., integrated weed management) would minimize the potential for noxious species to expand (Sheley and Petroff 1999). Noxious weed inventories and treatments and juniper treatment design features would offset these impacts.

Resilience/Resistance Considerations

The majority of the proposed project area and nearly all of the focal treatment area is 1,524 meters (5,000 feet) or above in elevation. Upland plant communities above 1,524 meters (5,000 feet) elevation are generally less prone to weed spread than those at lower elevations. Greater effective precipitation at higher elevations (or in more northern or north-facing sites) often results in greater perennial plant cover that is better at resisting weed invasion (Miller et al. 2014). At lower elevations with lower precipitation, plant communities tend to be less resistant and resilient to disturbance and have higher frequencies of noxious and invasive plants. See Vegetation section 3.3.1 for discussion of resilience and resistance and Map 5 for the distribution of plant communities in high, medium, and low resilience/resistance categories.

3.5.2.1 Alternative A – No Action

Noxious weeds would not be affected by juniper treatments or treatment related activities (e.g., ATVs and other machinery). The perennial herbaceous and shrub components of vegetation communities in the focal treatment area would continue to be suppressed by encroaching juniper. The existing noxious weeds would continue to propagate and expand through natural (wind, water, and animals) and other means (recreationists, etc.), particularly in less resilient and disturbed plant communities. The noxious weed program and CWMAs would continue noxious weed inventories and treatments (herbicide application and biological and mechanical control) to minimize their spread.

3.5.2.2 Alternative B – Proposed Action

The potential for noxious weeds to spread via implementation of the proposed action (approximately 600,000 acres of juniper treatment) is higher than for Alternative A (no treatment), and for Alternative C (approximately 553,000 acres of juniper treatment) to a minor extent. The wilderness MRA would ensure that juniper treatment methods employed in wilderness (i.e., hand tools and foot travel only) would create the least possible disturbance while still obtaining project objectives. Design features detailed in section 2.3.2.6 (avoidance, monitoring/inventory, cleaning vehicles and machinery, and broadcast seeding native species on burned sites) and ongoing weed treatments (via chemical, mechanical and biological means) would control and/or limit the spread of noxious weeds from activities related to the proposed juniper treatments.

Burning, particularly pile burning, could create small areas of exposed soil, opening niches for noxious weed expansion over the short term until vegetation recovery occurs. If a pile or jackpot fire is more intense or severe than expected due to site conditions, soils could be impacted

prolonging recovery of vegetation and/or seed establishment and increasing susceptibility for noxious weed spread at that site. However, jackpot and pile burning should produce little soil disturbance and little disturbance to surrounding vegetation, since fires would be implemented during low fire activity times (i.e., adequate live fuel moisture of shrubs and when soils are snow covered or frozen); therefore, the risk of spreading noxious weeds into these sites would mostly be minor. Recovery of native herbaceous perennial plants and shrubs would also be greatest in this scenario; healthy, functioning, native perennial plant communities would stem the spread of noxious weeds over the long term (10+ years).

3.5.2.3 Alternative C – No Treatment in Wilderness

The potential for noxious weeds to expand via juniper treatment activities would be similar to Alternative B, but to a lesser degree as juniper treatments would not be conducted in wilderness (around 47,000 fewer acres). Recovery of native herbaceous perennial plants and shrubs would also be to a lesser degree than Alternative B and to a greater degree than Alternative A.

3.5.3 Cumulative Impacts – Noxious Weeds

3.5.3.1 Scope of Analysis

The geographic scope for cumulative effects on noxious weed expansion is the 1.5 million-acre project area. This area was selected as the cumulative impacts analysis area because it contains similar plant community components and land uses are comparable. The timeframe for effects from past actions is 30 years and 15 years (the timeframe for this project) for future actions.

3.5.3.2 Current Conditions and Past, Present, and Reasonably Foreseeable Future Actions

The current condition of the CIAA is similar to the focal treatment area described in section 3.5.1, Affected Environment. Weed species recorded in and out of the focal treatment area are the same, except for a few occurrences of yellow starthistle recorded (and treated) in the project area boundary. Past, ongoing, and future actions contributing to noxious weed extent in the CIAA include livestock grazing, wildfire, road and right-of-way maintenance, fuel break development, and juniper treatments.

Wildfire

The wildfires previously discuss have influenced the degree to which noxious plants have moved into the vegetation communities impacted by wildfire. Resistant and resilient plant communities remain abundant in the CIAA; however, future wildfires could produce minor to major impacts to plant communities depending upon their extent and severity, which in turn will influence the introduction and spread of noxious weeds. Future rehabilitation treatments (i.e., drill and/or aerial seedings and shrub seedling planting) would offset the impacts of fire to the degree that they are successful.

Livestock Grazing

Livestock grazing would likely continue to alter plant communities, particularly in localized areas adjacent to fences, gates and livestock facilities (e.g. troughs and supplement sites), which may include the spread of noxious weeds. Livestock grazing would continue at current levels into the foreseeable future.

Roads and Rights-of-Way

Ongoing maintenance (e.g., blading, grading, and/or spraying) along these features will continue to affect vegetation within and adjacent to maintained buffers. Blading and grading disturb soils and vegetation and often create conditions conducive to noxious species establishment. Continued spraying of these sites helps to keep weeds relatively restricted to the maintained buffers or to a minimum (e.g., around power line poles, which are kept relatively free of vegetation to prevent fire).

Fuel Breaks

Direct effects of fuel break development include removal or treatment of noxious weeds in the project area. Indirect effects include alterations in species composition (i.e., from current vegetation to seeded species, or reductions in vegetation from mowing and chemical treatments), and reduction in fire size and fire return intervals. Seeded plant communities may better compete with noxious weeds and fewer fires would reduce the potential for noxious weeds in these areas over the long-term. Vegetation rehabilitation and restoration projects would impact noxious weeds and their distribution similarly.

Juniper Treatments

Juniper treatments would have minor, short-term, indirect adverse impacts and minor to moderate long-term benefits as described for Alternative B above. Temporary ground disturbance could create niches for noxious weed establishment and spread. However, best management practices, project design features, and ongoing weed treatments would limit weed spread. Long-term recovery of vegetation in response to removal of juniper would promote more resistant and resilient shrub and perennial herbaceous plant communities. Resistant and resilient plant communities, in turn, would stem the spread of noxious weeds.

3.5.3.3 Alternative A – Cumulative Impacts

Noxious weeds (i.e., their potential for expansion) would be affected in the same manner and to the same degree by the factors listed above. Cumulative impacts would be minor, overall. The absence of juniper treatments would result in minor reductions in overall impacts compared to alternatives B and C. The extent that vegetation treatments and noxious weed control efforts are successful will dictate the amplitude of the cumulative impacts outlined above.

3.5.3.4 Alternatives B and C – Cumulative Impacts

Cumulative impacts here would also be minor, overall. Juniper treatment activities could produce minor additive impacts in the CIAA. Design features to minimize the potential for noxious weed establishment and/or expansion would mitigate these risks. Cumulative impacts from ongoing and future actions would be identical to those described for Alternative A.

3.6 Wildlife/Special Status Animals

3.6.1 Affected Environment – Wildlife/Special Status Animals

There are a variety of habitat types supporting many different species of wildlife and no threatened or endangered species are known to occur. Greater sage-grouse and several other BLM special status wildlife species (SSS) and State of Idaho species of greatest conservation concern occupy the project area, of which, eight are sagebrush obligates (Paige and Ritter 1999).

Sagebrush obligate species, such as sage-grouse, are those that require sagebrush for some part of their life cycle. The eight vertebrate species considered to be sagebrush obligates include sage-grouse, sage sparrow, Brewer's sparrow, sage thrasher, pygmy rabbit, pronghorn antelope, sagebrush vole and sagebrush lizard. While juniper does provide habitat for several species of wildlife, there are no species known to be western juniper obligates, meaning no species require western juniper to exist.

The increasingly rapid and widespread degradation, fragmentation, or total loss of the sagebrush steppe ecosystem throughout western North America makes it one of the most imperiled in North America (Knick et al. 2003; Noss and Peters 1995, Mac et al. 1998). More than 350 sagebrush associated plants and animals are identified as species of conservation concern (Suring et al. 2005; Wisdom et al. 2005). The two biggest threats to sagebrush steppe habitat in southwest Idaho are wildfire and subsequent spread of invasive annual grasses, and the spread of western juniper (ISAC 2006, Section 4.3.10; OLWG 2000). This project focuses on the threat of juniper spread into sagebrush steppe vegetation because as juniper dominance increases across the landscape, wildlife abundance, species richness, and diversity decline (Miller et al. 2005). The spread of juniper and associated loss of sagebrush habitat in southwest Idaho was documented as early as 1969 (Burkhardt and Tisdale 1969). Since that time, hundreds of thousands of acres of habitat for sagebrush obligate species have been lost or degraded due to the spread of juniper within the project area.

The wildlife species analyzed in this EIS are categorized into seven different groups, excluding sage-grouse, which is analyzed separately. Several different species could be analyzed within each group; however the analysis focuses on one species from each group, with priority given to sagebrush obligate and special status species. The wildlife species used for analysis include:

1. Greater Sage-grouse
2. Raptors – Golden Eagle
3. Large Mammals – Pronghorn Antelope
4. Small Mammals – Pygmy Rabbit
5. Migratory Birds – Brewer's Sparrow
6. Reptiles – Sagebrush Lizard
7. Amphibians – Columbia Spotted Frog
8. Fish – Redband Trout

Greater Sage-grouse

The affected environment will focus on the project area, but conditions are generally similar across the Northern Great Basin (NGB) population area. Sage-grouse within the NGB typically congregate on leks (communal strutting grounds) from April to early May. The nesting season occurs soon after, generally extending from May to early June. Broods remain with females for several more months as they move from early brood-rearing habitat (i.e., forb- and insect-rich upland areas surrounding nest sites) to late brood-rearing and summer habitats (i.e., wet meadows and riparian areas) from June to August.

Habitat in the project area and adjacent landscape reflect habitat trends across much of the western distribution of sage-grouse; meaning that sagebrush habitat required for survival of the species at lower elevations is being lost to wildfire and invasive non-native annuals, while

sagebrush habitat at higher elevations is being lost to conifer encroachment (Davies et al. 2011). Juniper encroachment negatively impacts all sage-grouse habitat types by outcompeting and eventually replacing shrubs, grasses and forbs and by providing perch sites for raptors (Baruch-Mordo et al. 2013; Connelly et al. 2004; Stiver et al. 2006; Idaho Sage-grouse Advisory Committee 2006; USFWS 2010).

The Idaho and Southwestern Montana Greater Sage-Grouse Approved Land Use Plan Amendment (ARMPA) and Final Environmental Impact Statement use a three-tiered habitat classification system: Priority Habitat Management Area (PHMA), Important Habitat Management Area (IHMA), and General Habitat Management Area (GHMA). These three designations are secondarily linked to existing sage-grouse habitat; the designations are designed to direct management to maintain and improve habitat conditions.

Priority Habitat Management Area (PHMA) focuses on conserving the two key meta-populations in the sub-region. These meta-populations consist of a large aggregation of interconnected breeding subpopulations of sage-grouse that have the highest likelihood of long-term persistence. The PHMA includes adequate area to accommodate continuation of existing land uses and landowner activities. Prior to the 2015 Soda Fire, there were approximately 887,000 acres of PHMA within the project area; roughly 362,000 of those acres fall within the focal treatment area. The Soda Fire burned approximately 37,000 acres (4%) of PHMA in the project area (leaving 850,000 acres unburned) and 23,000 acres (6%) of the focal treatment area (leaving 325,000 unburned) (Map 9).

Important Habitat Management Area (IHMA) contains additional habitat and populations that provide a management buffer for the PHMA and to connect patches of PHMA. The IHMA is typically adjacent to PHMA but generally reflects a somewhat lower sage-grouse population status and/or reduced habitat value due to disturbance, habitat fragmentation, or other factors. Prior to the 2015 Soda Fire, there were approximately 434,000 acres of IHMA in the project area and approximately 166,000 of those acres are in the focal treatment area. The Soda Fire burned nearly 145,000 acres (33%) of IHMA in the project area (leaving 21,000 acres unburned); none of the IMHA acres in the focal treatment area burned.

General Habitat Management Area (GHMA) encompasses habitat that is outside of PHMA or IHMA. The GHMA contains approximately 10% of the occupied leks that have relatively low male attendance compared to leks in PHMA or IHMA. The GHMA is generally characterized by lower quality disturbed or patchy habitat of low lek connectivity. There are approximately 140,000 acres classified as GHMA within the project area, almost 53,000 of those acres are within the focal treatment area. None of these acres burned in the 2015 Soda Fire.

Based on information provided in the ARMPA, there are approximately 640,000 acres of winter habitat in the project area, of which 89,000 acres (13%) were within the Soda Fire perimeter. The ARMPA also identified approximately 1,318,000 acres of nesting/late brood rearing habitat in the project area, with nearly 492,000 of those acres within the focal treatment area. Approximately 170,000 acres (12%) of nesting/late brood rearing habitat in the project area and 76,000 acres (15%) of the nesting/late brood rearing habitat were within the 2015 Soda Fire perimeter.

Within the BOSH project area there are hundreds of thousands of acres of occupied sage-grouse habitat in the early stages of conversion to juniper woodlands. As researchers continue to study sage-grouse there is greater understanding of their habitat needs and the impacts from the continuing spread of juniper. Stiver et al. (2015) suggest that suitable lek habitat is characterized as having trees absent or uncommon within 3 km of occupied leks. Baruch-Mordo et al. (2013) studied the impacts of western juniper encroachment on sage-grouse and lek activity in eastern Oregon. Results of the Baruch-Mordo et al. (2013) study indicated there were no active leks within 1,000 meters (0.62 mile) of where conifer cover was greater than 4 percent. This finding is significant because lek activity is an important indicator of population-level trends. Moreover, research has shown that 80% to 95% of sage-grouse hens establish nests within 10 km (6.2 miles) of a lek (Holloran and Anderson 2005; Doherty et al. 2010; Connelly et al. 2013), suggesting that maintaining suitable habitat conditions within a 10 km radius of sage-grouse leks is extremely important.

Many of the leks within the project area are monitored annually to document population trends; some leks have been counted for many years. Data collection focuses on counting male sage-grouse because they are more visible due to their white chest feathers and strutting behavior. Some leks were monitored as early as 1955; however, few leks were monitored in the early years and bird counts on specific leks were not completed consistently, overall. Since 1955, there have been 176 different leks documented in the project area, but only 55 are currently identified as occupied and active (Map 10).

Golden Eagle

Golden eagles are protected under The Bald and Golden Eagle Protection Act (1940) as amended. The BLM manages golden eagle habitat under Executive Order 13186 Sec. 3, which directs federal agencies to promote the conservation of migratory bird populations, and as an Idaho BLM Sensitive Species. The golden eagle can be found in a variety of habitats, but prefers open space or low hills where visibility is good for hunting (Ehrlich et al. 1988; National Geographic Society 2006).

The golden eagle feeds primarily on mammals, preferring rabbits and ground squirrels, but will also feed on snakes, birds, and large insects when mammals are unavailable (Collopy 1983; Ehrlich et al. 1988). In the project area, golden eagles establish nests on cliff ledges, which are abundant in the Owyhee Canyonlands.

Black-tailed jackrabbits are the main prey item of golden eagles in the sage steppe of southwest Idaho, although white-tailed jackrabbits occur in the project area and likely make some portion of the eagle's diet. Loss of sagebrush results in lower numbers of black-tailed jackrabbits. White-tailed jackrabbits prefer areas of grass with scattered shrubs. In Wyoming, Preston (2011) determined that cottontail rabbits were the preferred prey for golden eagle in the Big Horn Basin. The three species of rabbits in the project area are likely a common prey item and important food supply for golden eagles. However, these rabbits prefer shrub steppe habitat, which is lost when juniper become established. Within the project area, loss of sagebrush steppe from the spread of juniper has occurred across thousands of acres. Where juniper has and is

establishing in the project area, golden eagle is likely being negatively impacted due to loss of open space and reduced numbers of preferred prey items.

Pronghorn Antelope

The vast majority of the project area is considered suitable habitat for pronghorn (Map 11), which is identified as a sagebrush obligate species (Paige and Ritter 1999). Pronghorn typically inhabit open grasslands, shrub-grasslands, steppes and deserts that provide adequate forage supplies, shelter, and hiding cover for fawns (Yoakum 1974). Forbs and some grasses are the main forage for most of the year. In late fall and through the winter, browse species such as sagebrush and bitterbrush comprise at least 80% of their diet. The Juniper Mountain Wildlife Habitat Management Plan (JWHP) identified declines in the pronghorn population in southwest Idaho back in 1969 (USDI 1969). Habitat for pronghorn in the project area has been degraded by livestock grazing, juniper encroachment, and periods of drought (USDI BLM 1999a and b).

Juniper encroachment into sagebrush steppe and grassland habitats can decrease forage for pronghorns. Even areas with scattered juniper are considered suboptimal habitat for pronghorn, because visibility and mobility are reduced (Yoakum 1980). While antelope will utilize juniper for thermal protection during winter and summer, the majority of pronghorn habitat must have high visibility for long-term health and productivity of the herd (Richardson 2006).

Other large ungulates such as mule deer, Rocky Mountain elk, and Rocky Mountain bighorn sheep exist within the project area (Map 12). Elk and deer may utilize denser stands of juniper for cover during winter storms. Bighorn sheep prefer open habitats but they will utilize juniper for shade. Juniper is not a major source of forage for any of the large herbivores, although it is consumed during difficult winters when other forage is not available.

While juniper does provide cover for large herbivores, juniper encroachment into surrounding grass and sagebrush communities has negatively impacted large herbivores by reducing diversity and productivity of understory vegetation, resulting in less forage and open space within the project area (Owyhee Resource Management Plan 1999; Cox et al. 2009; Paige and Ritter 1999).

Pygmy Rabbit

The pygmy rabbit is the smallest North American rabbit species (USFWS 2010b). It is one of two rabbit species in North America that digs burrows. On September 30, 2010, USFWS determined that pygmy rabbits do not warrant listing under the Endangered Species Act; however, it is still managed as a special status species by both BLM and IDFG.

Pygmy rabbits are typically found in tall, dense sagebrush cover with suitable soil for burrowing. This rabbit is a sagebrush obligate species, highly dependent on sagebrush to provide both food and shelter throughout the year (Green and Flinders 1980; Katzner et al. 1997). Understory biomass and cover has also been shown to be important (Schmalz et al. 2014; Edgel et al. 2014). Pygmy rabbits have been found from 884 meters (2,900 feet) to over 1,829 meters (6,000 feet) in elevation in southwestern Idaho.

The prehistoric record for pygmy rabbits in the Great Basin documents that their history in this region since the end of the Pleistocene has been one of strong declines in abundance through

time (Grayson 2006). Archeological records show a decrease in pygmy rabbit sign correlated with reduced sagebrush and increases in pinyon–juniper pollen (Grayson, 2006).

Larrucea and Brussard (2008) revisited pygmy rabbit locations documented before 1950 to determine current presence of the species. Of the 105 sites they surveyed, 14% (15 sites) showed signs of conversion to juniper woodlands, defined as the presence of at least one juniper greater than 2m (6 feet) tall. They found that the presence of even a few of these trees at a site generally meant the absence of pygmy rabbits. Woods et al. (2013) found that juniper woodland development leads to a loss of terrestrial cover and reduced forage for pygmy rabbit.

Distribution of pygmy rabbit is not well known across its range as populations can be isolated due to its narrow habitat requirements. Knowledge of pygmy rabbit distribution within the project area is also limited, mainly due to a lack of surveys. There are approximately 112,000 acres of Priority 1 habitat (P1) and approximately 263,000 acres of Priority 2 habitat (P2) within the project area (see project record for model description) (Map 13). Juniper is estimated to be present on nearly 24,000 acres of P1 and almost 59,000 acres of P2 habitat. Based on the research cited above, habitat for this species has been reduced and is not likely occupied where juniper is present.

Brewer's Sparrow

Migratory bird habitat is protected and managed under the Migratory Bird Treaty Act of 1918 as amended and Executive Order 13186. Accordingly, nests with eggs or young birds may not be harmed nor may migratory birds be killed. Executive Order 13186 directs federal agencies to promote the conservation of migratory bird populations. Brewer's sparrow is a BLM Sensitive species and USFWS Bird of Conservation Concern throughout its breeding and wintering ranges (USDI 2008). Brewer's sparrow is declining steadily and significantly across the West, with sharp declines since 1980 (Paige and Ritter 1999).

Brewer's sparrow is one of three passerine bird species considered a sagebrush obligate species, meaning it requires sagebrush for some aspect of its life history. Sage thrashers and sage sparrows are also sagebrush obligate passerines that are present within the project area. Brewer's sparrow utilize sagebrush habitat for nesting and rearing their young and are associated with sagebrush shrublands dominated by big sagebrush with perennial bunchgrasses (Knick and Rotenberry 1995).

There are other migratory bird species that are considered "near-obligates", meaning they are closely tied to sagebrush steppe. Some of the near-obligate species occurring within the project area include green-tailed towhee, loggerhead shrike, lark sparrow, and vesper sparrow.

Within the project area, the displacement of sagebrush from juniper encroachment has degraded and reduced available habitat for sagebrush obligate birds and other bird species associated with sagebrush steppe habitat.

Sagebrush Lizard

The sagebrush lizard is the most common lizard in the sagebrush deserts of Idaho. This species is commonly considered a sagebrush obligate (Paige and Ritter 1999). In Idaho, sagebrush

lizard is dispersed where suitable habitat exists from the middle of the state to the Nevada border and from sea level up to elevations greater than 3,048 meters (10,000 feet).

Juniper encroachment and development of woodlands within the project area has reduced the preferred habitat for this species.

Columbia Spotted Frog, Great Basin Population

Spotted frogs live in spring seeps, meadows, marshes, ponds and streams, and other areas where there is abundant riparian vegetation and suitable water conditions for breeding and over wintering. They often migrate along riparian corridors between habitats used for spring breeding, summer foraging and winter hibernation.

Columbia spotted frogs are found closely associated with clear, slow-moving or ponded surface waters, with little shade, and relatively constant water temperatures (Munger et al. 1996; Reaser 1997; Reaser and Pilliod 2005; Welch and MacMahon 2005). Reproducing populations have been found in habitats characterized by springs, floating vegetation, and larger bodies of pooled water (e.g., oxbows, lakes, stock ponds, beaver-created ponds, seeps in wet meadows, backwaters) (Reaser and Pilliod 2005). A deep silt or muck substrate may be required for hibernation and torpor (a state of lowered physiological activity, usually occurring during colder months) (Bull 2005; Reaser and Pilliod). In colder portions of their range, Columbia spotted frogs will use areas where water does not freeze, such as spring heads and undercut streambanks with overhanging vegetation (Bull 2005; Reaser and Pilliod 2005); however, they can overwinter in ice-covered ponds (Bull and Hayes 2002; Tattersall and Ultsch 2008).

In 1993, the Great Basin population of the Columbia spotted frog was elevated to candidate status under the Endangered Species Act (ESA), but the species was precluded from listing due to higher priority listing activities. The species remained a candidate species until October 7, 2015, when the FWS announced its determination that the species no longer warranted protection under the ESA. The determination was based on the collaborative conservation efforts with State and private landowners (USFWS 2015), and finding that the species was more widely distributed than previously known. Prior to 1993, Columbia spotted frogs were only known to occur at seven locations in Owyhee County, Idaho (Munger et al. 1996). Since 1993, survey efforts have discovered more frog locations, including several in Twin Falls County, Idaho (Munger et al. 1996; La Fayette 2011; Lohr 2012). Frogs were found in 7, 6th order hydrologic units (watersheds) prior to 1993 and in 42, 6th order hydrologic units from 1993 to 2012 (USFWS 2013).

Despite the frog's somewhat widespread distribution in Owyhee County, Robertson and Funk found that Columbia spotted frogs there had small effective population sizes, exhibited low genetic variation, and were highly differentiated from most other sites (Robertson and Funk 2011). However, long-term monitoring at four sentinel sites indicated that these Columbia spotted frog populations appear to be variable but stable (Lohr and Haak 2009).

In Owyhee County, spotted frog habitat has been degraded through conversion of wetlands to irrigated pastures, de-watering of rivers for irrigation uses, drying of ponds due to drought or overuse, and reduction in riparian habitat quality due to overgrazing (Lohr and Haak 2009).

While there are no data documenting impacts of juniper encroachment to spotted frog and their habitat, inference would suggest that encroachment, especially adjacent to occupied habitat, degrades conditions for this species. This inference is based on research documenting the loss of riparian vegetation, increased sediment, and hydrologic changes (Miller et al. 2005; Barrett 2007; Pierson et al. 2013; Mollnau et al. 2015). The increased levels of shading caused by juniper encroachment would also degrade habitat conditions (Munger et al. 1996).

3.6.2 Environmental Consequences – Wildlife/Special Status Species

Sagebrush habitats and the wildlife species that depend on them, including sage-grouse, are now among the most at risk in North America due to habitat loss and fragmentation (Knick et al. 2003; Dobkin & Sauder 2004; Meinke et al. 2009). Miller et al. (2008) estimated that without intervention, 75% of encroachment in the western portion of the sage-grouse range may transition into juniper woodlands within the next 30-50 years. Millions of acres of sagebrush habitat in the western states have been degraded or lost due to wildfire, agriculture, urban development, and shifts in vegetative composition, including juniper encroachment. Within the BOSH project area, juniper encroachment is a serious threat to wildlife dependent upon sagebrush.

Of the seven wildlife species analyzed in this EIS, five are sagebrush obligate species. Even low levels of juniper encroachment have been shown to negatively impact sagebrush obligates such as sage-grouse and pygmy rabbits (Baruch-Mordo et al. 2013; Larrucea and Brussard 2008; Daubkin and Sauder 2004). If the current trend of juniper encroachment continues, sagebrush steppe vegetation across hundreds-of-thousands of acres will become unsuitable over time, leading to the further reduction or extirpation of sagebrush obligate populations from that area. Continued juniper encroachment would also have negative impacts to species closely associated with sagebrush habitat: golden eagle, mule deer, ferruginous hawk, blacktail and whitetail jackrabbits, and bighorn sheep.

In contrast to the threats facing sagebrush obligate species, wildlife species that utilize juniper are under no threat from loss of habitat. Many species utilize juniper to some degree as cover and food, however, there are no known juniper obligate species. Deer and elk will forage on juniper during severe winter conditions and juniper berries are an important winter food source for some migratory bird species. Even after treatment, there would still be hundreds-of-thousands of acres of juniper throughout the project area.

3.6.2.1 Alternative A – No Action

No juniper treatment would occur and juniper would continue to spread and develop into woodlands.

Because the impacts of western juniper encroachment to sagebrush obligate species and wildlife species closely associated with sagebrush habitat have been well documented in previous sections of this EIS, they will not be reiterated in depth in the analysis of the No Action Alternative. The impacts of juniper expansion are occurring at this time and would continue into the foreseeable future with selection of this alternative. Given the habitat needs of sagebrush

obligate species, there are no beneficial effects expected by taking no action regarding juniper encroachment in sage-steppe habitat.

Greater Sage-grouse

Continued encroachment of western juniper into sagebrush habitat would lead to the following adverse impacts to greater sage-grouse:

- Loss/reduction of sagebrush habitat – breeding (leks), nesting, brood rearing, and winter
- Habitat fragmentation; reduction of connectivity between seasonal habitats
- Loss of forage
- Population level impacts – reduction in the distribution and numbers of sage-grouse
- Perch sites for avian predators would increase

Golden Eagle

Continued encroachment of western juniper into sagebrush habitat would lead to the following impacts to golden eagle:

- Loss/reduction of sagebrush habitat – foraging, open space
- Loss of prey base – populations of preferred prey species would decline

Pronghorn Antelope

While pronghorn utilize juniper for thermal cover, the continued encroachment of western juniper into sagebrush habitat would lead to the following impacts to pronghorn antelope:

- Loss/reduction of sagebrush habitat – foraging, hiding cover for fawns, shelter, open space
- Habitat fragmentation
- Population level impacts – reduction in the distribution and numbers of antelope

Pygmy Rabbit

Continued encroachment of western juniper into sagebrush habitat would lead to the following impacts to pygmy rabbit:

- Loss/reduction of sagebrush habitat – forage, cover
- Habitat fragmentation
- Population level impacts – reduction in the distribution and numbers of pygmy rabbit

Brewer's Sparrow

Continued encroachment of western juniper into sagebrush habitat would lead to the following impacts to Brewer's sparrow:

- Loss/reduction of sagebrush habitat – nesting, foraging, open space
- Habitat fragmentation
- Population level impacts – reduction in the distribution and numbers of Brewer's sparrow

Sagebrush Lizard

Continued encroachment of western juniper into sagebrush habitat would lead to the following negative impacts to sagebrush lizard:

- Loss/reduction of sagebrush habitat – reduced cover
- Habitat fragmentation
- Population level impacts – reduction in the distribution and numbers of sagebrush lizard

Columbia Spotted Frog, Great Basin Population
There is no documentation of the effects of juniper encroachment to the spotted frog; however, the impacts of juniper to stream systems and hydrology (reduced surface water) are likely having a negative effect on spotted frogs. Loss of riparian habitat, increased sediment input, impacts to hydrology, and degradation to aquatic ecosystems that result from juniper encroachment and woodland development (Bedell et al. 1993) would have long-term negative impacts to spotted frog and other aquatic organisms.

3.6.2.2 Alternative B – Proposed Action

The proposed treatment of early phase juniper encroachment would benefit sagebrush obligate wildlife and those species closely associated with sagebrush steppe habitat (Woods et al. 2013; Grayson 2006; Baruch-Mordo et al. 2013; Sanford and Messmer 2014). The proposed methods would maintain sagebrush across the treatment areas and design features would be utilized to minimize impacts to wildlife (section 2.2.2.6). Suitable habitat for sage-grouse and other sagebrush obligates would be maintained and improved through the proposed treatment of juniper. The most likely negative effect to wildlife would be temporary disturbance.

Methods and design features such as timing restrictions and the light-handed methods proposed would reduce wildlife impacts to a negligible level. Mortalities caused by project implementation could occur on a limited basis. However, the current and continued impacts that would occur from selection of the No Action Alternative increase the likelihood of local extirpation of sagebrush obligate species where sagebrush is lost/reduced.

To effectively maintain and improve habitat for sage-grouse and other wildlife closely associated with sagebrush steppe vegetation; efforts should be focused on maintaining environmental and landscape heterogeneity (Hanser and Knick 2011). This is because sage-grouse utilize a diversity of sagebrush species with varying stand characteristics to meet their seasonal forage and life history requirements. The BOSH Project meets the criteria described above because the proposed treatment would maintain a wide diversity of sagebrush species and sagebrush stand characteristics across a large landscape. The diversity of sage steppe vegetation and habitat would also benefit other sagebrush obligate species and wildlife species closely tied to sagebrush steppe habitat (Sage Grouse Initiative 2015a and 2015b; Wood et al. 2013; Noson et al. 2006). Therefore, the effects to sage-grouse from the alternatives analyzed in this EIS are at times representative and referenced as the effects to other species in this analysis.

Common Effects of Proposed Action
Juniper Cutting
This action would result in temporary disturbance wildlife near the cutting area. Animals near cutting operations would likely seek refuge by leaving the area temporarily or finding suitable hiding cover. Timing restrictions would be utilized that would greatly reduce the likelihood of impacts to bird nest and nestlings.

Juniper Mastication/Shearing
This action would result in temporary disturbance of wildlife within the immediate area being treated. Animals near mastication/shearing operations would seek refuge by leaving the area temporarily or finding suitable hiding cover. Timing restrictions would be utilized that would greatly reduce the likelihood of impacts to active bird nests and nestlings.

Jackpot/Pile Burning
These methods would have minimal impacts to most species. There could be mortality to individual animals that are using the piles for cover such as small mammals, amphibians, and reptiles.

Greater Sage-grouse
Juniper treatment across sage-grouse habitat management areas would occur on approximately 362,000 acres of PHMA, 166,000 of IHMA, and 53,000 acres of GHMA. No cutting or mastication of juniper would occur during breeding and nesting season. Sage-grouse hens do not normally establish nests near juniper, further reducing the likelihood of impacting nest success. Cutting and mastication could temporarily disturb hens with broods but they could simply move away from areas with ongoing implementation. Jackpot and pile burning would have no impacts to sage-grouse other than temporary disturbance because these methods would be implemented under conditions that reduce the loss of adjacent sagebrush habitat.

The impacts of juniper to sage-grouse have been well covered in previous sections of this document. Removing juniper from currently occupied sage-grouse habitat would benefit the species by maintaining vegetation and conditions required for the persistence of this species. Without implementation of the proposed action, sage-grouse would be expected to decline as suitable habitat is lost to juniper encroachment and woodland development.

Golden Eagle
Individual eagles, if present, would experience temporary disturbance from implementation of the proposed action. Golden eagles and other raptors would simply move away from areas where treatments are occurring. Project design features, including seasonal restrictions and buffers around active nests would minimize the likelihood of negatively impacting golden eagle and other raptor species. The proposed juniper treatment would benefit golden eagle and other raptor species by maintaining open space and productive habitat for prey species.

Pronghorn Antelope
This highly mobile sagebrush obligate species would not be negatively impacted by any of the proposed methods of juniper treatment. The proposed juniper treatment would maintain and improve beneficial habitat conditions including cover, forage, and open space. Maintenance of such habitat conditions is essential for persistence of pronghorn in the project area.

Pygmy Rabbit
There would be no negative impacts to pygmy rabbit from the proposed action other than temporary disturbance. The species would benefit from juniper removal and by maintaining sagebrush habitat necessary for its survival. No heavy equipment operation would occur in occupied pygmy rabbit habitat.

Brewer's Sparrow
Reinkensmeyer et al. (2007) studied avian community structure along a mountain big sagebrush gradient from post-burn grasslands, mountain big sagebrush-grasslands-shrub steppe, sagebrush steppe-juniper and old growth juniper. Bird diversity was highest in old growth woodlands and late stage juniper stands but no species preferred the early-stage juniper encroachment into shrub steppe. Tree and cavity nesters were the most common species in old growth juniper. It is important to understand that while juniper does provide habitat for a diversity of birds, none of these birds are juniper or old growth juniper obligates.

Noson et al. (2006) also found juniper encroachment to negatively impact sagebrush bird communities. New research is showing that juniper treatment to protect sage-grouse habitat is benefitting sagebrush obligate and near-obligate migratory bird species. A study in the Warner Mountains of southern Oregon showed that Brewer's sparrow abundance increased by more than 55% and green-tailed towhee abundance increased by more than 81% following juniper cutting (Sage Grouse Initiative 2015a). This study also found that conifer removal did not affect the abundance of other species, such as rock wren and mountain bluebird, that use both wooded and shrub habitats.

Juniper treatment would not occur from March 1st through July15th. This time restriction greatly reduces the likelihood of impacts during the breeding season and there would be no disturbance to breeding behavior, and no loss of nests, eggs, or nestlings. Some birds may attempt to nest a second time after July 15th. Birds attempting a second nest on the ground or in shrubs after July 15th could be impacted by juniper treatment, but tree-nesting birds attempting a second nest in juniper targeted for treatment after July 15th would be negatively impacted. However, not all birds would attempt a second nest and because the timing restriction protects the vast majority of nesting, the likelihood of measurable effects is negligible.

Implementation of the proposed action would reduce the amount of juniper in the project area, but vast areas of juniper would remain adjacent to and within the project area. Remaining juniper in the vicinity of the project area would provide habitat for bird species that do utilize juniper trees, although no bird species are known to be juniper obligates.

The treatment of juniper in the project area would improve and maintain suitable sagebrush habitat for Brewer's sparrow and several other migratory bird species, including sagebrush obligate and near-obligate species. The benefits of this landscape level treatment would improve the likelihood of long-term persistence of Brewer's sparrow.

Sagebrush Lizard
Removal of juniper from sagebrush habitat would benefit this other reptile species found in the project area. Maintaining a diverse community of sagebrush, forbs, and grasses is important for cover and production of insects and other small invertebrate prey species. Cutting juniper may cause temporary disturbance to individuals. There could be mortality caused by the use of heavy equipment and pile burning but because these treatments would be limited in scope, the level of mortality would be negligible.

Columbia Spotted Frog, Great Basin Population
Human presence and the sound from chainsaws would temporarily disturb spotted frogs but frogs would seek refuge in nearby water. Treatment of juniper would benefit spotted frog over the long-term by reducing fine sediment input to aquatic habitat, increasing the amount of available groundwater, and by promoting the growth and establishment of riparian vegetation adjacent to springs and mesic areas.

3.6.2.3 Alternative C – No Treatment in Wilderness

The effects of implementing this alternative would be the same as the proposed actions except less area would be treated. Approximately 553,000 acres would be treated but no treatment would occur in nearly 47,000 acres of wilderness. Effects to wildlife from not treating those acres in wilderness, especially to sage-grouse, could reach far beyond those wilderness acres. Juniper encroachment across those 47,000 acres would lead to extirpation of sagebrush obligate species. The timeframe of extirpation would vary by species depending on their tolerance of juniper presence and life history requirements for sagebrush habitat.

Greater Sage-grouse
Sage-grouse that attend leks within the wilderness areas would be extirpated from those lek sites as juniper become established. This would reduce the amount of suitable lekking areas and negatively impact sage-grouse. Of the 55 occupied/active leks in the project area, 16 (30%) are within designated wilderness (Map 14). There are also 23 occupied/active leks within nesting distance of proposed wilderness treatment areas, so many sage-grouse hens may utilize habitat within the wilderness for nesting, even though they may breed at a lek outside of wilderness. The 16 leks within wilderness and 23 leks within 10km of proposed wilderness treatment areas comprise 70% of the occupied/active leks across the 1.5 million-acre project area.

Continued encroachment by juniper would create unsuitable habitat conditions with the proposed wilderness treatment areas and would impact more than just the suitability of leks sites. There would also be a loss of suitable nesting and foraging habitat. Development of juniper woodlands could act as barriers to seasonal migration of sage-grouse.

Golden Eagle
Golden eagle would be impacted by loss of open habitat and reduced numbers of prey as juniper increases within potential wilderness treatment areas. The untreated wilderness areas would eventually become unsuitable for this species and other raptors that prefer open habitat.

Pronghorn Antelope, Brewer's Sparrow, Sagebrush Lizard
Generally, juniper encroachment would eventually lead to unsuitable habitat conditions and extirpation of these species from the untreated wilderness. Impacts from not treating wilderness areas would be similar to those resulting from the No Action Alternative but on a smaller scale.

Pygmy Rabbit
Juniper encroachment into the wilderness area would not affect this species to the degree as the other sagebrush obligate species as pygmy rabbits require distinct soil types for burrowing and the approximate acres of suitable habitat within potential wilderness treatment areas is much less for pygmy rabbit than the other species analyzed. There are approximately 2,000 acres of

Priority 1, and 13,000 acres of Priority 2 pygmy rabbit habitat that would be lost within the next 30-50 years if no juniper removal occurs in the wilderness areas proposed for treatment.

Columbia Spotted Frog, Great Basin Population
Spotted frogs have been documented in four sites identified for treatment in wilderness, although surveys in many of the remote areas have not been completed. Not removing juniper within the wilderness would have the same impacts identified above in the No Action Alternative.

Sagebrush Lizard
The analysis area for sagebrush lizard is the project area. This is sufficient because the project area can support high numbers of the species and habitat conditions would be maintained or improved. Further, the species is widespread in the Idaho, Nevada, and Oregon.

3.6.3 Cumulative Impacts – Wildlife/Special Status Animals

3.6.3.1 Scope of Analysis

The spatial and temporal scope for cumulative impact analysis is identified by individual species. Further, temporal scope is considered for actions included in the cumulative analysis.

Greater Sage-grouse
The cumulative effects area for greater sage-grouse is the NGB population which includes portions of northern Nevada, southeast Oregon, southwest Idaho, and northwest Utah. This area incorporates local migration areas and includes the area of potential genetic exchange. Maintenance of habitat in this analysis area is important in providing opportunities for genetic exchange.

Golden Eagle
The scope of analysis for golden eagle for this alternative includes the project area and the area within 21 miles of the project area. This analysis area was determined based on the biggest average territories documented in southwestern Idaho (Kochert et al. 2002).

Pronghorn Antelope
Pronghorn migration within the project area is not well understood. Most pronghorn that utilize summer range in the project area likely winter at lower elevations along the Owyhee Front. Some may migrate up to 50 miles, most of which would be within the project area (Jake Powell 2015, IDFG Biologist, Personal Communication). Based on this information, the analysis area for pronghorn is the project area.

Pygmy Rabbit
The analysis area for pygmy rabbit is the same as greater sage-grouse. This analysis area is appropriate because it includes several isolated populations, and maintenance of habitat in this area would enhance suitability of habitat and the opportunities for genetic exchange.

Brewer's Sparrow

The analysis area for Brewer's sparrow is the same as greater sage-grouse. This species is closely aligned with sage-grouse habitat and effects from impacts to habitat would generally be the same for both species.

Sagebrush Lizard

This species is not carried forward in a cumulative effects analysis as the direct and indirect effects discussed previously are not expected to have measurable impacts.

3.6.3.2 Current Conditions and Past, Present, and Reasonably Foreseeable Future Actions

Current conditions for each species and their habitats are similar to what was described in the affected environment above (section 3.6.1). Past, present, and reasonably foreseeable future actions that have had, are having, and/or are expected to affect wildlife in their defined CIAAs include juniper treatments, recreation, wildfire, livestock grazing, exurban development, and fuel breaks, and are described in more detail in section 3.0 (Affected Environment and Environmental Consequences). Potential cumulative impacts are addressed by species for each alternative below.

3.6.3.3 Alternative A – Cumulative Impacts

Greater Sage-grouse

Juniper Treatments – Juniper treatment occurring in the cumulative effects analysis area would benefit sage-grouse but the result of those benefits would vary depending on the level of encroachment being treated and the location of treatments relative to occupied sage-grouse habitat. The Pole Creek and Trout Springs juniper treatments involve broadcasts burns covering approximately 47,000 acres. The reason for broadcast burning these areas is because the juniper stands are in the mid to late stages of woodland development and there is little sagebrush remaining across the project areas. The Tongue Complex in 2007 burned adjacent to the Pole Creek and Trout Springs project areas and native vegetation responded very well. A similar response would be expected from the proposed broadcasts burns in Pole Creek and Trout Springs.

Broadcast burning to treat late stage juniper encroachment would benefit sage-grouse, but those benefits may take from 15-20 years to be realized. Treatments that remove juniper without the loss of sagebrush steppe vegetation would provide immediate benefits. Past, ongoing, and future juniper projects would likely benefit sage-grouse for around 30 years or longer if the treatment areas are maintained into the future. However, those benefits would be offset and reduced with continued loss of habitat in the BOSH project area. Development of dense juniper woodlands may lead to the permanent loss of sage-grouse habitat where that occurs.

Recreation – The types of recreation that occur in the sage-grouse cumulative effects analysis area are numerous and will likely increase in the future. Those most likely to negatively impact sage-grouse include OHV use, hunting, and bird watching during the breeding season. Over the long-term (50 to 100 years), continued juniper encroachment would constrict suitable sage-grouse habitat to smaller areas and make them more vulnerable to impacts from OHV use, hunting, and disturbance during breeding season.

There is little documentation of direct mortality to wildlife from OHVs, although physical impairment and stress does occur from hearing loss, increased metabolic rates, escape responses, reduced reproductive output, and disruptions to foraging (Berry 1980; Bury et al. 1977; and Canfield et al. 1999). OHV use can lead to habitat degradation, reduced patch size, reduced populations, interruption of life-history events, and cause disturbance from both noise and presence (Barton and Holmes 2007; Ouren et al. 2007; Wisdom et al. 2004; Wakkinen et al. 1992; Marler et al. 1973; Luckenbach and Bury 1983; Aldridge and Brigham 2001; Brooks and Lair 2005; Brattstrom and Bondello 1983; and Havlick 2002).

The impacts of recreation and juniper encroachment are currently causing cumulative impacts to sage-grouse. The expected increase in recreation and the loss of sagebrush steppe habitat to continued juniper encroachment would compound the current level of cumulative effects of these actions. These effects would occur into the foreseeable future under current recreation management.

Wildfire – The degree of cumulative impacts from wildfire are highly variable for several reason such as the intensity of the fire, the size of the fire, the vegetation condition before the fire, the growing conditions after the fire, and land management following the fire. Sagebrush at lower elevations is often replaced by non-native invasive annual grasses after a wildfire. Areas dominated by non-native annual grasses may never recover to provide sage-grouse habitat. Areas burned by wildfire in sagebrush habitat at higher elevations have a much greater likelihood of recovering. Sagebrush in such areas can begin to provide habitat for sage-grouse in 15 years but is dependent on the factors identified above. Areas of juniper woodlands burned by wildfire can take a much longer time to recover because the sagebrush seedbed is likely depleted. The impacts to sage-grouse habitat would be cumulative with the continued spread of juniper. However, the timeframe of impacts could be short-term (15-50 years) or long-term (greater than 50 years).

Livestock Grazing – Continued juniper encroachment would lead to a reduction in sagebrush steppe vegetation including forage available for livestock. Livestock grazing can cause degraded conditions for sage-grouse by reducing cover and degrading riparian areas. Loss of sage-grouse habitat and available livestock forage could eventually concentrate use to areas without juniper, increasing the likelihood of conflict and cumulative impacts. Without juniper treatment or changes to livestock grazing, cumulative impacts would occur across the cumulative effects analysis area until juniper was treated or until changes to livestock management were made.

Exurban Development – Past and ongoing development for energy, agriculture, housing, etc. has resulted in the loss of suitable habitat for sage-grouse. Loss of sage-grouse habitat from these past, present, and future developments would be cumulative with continued juniper encroachment across all management zones. Most of the future exurban development in or near the project area would occur along the Owyhee Front. Loss of habitat to exurban development would be long-term (greater than50 years) and may be permanent.

Fuel Breaks – Establishing fuel breaks reduces nesting habitat and cover but developed fuel breaks are utilized by sage-grouse for foraging, loafing areas, roosting, and lekking (Graham 2013; Destin Harrell BLM Biologist, Personal Communication 2011; Michael McGee 2015,

Personal Observation). Juniper encroachment in conjunction with fuel breaks would not result in cumulative impacts because fuel breaks are not a complete loss of habitat and they can benefit sage-grouse by reducing habitat loss to wildfire.

Golden Eagle

Juniper Treatments – Ongoing and future juniper projects would lead to improved conditions for golden eagles by maintaining open space and habitat for prey species. Projects removing early stage juniper encroachment using methods that cause minimal loss of sagebrush habitat would provide immediate benefits. Juniper projects treating mid to late stage encroachment with more developed stands of would benefit golden eagle by increasing open space and by providing improved habitat conditions for prey species. Ongoing and future juniper projects would not lead to detrimental cumulative impacts with the No Action Alternative, but the benefits of juniper treatments in the analysis area would be offset and diminished by continued development of juniper throughout the BOSH project area into the foreseeable future (greater than 50 years).

Recreation – See sage-grouse above.

Wildfire – See sage-grouse above.

Livestock Grazing – Continued juniper encroachment would lead to a reduction in sagebrush steppe vegetation. This would lead to reduced forage for livestock and for prey species of golden eagle. This loss of prey species habitat from juniper encroachment and increased levels of pressure on remaining resources would eventually lead to cumulative impacts with selection of Alternative A.

Exurban Development – Past and ongoing development for energy, agriculture, housing, etc. has resulted in the loss of suitable habitat for golden eagle. Such exurban development is expected to continue in the future. Loss of golden eagle habitat from these past, present, and future developments would be cumulative with continued juniper encroachment. Most of the future exurban development would occur along the Owyhee Front. Loss of habitat to exurban development would be long-term (greater than50 years) and may be permanent.

Fuel Breaks – Fuel breaks alter habitat but they would not degrade habitat for prey species. Jackrabbit and cottontail rabbits have been shown to increase along new created edge habitat (Pierce et al. 2010). Benefits of fuel break development would be offset or diminished due to continued loss of prey species habitat. While juniper treatment and fuel break development would result in beneficial cumulative effects, these benefits would not be realized with selection of Alternative A.

Pronghorn Antelope

Juniper Treatments **–** Ongoing and future juniper projects would lead to improved conditions for pronghorn by maintaining open space and suitable forage. Juniper projects treating mid to late stage encroachment with more developed stands through the use of broadcast fire would benefit pronghorn antelope by increasing open space and they would increase forage. However the benefits to habitat from past, ongoing, and future juniper projects would be offset or diminished with selection of the No Action Alternative. The temporal scope would be similar to sage-grouse and golden eagle.

Recreation and Wildfire – See sage-grouse above.

Livestock Grazing – The continued loss of diverse sagebrush steppe plant communities to juniper encroachment could eventually lead to cumulative impacts through the subsequent increase in competition for resources between antelope and livestock with selection of Alternative A. These impacts would continue until juniper treatment occurs or until a change in management is made.

Exurban Development – See golden eagle above.

Fuel Breaks – Fuel breaks would likely increase preferred forage for pronghorn. Benefits of fuel break development would be offset or diminished due to continued loss of open space and foraging habitat. While juniper treatment and fuel break development would result in beneficial cumulative effects, these benefits would not be realized with selection of Alternative A.

Pygmy Rabbit

Juniper Treatments, Recreation, Wildfire, Livestock Grazing and Exurban Development – See sage-grouse above.

Fuel Breaks – Fuel breaks reduce habitat for pygmy rabbit. While design features can be incorporated to reduce the level of impacts, fuel breaks reduce cover and can restrict movements or fragment habitat. Selection of Alternative A would lead to loss of habitat from increased levels of juniper and a reduction of pygmy rabbit habitat through fuel break development. The detrimental cumulative impacts from development of fuel breaks and selection of Alternative A would be long-term (greater than50 years).

Brewer's Sparrow

Juniper Treatments, Recreation, Wildfire, Livestock Grazing and Exurban Development – See sage-grouse above.

Fuel Breaks – See pygmy rabbit above.

Sagebrush Lizard

Juniper Treatments, Recreation, Wildfire, Livestock Grazing and Exurban Development – See sage-grouse above.

Fuel Breaks – See pygmy rabbit above.

Columbia Spotted Frog, Great Basin Population

Juniper Treatments – Ongoing and future juniper projects would be expected to improve aquatic habitat conditions by reducing sediment input into aquatic systems and riparian vegetation would be maintained or able to reestablish in areas where it has been reduced from juniper encroachment. However the benefits to habitat from past, ongoing, and future juniper projects would be offset or diminished with selection of the No Action Alternative.

Recreation – There is a negligible likelihood of recreation impacting spotted frog habitat within the cumulative effects analysis area because recreational use is low in areas with spotted frog

habitat. There would be no cumulative impacts associated with the No Action Alternative and recreation.

Wildfire – Spotted frog habitat that is in good condition would likely recover relatively quickly from the effects of wildfire depending on management actions after a fire. Wildfire in riparian areas that are now encroached upon by western juniper would likely experience slower recovery and may see increased levels of sediment input and reduced habitat quality. Wildfire may lead to cumulative effects with selection of Alternative A depending on the existing condition of the habitat.

Livestock Grazing – The meadows, springs, marshes, and streams that provide spotted frog habitat are very attractive to livestock because of the highly palatable forage. Livestock congregate in such areas and often degrade aquatic conditions. Areas with juniper encroachment are more susceptible to bank damage and more susceptible to overgrazing from livestock. Properly managed grazing would not add to effects from juniper encroachment, but grazing that degrades aquatic habitat would lead to detrimental cumulative effects with selection of Alternative A.

Exurban Development – This action is not likely to impact spotted frog habitat because the level of development that would occur in spotted frog habitat is negligible. There would be no cumulative effects associated with the No Action Alternative and exurban development.

Fuel Breaks – Fuel breaks are not developed through riparian areas so there would be cumulative effects associated with the No Action Alternative and fuel break development.

3.6.3.4 Alternative B – Cumulative Impacts

Overall, the temporal scope of cumulative effects associated with action alternatives would be long-term (greater than50 years) if actions to maintain sage-grouse habitat continue into the future.

Greater Sage-grouse, Pygmy Rabbit, Brewer's Sparrow, **Sagebrush Lizard**

Juniper Treatments – Juniper treatment occurring in the cumulative effects analysis area would likely benefit sage-grouse but the result of those benefits would vary depending on the level of encroachment being treated and the location of treatments relative to occupied sage-grouse habitat. Past, present, and future juniper removal projects have and would have beneficial cumulative effects to sage-grouse with implementation of the Proposed Action Alternative.

Recreation – A general description of this action is provided above in the cumulative effects section for sage-grouse, Alternative A.

The proposed action would maintain and improve existing occupied habitat at a landscape level for this group of species, which would help to mitigate the expected increase in recreation by providing suitable habitat in areas away from concentrated recreation use. The benefits of juniper treatment would not be improved upon through recreational activities, so there would not be beneficial cumulative effects. Further, motorized recreation has been shown to be detrimental

to most wildlife species, so the proposed treatment would provide an opportunity to offset the negative impacts in areas with high levels of motorized use.

Wildfire – Wildfire has led to the loss of millions of acres of sagebrush habitat across the west. The proposed action would benefit sagebrush obligate species by maintaining and improving a diversity of sagebrush habitat conditions across the landscape through removal of encroaching juniper. Fire occurring within suitable sagebrush habitat would decrease habitat for this group of species and offset, or diminish the benefits of juniper treatments. However, wildfire in stands of juniper that eventually recover to sagebrush would provide long-term beneficial cumulative effects in conjunction with the proposed action.

Livestock Grazing – Livestock grazing can lead to degraded habitat conditions for sage-grouse and other wildlife species by reducing cover and through competition for resources (Fleischner 1994; Mosconi and Hutto 1982; Schulz and Leininger 1990). The proposed action would maintain and improve habitat conditions for this group of species. Additive effects from the proposed action and livestock grazing would be unlikely.

Exurban Development – Past and ongoing development for energy, agriculture, housing, etc. has resulted in the loss of suitable habitat for sage-grouse. Such exurban development is expected to continue in the future. Loss of habitat for this group of species from these past, present, and future developments would generally be neutralized by the beneficial effects of the proposed action.

Fuel Breaks – Potential effects of habitat alteration from the development of fuel breaks to sagebrush obligate species are generally considered to be detrimental. In contrast, the effects of juniper treatment are considered to be beneficial to sagebrush obligate species. No cumulative impacts would be realized from these two actions.

Golden Eagle

Juniper Treatment – Ongoing and future juniper projects would lead to improved conditions for golden eagles by maintaining open space and by maintaining or improving habitat for prey species. Ongoing and future juniper treatments would result in positive cumulative effects with implementation of the proposed action.

Recreation – See sage-grouse cumulative effects Alternative B.

Wildfire – The main impact of wildfire in sagebrush habitat to golden eagle is loss of habitat for prey species. Burned sagebrush habitat may or may not recover to suitable habitat. Sagebrush re-establishment after a wildfire can take several decades. Less prey results in lowered carrying capacity for golden eagle in the burned area until the habitat recovers. Wildfires that burn in areas with later phase juniper establishment would create open space but would not provide habitat for prey species for several years, however, such a fire would lead to long-term benefits to golden eagles. The proposed action would maintain and improve condition for prey species of golden eagle that would offset or diminish the loss of habitat caused by wildfire. In general, effects of the actions would be neutral.

Livestock Grazing – See sage-grouse cumulative effects Alternative B.

Exurban Development – See sage-grouse cumulative effects Alternative B.

Fuel Breaks – Fuel breaks alter habitat but they would not degrade habitat for jackrabbits and they can benefit golden eagle by reducing habitat loss of prey species to wildfire. Maintenance of habitat for golden eagle through reducing acres burned using developed fuel breaks and reducing the impacts of juniper encroachment would lead to positive cumulative effects to this species.

Pronghorn Antelope

Juniper Treatment – In general, any juniper treatment that improves or maintains openness of the sagebrush steppe would benefit pronghorn. The Trout Springs and Pole Creek juniper projects are treating more developed stands (mid- to late stage encroachment) through the use of broadcast fire. Juniper projects would lead to improved conditions for pronghorn by maintaining open space and suitable forage and beneficial cumulative impacts.

Recreation – See sage-grouse cumulative effects Alternative B.

Wildfire – See sage-grouse cumulative effects Alternative B.

Livestock Grazing – See sage-grouse cumulative effects Alternative B.

Exurban Development – See sage-grouse cumulative effects Alternative B.

Fuel Breaks – Fuel breaks would likely increase preferred forage for pronghorn and they help to maintain habitat by reducing the acres lost to wildfire. The proposed action would also maintain suitable forage species and maintain open space for pronghorn. There would be positive cumulative effects from the proposed action and development of fuel breaks.

Columbia Spotted Frog, Great Basin Population

Juniper Treatment – Ongoing and future juniper projects would be expected to improve aquatic habitat conditions by improving hydrologic function, reducing shading, and reducing sediment input into aquatic systems. Riparian vegetation would be maintained or able to reestablish in areas where it has been reduced from juniper encroachment. This would result in positive cumulative effects with implementation of the proposed action.

Recreation – There is a negligible likelihood of recreation impacting spotted frog habitat within the cumulative effects analysis area because recreational use is low in areas with spotted frog habitat. There would be no cumulative impacts associated with the proposed action and recreation.

Wildfire – The effects of wildfire to spotted frog habitat are not well known. Riparian areas that are in good condition would likely recover relatively quickly (5 – 10 years) from the effects of wildfire depending on management actions after a fire. Riparian areas in poor condition would

take longer to recover. The proposed action would lead to improved riparian conditions so the effects would not be cumulative with wildfire.

Livestock Grazing – Riparian areas are attractive to and are sometimes degraded by overuse from livestock. Because the proposed action would result in improved riparian and aquatic habitat conditions, cumulative effects would not occur.

Exurban Development – This action is not likely to impact spotted frog habitat because the level of development that would occur in spotted frog habitat is negligible. There would be no cumulative effects associated with juniper treatment and exurban development.

Fuel Breaks – Fuel breaks are not usually developed through riparian areas so there would be cumulative effects associated with the proposed action and fuel break development.

3.6.3.5 Alternative C – Cumulative Impacts

The cumulative effects associated with Alternative C are identical to the proposed action where treatments would occur and identical to the cumulative effects of the Alternative A in wilderness areas where treatments would not occur.

3.7 Hydrology

3.7.1 Affected Environment – Hydrology and Water Quality

Hydrology

Riparian Areas

In the western United States, riparian areas comprise less than 1% of the land area, but they are among the most productive and valuable natural resources (USDA RCA Issue Brief #11 1996). In spite of their differences, all riparian areas possess similar ecological characteristics: energy flow, nutrient cycling, water cycling, hydrologic function, and support of plant and animal populations. Riparian areas are the interfaces between water courses (e.g., rivers and streams) or water bodies (e.g., ponds and springs and associated wet meadows) and the uplands, and are characterized by riparian vegetation (e.g., rushes, sedges, willows, alders, and cottonwoods). Riparian vegetation is important for maintaining the integrity of ecological processes of riparian areas.

The 1.5 million-acre project area contains numerous riparian areas including streams, springs, and wet meadows (Map 15). The National Hydrography Dataset identifies 501 miles of perennial streams, 3,750 miles of intermittent and ephemeral streams, and 656 springs within the project area. The focal treatment area includes 335 miles of perennial streams, 1,486 miles of intermittent and ephemeral streams, and 414 springs. Streams and springs are generally classified as either lotic (flowing water) or lentic (still water) depending on the behavior of the ground water or surface water and the interaction of the groundwater with the Earth's surface.

Plant communities vary in response to hydrologic conditions. Many riparian areas in this region exhibit characteristics of both lentic and lotic environments, such as springs discharging water diffusely across high and low gradient wet meadows. This access to water enables certain plant species to thrive. Obligate wetland species (plants that occur in saturated soils) include Nebraska sedge and coyote willow. Facultative wetland species (plants that usually occur in

saturated soils but are occasionally found in seasonably dry soils) include Baltic rush and Wood's rose. Riparian vegetation decreases water velocities and traps sediment, and has densely matted root systems that stabilize soils. Riparian areas provide habitat for aquatic organisms as well as upland terrestrial species (e.g., upland birds, ungulates, mammals, insects, and reptiles) that utilize them as a source for water and food.

Hydrologic Condition
Riparian areas within the project area have experienced significant levels of development and degradation over the past 200 years. In order to survive in a semi-arid desert, homesteaders developed water sources for domestic and agricultural uses (e.g., piped water to troughs, crops, etc.). Transportation networks were developed across the project area for use by horses, vehicles, and trains. Natural, low intensity wildfires have been removed from the landscape, so as to not interfere with human uses of the area. These actions have altered the hydrologic and geomorphic balance of riparian areas within the project area, which has degraded functional condition of the stream systems and their ability to retain stable stream banks and discharge normal levels of sediment.

Water Quality
Currently there are 296 miles of streams within the project area that are either on the Environmental Protection Agency's list of 303(d) impaired waters for sediment pollution or have Total Maximum Daily Loads (TMDL) assigned for sediment pollution (i.e., the maximum amount of sediment the stream can receive and still meet water quality standards). The focal treatment area includes 186 of these stream miles.

3.7.2 Environmental Consequences – Hydrology and Water Quality

General Impacts of Juniper Encroachment
Ongoing encroachment by juniper poses a risk to lentic and lotic systems by altering the shrub-steppe environment to a juniper-dominated environment, which causes a pronounced change in the hydrologic and geomorphic setting of this landscape. Juniper is able to quickly establish populations within shrub steppe environments and dominate the vegetative community within decades. If juniper trees are treated in early phase encroachment areas within lentic and lotic environments, the desired obligate and facultative wetland plant communities would have an opportunity to re-establish given their resilient nature.

Juniper trees compete with upland and riparian plants for space, water, and nutrients. Juniper roots on mature trees extend out past the crown of the tree and can outcompete and occupy root space utilized by adjacent plant species. In one study, nine mature juniper trees occupied the entire root zone of an acre of ground (Gedney et al. 1999). Aggressive root behavior combined with the juniper canopy stresses adjacent and understory herbaceous plants and shrubs. Stress to adjacent and understory plants reduces their vigor and suppresses recruitment of these plants. In turn, bare ground increases both under the juniper canopy and the space between juniper canopies (intercanopy).

An increase in bare ground alters the way water flows over the ground surface and infiltrates into the soil. The lack of grasses, forbs, and shrubs allows water to flow overland rather than infiltrate into the soil profile. Sheet flow of surface water across the soil could create erosional

features including rills and gullies. The accelerated runoff and erosion rates caused from an increase in interconnected bare ground between the juniper canopies can greatly increase the sediment yield within an affected watershed (Pierson et al. 2010). This process can occur in upland systems along with riparian and wetland systems.

The excess amount of water and sediment entering the system shifts stream equilibria causing increased erosion and deposition features within a watershed and a loss of stream bank stability. Juniper roots can dominate the root zone, but they are not as densely matted as riparian vegetation (i.e., willows, sedges, and rushes). Where juniper dominates riparian areas, vegetation that decreases water velocities and root matter that stabilizes the sediment is lacking. The result is an unstable stream bank that is less capable of withstanding high energy flows.

With increased surface water velocities and discharge, stream channels tend to incise (lowering of the stream channel elevation) until a new equilibrium is achieved; increased incision lowers the localized water table and removes the connection of the natural flood plain to the stream system. The loss of surface water and groundwater to the flood plain reduces the viability of riparian plant species and allows upland plant species to expand into riparian systems. This, in turn, reduces the functionality of the stream system making recovery to natural conditions unlikely. Moreover, further degradation of these stream systems would be expected for the foreseeable future.

3.7.2.1 **Alternative A – No Action**

No juniper would be removed and existing juniper trees would continue to mature and reproduce leading to further encroachment within the proposed 600,000-acre focal treatment area and 1.5-million acre greater project area. Existing and encroaching juniper in riparian areas and adjacent upland areas would continue to change plant community composition impacting the integrity of hydrologic processes. Diminished hydrologic function would cause major, lasting negative effects to the sagebrush shrub steppe environment, along with a departure in functional condition of riparian and wetland areas in the project area.

If juniper encroachment is left unabated, the hydrologic flow regime of groundwater and surface water within affected watersheds would be altered for the foreseeable future. The geomorphic structure of the landscape within the affected watersheds would be altered permanently from its current condition, and would be more susceptible to erosional events that could further increase this departure.

3.7.2.2 **Alternative B – Proposed Action**

The proposed action involves removing early and select later stage juniper from riparian and wetland areas identified within the entire treatment area. The project focuses on early stage juniper encroachment, but late stage juniper impacting riparian and wetland areas within the treatment area may be removed also. Juniper would be cut using hand saws and either moved a distance up to 46 meters (150 feet) from riparian and wetland ecosystems or limbed and left in place, depending on the site specific conditions. Juniper trees removed from the riparian and wetland areas would be staged in small slash piles and burned when ground moisture levels are high enough to avoid soil damage. Juniper mastication would not occur within riparian or wetland areas (see Methods in section 2.3.2.5).

The trunks of trees cut in riparian areas would be left in place and limbed to promote contact with the ground surface. The trunks would be arranged to trap local sediment from traveling down gradient. This action would have several immediate effects resulting from the removal of the juniper from riparian and wetland treatment areas to include new bare ground where the juniper were present, destabilization of stream banks where juniper were present, and localized burned areas outside of the riparian and wetland areas. Long-term (greater than 3 years) effects include a return of desired riparian plant communities, an increase in stable stream banks, and an increase in functional condition of lentic and lotic riparian environments.

Removing early phase juniper would have a negligible to minor, site-specific, negative short-term (0-3 years) effect on riparian and upland areas by exposing bare soil and increasing the risk of erosion of the soil surface because interspatial and understory species would largely be intact. This effect would be more pronounced in treated areas with larger juniper trees and later stage juniper encroachment because trees with larger canopies may have outcompeted desirable plants resulting in greater areas of exposed soil.

The magnitude of the negative effects would increase with greater amount of slope within the riparian and wetland areas and the amount of bare soil that has developed under the juniper canopy. The short-term negative effect of bare ground would last until the adjacent plant community reoccupies that particular space. Since the majority of the treatment focal area is within early stage juniper encroachment, the adjacent desired plant community should expand into the bare ground within one to three growing seasons depending on annual precipitation levels.

Juniper trunks placed in contact with the soil would act as sediment traps, reduce erosion, and stabilize soils until desired plant species re-establish (Pierson et al. 2013). In areas treated with mastication with residue left on the bare soil, there would be significantly less short term (0-3 years) negative effects as increased infiltration rates and lower sediment yields are typically observed compared to bare soil that is left to revegetate from adjacent plant communities (Cline et al. 2010).

Removing juniper from stream banks could cause an immediate reduction in stream bank stability due to bare ground being exposed. This effect would be minor since the root structure would remain in place and would only last until adjacent obligate wetland plant species recolonize the space once occupied by juniper. This process should only take one to three growing seasons depending on water availability and the ability of adjacent desired plant species to occupy the bare ground. Juniper residing on stream banks cause moderate to major negative effects on stream conditions, so the increase in negative effects from removing early phase juniper would be negligible. Depending on site specific conditions, cut and partially limbed juniper will be placed within the bare ground to decrease the negative effects of erosion on the bare soil surface. This action will allow some resistance to erosion on the stream banks from rainfall events and allow the desired riparian vegetation time to colonize the bare ground.

When scattering juniper material is not optimal, juniper branches would be removed from the riparian and wetland areas and burned up to 46 meters (150 feet) away depending on site specific

conditions. Juniper branches piled outside of riparian areas would be burned in small slash piles when soils are frozen, covered by snow, or soil moisture levels are high enough to limit negative impacts from heating soils. Burning under such conditions also reduces the potential of fire spreading to adjacent vegetation. This would have no effect on the adjacent riparian and wetland areas.

Long-term effects to wetland areas would include a return to desired obligate and facultative wetland plant species. Desired wetland plant species would increase the functioning condition of riparian and wetland areas. A return to the natural hydrologic flow to lentic wetland environments and increasing the stability of stream banks in lotic environments would also occur. Removing juniper trees would increase the amount of groundwater and habitat for desired wetland plants and enable existing plant communities to increase plant vigor. An increase in plant vigor of desired wetland plant species within riparian and wetland areas would aid in the natural development of floodplains, retain and filter sediment within the stream channel, and increase the functional condition of the stream system.

Although there would be short term negative effects from juniper treatment with Alternative B, those effects would be much less than the long-term negative effects that would result from no action.

3.7.2.3 **Alternative C – No Treatment in Wilderness**

The focal treatment area for this alternative to the proposed action, which excludes designated wilderness areas, contains 323 miles of perennial streams, 1,383 miles of intermittent and ephemeral streams, and 401 springs. Juniper removal from riparian and wetland areas would take place outside wilderness on approximately 553,000 acres. Direct and indirect effects described for Alternatives A and B would result in the project area. Impacts to hydrologic processes and water quality on 47,000 acres (wilderness) would be identical to Alternative A and identical to Alternative B on 553,000 acres where juniper treatment occurs.

Erosion and sediment features that are developing or may develop in untreated wilderness areas have the ability to influence portions of watersheds that are not currently affected by juniper encroachment. Upstream portions of watersheds from affected wilderness areas would likely see head cuts (an abrupt vertical drop/knickpoint) propagating through the stream systems as erosion is enhanced within the early stage juniper areas. The resulting sediment load would adversely affect the water quality and geomorphology of downstream reaches of the stream systems. The treated area within the project area would see the immediate negative effects from the removal of early phase juniper as stated in alternative B, but the long term beneficial impacts would also result.

Short-term impacts to hydrologic processes and water quality on 47,000 acres (wilderness) would be identical to Alternative A and identical to Alternative B where juniper treatment occurs. Long-term (greater than 3 years) impacts to hydrologic processes and water quality within the untreated wilderness would be identical to Alternative A, but might also propagate and influence conditions outside of the untreated wilderness within the project area. Long-term impacts where juniper treatment occurs would see the same beneficial impacts as Alternative B, unless portions of watersheds are not treated (wilderness) within this alternative.

3.7.3 Cumulative Impacts – Hydrology and Water Quality

3.7.3.1 Scope of Analysis

The spatial extent of the cumulative impacts analysis area is the Bruneau, East Little Owyhee, Jordan, Middle Owyhee, Middle Snake-Succor, South Fork Owyhee, and Upper Owyhee watersheds (8th digit Hydrologic Unit Code (HUC), fourth level cataloging unit). These watersheds (8,620,220 acres total) incorporate the entire project area and are considered within the cumulative impacts analysis as hydrologic changes within portions of watersheds have the potential to propagate throughout the entire watershed.

The temporal frame for cumulative impacts begins from the previous 10 years from treatment implementation. Direct and indirect effects to riparian and wetland areas would dissipate once the area has been treated and desired plant species reestablish. The proposed action is expected to take 10-15 years to complete. Re-vegetation of herbaceous species in areas where mastication and/or jackpot burning occur is expected to take 0-3 years to re-vegetate therefore the direct and indirect effects would dissipate within 18 years of initial project implementation; as a result cumulative effects will be considered through 2033.

3.7.3.2 Current Conditions and Past, Present, and Reasonably Foreseeable Future Actions

The current conditions of the riparian and wetland areas within the project area have been affected in several ways from the development of the region by European settlement. Homesteads have been established across the region and the majority of the reliable water sources have been developed for agricultural uses. Roads have been constructed to provide a transportation network across the region enabling agricultural, recreational, and industrial use to occur. Woody encroachment of the sagebrush steppe has increased in areas that historically did not contain high densities of mature juniper trees. There have been a number of past and current juniper treatment projects occurring within the cumulative impact analysis area to reduce the amount and scale of juniper encroachment. Large range fires have occurred within the treatment area within the past 10 years that have altered the local landscape. Livestock grazing has occurred historically and currently at some level throughout the analysis area.

The combination of development of the rangeland within the project area by European settlers, construction of road networks, increased encroachment from juniper trees, juniper management projects, large range fires, and livestock grazing have all had significant impacts on the past, current, and future hydrologic system within the project area. These actions combined have had an effect on the current conditions and will have an effect on future conditions.

Watersheds within the project area have been and are in the process of reaching a hydrologic equilibrium influenced by these specific disturbances.

Development of Riparian and Wetland Areas

Development of the project area in the 1800s by European settlers has had a significant impact to the condition of the riparian and wetland areas. Homesteaders needed reliable water sources to

function as a population center and for agricultural uses. This need for reliable water has led to the development and alteration of both lotic and lentic areas. Water diversion structures were constructed on both springs and streams to deliver focused flow of spring water and surface water to houses, troughs, and irrigated pasture land. These water diversion structures include dams, canals, and spring boxes. As a result, both water quantity and the timing of water availability have changed in cumulative effects analysis area watersheds and stream systems. Some watersheds have had a significant amount of water diverted out of them, while other watersheds have had an increase in water to their stream systems. This alteration of water supply has resulted in significant changes to the geomorphic and hydrologic function of some of the stream systems in this region.

Roads

The construction of road networks has also caused a significant change in the condition of the riparian and wetland areas within this region. Roads have been constructed within floodplains, across stream channels, and within lentic areas. Roads residing within stream channel floodplains have a negative impact on the stream channel by reducing the amount of space the stream has developed naturally within and has access to. This leads to a straightening of the stream channel which increases stream velocities causing incisions of the stream channel. Increased sediment loads have a dramatic impact on the downstream reaches of the stream system and will alter the geomorphic structure of the stream network. The incised stream channel will cause the local water table to drop, disconnecting the riparian vegetation on the floodplain with its water source.

Roads constructed across stream channels impact the ability of the stream channel to naturally meander. Many of the roads constructed across stream channels have either a culvert installed to divert surface water under the road, or a low water crossing. If culverts and water crossings are improperly designed, they have the tendency to create erosional features such as head cuts, resulting in incised channels. Lentic areas are also prone to degradation when roads are constructed through them. Lentic areas within this region usually have diffuse surface and groundwater flow creating wet meadow type environments. Roads constructed within a lentic area will cause a focusing and linear change in the flow pattern of the wet meadow, resulting in negative impacts to the down gradient wet meadow environment.

Juniper Encroachment

Woody encroachment of riparian and wetland areas by juniper has been ongoing for decades. This encroachment has altered the local hydrology in affected watersheds and will continue to adversely affect additional watersheds, as it continues. Changes to the hydrology include increased erosion and sediment deposition, reduction in native wetland vegetation, reduction in stream bank stability, and reduction in lentic and lotic surficial area. These negative impacts have been occurring within the project area, but are expected to become more pronounced within the treatment area as the early phase juniper trees mature.

Juniper Treatments

Multiple juniper treatment projects have been completed or are currently being conducted to reduce the amount and density of juniper within sagebrush steppe habitat. These treatments include the Pole Creek (31,450 to 35,630 acres), Trout Springs (23,300 acres), South Mountain

(730 acres), and Johnston Draw (2,309 acres) treatments (see section 3.0). Treatment methods for those projects include broadcast burning and hand cutting/girdling, with the slash either being jackpot burned or scattered. Broadcast burning would create negative erosional conditions for the short term before regrowth of desired, resilient plant populations repopulates the treated area. Erosion and sediment yields would then start to return to normal levels and in the areas affected by heavy juniper encroachment would see increased resistance to erosional events. Hand cutting and jackpot burning would see localized negative short-term effects until desired plant species repopulate the bare ground.

Wildfire

Rangeland fires have occurred within the project area in the recent past and have had impacts to the current conditions. Large fires that have occurred in the project area are the Tongue Complex (47,000 acres) in 2007, the Jacks Fire (49,000 acres) in 2012, and the Soda Fire (182,000 acres) in 2015. These fires have had significant effects to the hydrology across the landscape. The removal of shrubs and herbaceous understory has dramatically increased the amount of surface water runoff and sediment. The increase in water and sediment have negative impacts on the natural functioning condition of riparian and wetland conditions which will generally last until vegetation reestablishes its natural coverage (less than 3 years) and the stream systems distribute the excess sediment that has been transported into them.

The Tongue Complex occurred long enough ago that vegetation has reestablished and sediment loads have decreased to near normal levels. The Jacks Fire was more recent, but vegetation has had three growing seasons to revegetate the burned areas and decrease the amount of erosion and sediment loading occurring within stream systems within and downstream of the burned area. The Soda Fire is the most recent large-scale fire within the project area and direct and indirect negative effects including excessive erosion and sediment deposition are occurring and will continue to occur for the next 3 years. Once vegetation reestablishes, these direct and indirect effects should subside.

Livestock Grazing

Livestock grazing has been occurring for over a century within the analysis area. Stocking levels of livestock have fluctuated within that timeframe and some lasting impacts have been observed from historic grazing, to include terracing, incision of stream channels, and other erosional features. Since 1997, BLM has managed livestock grazing according to the Idaho Standards for Rangeland Health and Guidelines for Livestock Grazing Management. Standard 1 applies to watershed processes, Standard 2 and Standard 3 apply to hydrologic processes within stream and wetland systems, and Standard 7 applies to water quality. The BLM manages livestock grazing to meet these standards.

3.7.3.3 Alternative A – Cumulative Impacts

The hydrologic conditions of the project area would continue to deviate from the present condition and erosion and sediment loads would increase. Over time, desirable riparian plant species would disappear from riparian areas, leaving stream systems more susceptible to erosional events. These processes in combination with the level of development and alteration already present would cause a significant degradation to the hydrologic and rangeland conditions in the project area.

3.7.3.4 Alternative B – Cumulative Impacts

The proposed treatment would cause minor, short-term sediment loads within the treatment area when combined with the other cumulative actions and impacts outlined above. The increase in desired plant species that would result from the proposed action would cause an increase in the functional condition of riparian and wetland systems over the long term; therefore, the proposed juniper treatment would benefit hydrologic properties and water quality in the project area and help stabilize the watersheds that have already had erosional events and deviations from natural conditions.

3.7.3.5 Alternative C – Cumulative Impacts

Additive impacts in this scenario would be nearly identical to Alternative B. The 47,000 acres (8% of the treatment area proposed for Alternative B) of wilderness would not be treated, so those hydrologic properties and water quality would be affected similarly to Alternative A.

3.8 Fisheries

3.8.1 Affected Environment - Fisheries

Fish habitat includes perennial and intermittent streams, springs, and reservoirs that support fish through at least a portion of the year. Within the project area, there are an estimated 500 miles of perennial streams and a limited number of reservoirs (Map 15) that provide year round habitat. Of the approximately 3,700 intermittent or ephemeral channels found within the project area, it is expected that some intermittent streams are used during various life history phases such as spawning or juvenile rearing. Intermittent streams are vital for maintaining aquatic biodiversity by providing habitat for nongame species. In addition, these resources provide connectivity within and between perennial streams during high flow events or pool habitat during seasons of low water. Year-to-year variability in rain and snow accumulations greatly influences stream and spring flows, both in quantity and duration of runoff. For example, during extended periods of drought, extensive lengths of streams which normally have perennial surface flows go dry. Many springs, with flows maintained by groundwater, support small wetlands and riparian habitat or short stream segments (Map 15).

The condition of fish habitat within the planning area is related to hydrologic conditions of the upland and riparian areas associated with, or contributing to, a specific stream or stream channel characteristics (Beschta 1997). Intact riparian vegetation along floodplains dissipates stream energy, stores water for release later in the season, and provides habitat for non-fish species such as amphibians. Riparian vegetation reduces solar radiation by providing shade and thereby moderates water temperatures (Rosenberger et al. 2015), adds structure to the banks to reduce erosion (Matney et al. 2005), provides in-stream habitat structure for fish, and produces organic material that is a food source for macroinvertebrates and other bottom feeders (Wetzel 2001). Juniper encroachment into riparian and upland areas has decreased both the shrub and herbaceous vegetation components in both upland and riparian areas (Matney et al. 2005; Pierson et al. 2010) often leaving bare ground or a monoculture of drought tolerant and shade tolerant (often times invasive) species such as cheatgrass. Additionally, the spread of juniper alters the hydrological processes by sequestering or intercepting water flow (Robinson et al. 2010; Pierson et al. 2010) and increasing the potential for overland runoff and erosion (Pierson et al. 2010; Pierson et al. 2007; Bisson et al. 2003).

Fish Species and Distribution

Approximately 300 perennial stream miles in the proposed project area are documented to support fish populations. These streams provide habitat for both cool-water and cold-water adapted fish species. Redband trout, a BLM special status species, and sculpin are examples of native cold water fish within the project area. These species prefer water temperatures below 24°C (75.2ºF) but can tolerate temperatures up to 28°C (82.4ºF) for short periods of time. (Hillman et al. 1999) Cool water-adapted fish species include members of the minnow and sucker families (Cyprinids and Catostomids, respectively); most of these species can tolerate warmer water conditions up to 32°C (89.6ºF) for limited amounts of time (Hillman et al. 1999).

Redband trout, speckled dace, redside shiner, and bridgelip sucker are the most common and widely distributed native fish known to occur in the project area; chiselmouth and longnose dace are less common, but are relatively widely distributed. General species and habitat information for these widely distributed fish assemblages is presented below.

Interior Redband Trout

Interior redband trout (RBT) is a subspecies of rainbow trout found in the interior Columbia Basin east of the Cascade Mountains upstream to geologic barriers, such as, Shoshone Falls. RBT is a BLM special status species throughout its distribution. The species is present in the Owyhee, Bruneau, and Snake Rivers and their associated tributaries, including the majority of perennial streams within the project area. Their preferred habitat is cold water streams but they can survive at a wide variety of elevations and temperature regimes.

Speckled Dace

Speckled dace are widespread across the United States, and are distributed throughout a large portion of the project area. This species lives in a variety of habitats, but normally prefers the shallow, cool and slower moving waters rather than the swift riffles preferred by longnose dace.

Redside Shiner

Redside shiners occupy a wide variety of habitats including lakes, streams, ponds, and irrigation ditches. They prefer ponds, lakes, ditches, springs, sloughs, and rivers where the current is slow or absent.

Bridgelip Sucker

This sucker species is widely distributed in all major tributaries to the Owyhee, Bruneau, and Snake Rivers. Preferred habitat for bridgelip sucker is small, fast-flowing cold water streams with gravelly, rocky bottoms; although it may also inhabit rivers where current is moderate and substrate composed of sand and silt.

Chiselmouth

A widely distributed member of the minnow family, it inhabits moderate to slow-flowing streams of all sizes, and can be found in lakes. Spawning occurs in streams over gravel or small rubble. Species distribution includes all major tributaries to the Owyhee, Bruneau, and Snake Rivers.

Longnose Dace
Longnose dace is widespread across the United States, and is distributed throughout a large portion of the project area. They prefer the riffle areas of streams, but can be found along the shoreline of lakes where the substrate is composed of small rubble. Longnose dace are a benthic species, living among the stones on the bottoms of streams.

Others
Other species recorded in the project area include: brook trout, largescale sucker, mottled sculpin, mountain sucker, northern pikeminnow, Paiute sculpin, and rainbow trout (hatchery reared rainbow trout were formerly stocked in several streams). Eleven fish species have been introduced to streams or reservoirs over the last 100 years, though most are restricted in distribution to the Snake River which is outside of the project area boundary. However, smallmouth bass were introduced into and are now widely distributed in the Owyhee River basin.

Indicators of Productivity
Aquatic macroinvertebrates are often used as water quality indicators reflecting long term stream conditions. Diversity of macroinvertebrate communities is a good indicator of the amount of community stability in a stream. Macroinvertebrates include aquatic insects, crayfish, and mollusks, and play an important role in the aquatic food web which includes nutrient processing and providing a prey base for vertebrates. Larval macroinvertebrates are a food source for other omnivorous aquatic macroinvertebrates and aquatic vertebrates. Adult macroinvertebrates are a food source for aquatic vertebrates and some terrestrial vertebrates. In addition, biomass of aquatic macroinvertebrates is indicative of the amount of food available to fish and the general productivity of a water body. At least 123 species of macro-invertebrates representing a broad spectrum of habitat preference types are found in the project area.

3.8.2 Environmental Consequences – Fisheries

Effects Common to All Action Alternatives
No measurable project objectives for fish and fish habitat have been identified for the action alternatives. General habitat improvement objectives have been identified for riparian areas in support of other wildlife species (i.e., sage-grouse) which would also benefit fish habitat. Therefore, a description of potential effects common to all action alternatives for hydrology and water quality would reflect potential effects to fish and their associated habitat. Life history information and overlapping presence of fish species in the project area suggest that habitat needs are similar, with caveats for use of specific niches within stream systems at various life history stages.

3.8.2.1 Alternative A – No Action

Fish habitat within the project area would maintain the current conditions and rate of degradation in the short term (5-10 years) but worsen in the long-term (10+ years). Over time, juniper would continue to progress through each successional phase as defined by Miller et al. (2005) until the project area experiences a substantial change to the landscape (i.e., wildfire, juniper removal, etc.) or Phase III juniper cover is reached.

The continued expansion and increased dominance of juniper in riparian areas will continue to result in changes to the riparian vegetation community, including a reduction in preferred riparian wood, shrub, and herbaceous vegetation (Matney et al. 2005). The lower riparian cover will likely result in increased water temperature from a lack of canopy shading and increased bank erosion (Wissmar 2004, Rosenberger et al. 2015). Changes in stream temperature will likely be minimal to moderate but persistent over the short-term (5-10 years), allowing fish species time to acclimate. Over the long-term and as juniper increases in dominance and canopy cover is reduced, stream temperatures will likely reach thresholds that cause fish to abandon use of those channels either seasonally or permanently.

Transitions from riparian woody species such as willows, alders, and cottonwoods that produce rhizomatous root structures to junipers, which tend to have central tap roots (OSU, 1995, Miller et al. 2005), will further reduce bank stability and in-stream habitat structure for fish. As juniper becomes dominant in the project area, the amount of bare ground will increase in the uplands and along the riparian corridors creating higher runoff and erosion rates (Pierson et al., 2007; Bisson et al., 2003, Robinson et al., 2010, Pierson et al., 2010). This increase in runoff and erosion would increase fine and course sediment loads in stream channels, potentially causing local fish extirpation (if the event is severe enough) or fish to avoid areas where excessive sediment influxes are common (Rosenberger et al., 2015, Bisson et al. 2003) and habitat is degraded as a result (i.e. pool depth reduced due to excess sediment).

The short-term effects (5-10 years) of stream sedimentation include degradation of fish habitat due to changes in preferred habitat structure (reduced cover, decreased pool depth, changes in pool/riffle structure, etc) and a reduction in available prey (macroinvertebrates) as organic matter is reduced or covered (fine sediment coated cobbles, algal blooms). Potential long-term effects (10+ years) include increased sediment loads as bare ground increases and habitat abandonment, either seasonally or permanently, as a result of reduced habitat complexity or prey base.

Loss of desired riparian vegetation would also affect in-stream nutrient cycling. As juniper dominates riparian corridors, biological input will convert from one dominated by deciduous and herbaceous species to one dominated by juniper leaf litter (Miller et al., 2005). While total nutrient input may not decline, nutrient input from juniper litter may not be as readily available for macro-invertebrates. This would cause a shift in diversity and density of aquatic macro-invertebrates. In addition, terrestrial invertebrates such as worms, beetles, and grasshoppers can be an important food source for trout during certain times of year and these would likely be less prevalent in juniper dominated riparian areas due to dryer soils and less herbaceous vegetation.

3.8.2.2 **Alternative B – Proposed Action**

The proposed action alternative would mainly involve early stage juniper removal on approximately 600,000 acres within the project area. Riparian areas identified as important to sage-grouse habitat that are Phase II or higher may also be treated using methods outlined in section 2.2.2.5. Juniper would be removed via mechanical or non-mechanical methods and either piled and burned at a later date or de-limbed and left within riparian habitats to provide additional habitat diversity and sediment control. Old growth juniper would be left standing.

The reduction of juniper along fish-bearing streams would allow for preferred riparian vegetation to increase as competition from juniper is reduced. Incremental removal of juniper in these stream corridors would provide time for preferred riparian vegetation to recolonize and stabilize banks and bare soil areas. The short-term effects (1-3 years) of juniper removal include increased riparian vegetation, increased canopy cover, and a reduction in temperature within the stream (Rosenberger et al., 2015; Beschta, 1997). These changes would gradually increase habitat availability by stabilizing banks, creating in-stream habitat structure and reduce the number and extent of areas where current thermal regimes limit fish use.

As riparian vegetation increases over the mid to long-term (5+ years), banks will continue to stabilize and overall amount of bare ground will be reduced. This decrease in bare ground and increase in riparian vegetation will reduce sedimentation into stream channels by dissipating energy from runoff and capturing sediment (Miller et al., 2005). Reductions in sediment delivered to streams will likely result in an increase in habitat availability (Bisson et al., 2003). Habitat complexities will also likely increase as excessive sediment is flushed from the system and new sediment is sequestered by riparian vegetation allowing for pools to increase depth, overhanging banks to develop and woody debris to accumulate in channels.

In general, removal of juniper from riparian corridors and fish-bearing streams would be positive in the long-term by maintaining or improving fish habitat within the project area. Less sediment would be expected to enter streams as herbaceous and shrubby or woody vegetation increases, as compared to Alternative A. Upland sites and riparian areas would have reduced amounts of bare soils and increased vegetative cover would increase ground stability (banks or upland slopes). As juniper is removed, desirable woody riparian species would increase resulting in increases stream shading and reduced water temperatures. In watersheds where juniper is present but not yet established in riparian areas, treatments would ensure juniper does not degrade fish habitat.

3.8.2.3 Alternative C – No treatment in Wilderness

Impacts to fisheries outside of wilderness would be similar to those described for Alternative B. Within the 47,000 acres of wilderness, only a few miles (less than 3 miles) of fish-bearing streams would not be treated. These include small segments of East and West Fork Shoofly Creek and its tributary Snow Creek as well as a small portion of Poison Creek. Fisheries within the wilderness areas would undergo impacts similar to those described for Alternative A. Sediment loads would continue to increase, unmitigated, as riparian plant diversity decreases. Overall in-stream habitat would likely have reduced complexity, an impaired nutrient cycle, and fish forage base (i.e. macro-invertebrates) would become limited (Miller et al. 2005).

3.8.3 Cumulative Impacts – Fisheries

3.8.3.1 Scope of Analysis

The spatial scope of the cumulative impacts analysis for fisheries resources is the project area of approximately 1.5 million acres. Watersheds within this area contain similar landscape features, riparian vegetation components, and land uses. Primary resource concerns include the reduction in upland and riparian vegetation, runoff and erosion, and sediment input into stream channels. While the direct effects from this proposed project are expected to be localized in nature (as

described in section 3.8.2) the effects from other present and reasonably foreseeable future actions overlap within these watersheds.

The temporal frames for cumulative impacts are identical to those described in the fisheries section above. Direct and indirect impacts to fish and fish habitat would be short in duration (1-3 years) as riparian vegetation re-establishes. Overall improvements to habitat complexity and availability would likely occur within 5-10 years after treatment.

3.8.3.2 Current Conditions and Past, Present, and Reasonably Foreseeable Future Actions

In the Snake River drainage, irrigation diversions, livestock grazing, road construction and historic mining have combined to reduce stream flows and alter stream channels and riparian communities on many streams in the project area, resulting in impacts to fish habitat. In the Jordan Creek/Boulder Creek drainage, primary land management impacts include historic mining, livestock grazing, and, more recently, outdoor recreation. These activities impact fish-bearing streams in a variety of ways including utilization of riparian vegetation by livestock which results in a reduction in vegetation that can dissipate energy during overland flow events, in-channel dredging or development of tailing piles that alter stream channels and/or increase sedimentation, the development of roads, camping areas and other anthropogenic alterations associated with recreation use that increase sedimentation (roads and camping areas) and altered stream channels (placement of rock barriers to create pool areas, trail or road crossings, etc.). The Boulder Creek drainage does have short reaches of restricted canyons that are inaccessible to livestock and have satisfactory fish habitat.

In the Owyhee River drainage, irrigation diversions and livestock grazing have had the greatest impact on stream channels, riparian vegetative communities and associated fish habitat. Irrigation diversions occur primarily on private land but impact aquatic life on downstream public lands especially during low flow periods.

Juniper treatments have been ongoing and are targeted at reducing juniper throughout sage brush steppe habitat. These projects include Johnston Draw, South Mountain, Trout Springs and Pole Creek. Johnston Draw and South Mountain are both experimental burns planned by the local Agriculture Research Station and are located within the Reynolds Creek drainage. Trout Creek and Pole Creek are juniper removal project whose primary focus is to increase rangeland forage availability. All projects will use a combination of mechanical juniper removal and controlled burning to achieve their respective project goals.

Wildfire is a phenomenon that occurs both naturally and as the result of human ignition throughout the Boise District and within the proposed project area. Large fire complexes include the 2015 Soda Fire which burned approximately 182,000 of the project area, the 2012 Jacks Fire (approximately 50,000 acres), and 2012 Tongue Complex (approximately 47,000 acres).

3.8.3.3 Alternative A – Cumulative Impacts

Since fish are currently well-distributed in streams throughout the project area and adverse effects such as chronic (persistent and lasting) increased sediment, elevated water temperature

and altered nutrient balance move downstream through aquatic systems, potential for cumulative effects to fish habitat and fish populations, especially in the downstream portions of watersheds, would be apparent in the short-term. As juniper continues to transition towards Phase III, riparian vegetation would continue to be reduced and bare ground would increase causing higher levels of sedimentation into stream channels and reducing overall fishery habitat complexity and availability at a local and regional scale.

Past, present and reasonably foreseeable future actions within the project area would continue to have varying degrees of impacts on fisheries resources. Roads, recreation activities, wildfire, water diversions, grazing, and mining activities would continue throughout the project area and likely result in reduced vegetative cover in riparian areas, increased sedimentation, and changes to water quality (temperature). Where mitigation can be implemented on future projects, effects would be minimal. Cumulatively, however, these impacts would reduce the overall habitat availability and complexity available to fish and macroinvertebrate communities in the long-term.

3.8.3.4 Alternative B – Cumulative Impacts

Since fish are currently well-distributed in streams throughout the project area and adverse effects such as chronic (persistent and lasting) increased sediment, elevated water temperature and altered nutrient balance move downstream through aquatic systems, potential for cumulative effects to fish habitat and fish populations, especially in the downstream portions of watersheds, would be apparent in the short term. As preferred riparian vegetation re-establishes in treatment areas, sediment input would be reduced, habitat complexity would increase and bank stability would increase. Short-term impacts to fisheries within the project area would be minor with long-term benefits leading increased habitat availability at a local and regional scale.

Past, present and reasonably foreseeable future actions within the project area would continue to have varying degrees of impacts on fisheries resources. Roads, recreation activities, wildfire, water diversions, grazing, and mining activities would continue throughout the project area and likely increase sedimentation, reduce vegetative cover in riparian areas, and change water quality (temperature). Cumulatively, these impacts would reduce the overall habitat availability and complexity available to fish and macro-invertebrate communities.

3.8.3.5 Alternative C – Cumulative Impacts

Fish habitat located outside of wilderness areas would have similar cumulative impacts as identified for Alternative B. Areas with Wilderness would have cumulative impacts similar to those described for Alternative A.

3.9 Wilderness

3.9.1 Affected Environment – Wilderness

Wilderness

The proposed project area includes portions of five wildernesses: Big Jacks, Little Jacks, North Fork Owyhee, Owyhee River, and Pole Creek (Map 16). These were all designated in March 2009 through the Omnibus Public Land Management Act (OPLMA). Regulations administering management of wilderness areas specify that they be managed in a manner that preserves and protects wilderness characteristics and values. Wilderness values include: solitude, naturalness,

opportunities for primitive and unconfined recreation, and the presence of special features that enhance wilderness values. The BLM Manual 8560 [Sec .08 (A) (1)] states that "The Wilderness Act directs that wilderness areas be managed to provide for their protection, the preservation of their natural conditions, and the preservation of their wilderness character", which include naturalness and outstanding opportunities for solitude and/or primitive and unconfined recreation.

Big Jacks Wilderness
The Big Jacks Wilderness includes approximately 52,684 acres; roughly 2,870 acres of the wilderness fall within the focal treatment area. The area consists of deep canyons, streams, and uplands that provide habitat for several sensitive species, including greater sage-grouse, bighorn sheep, and redband trout. The wilderness also contains four wild river segments: Big Jacks, Wickahoney, Duncan, and Cottonwood creeks. The Big Jacks Wilderness is home to Parker Trail, which provides non-motorized recreational access from the eastern wilderness boundary to Big Jacks Creek Canyon.

Little Jacks Wilderness
The Little Jacks Wilderness includes approximately 51,491acres; roughly 6,400 acres of the wilderness fall within the focal treatment area. The area is popular for hiking, backpacking, angling, and nature observation. The Little Jacks Wilderness is the closest BLM wilderness to Boise ID, and the urban areas of the Treasure Valley in southwest ID. Therefore, this wilderness area receives a higher volume of recreational use than the other wilderness areas.

North Fork Owyhee Wilderness
The North Fork Owyhee Wilderness includes approximately 43,413 acres; roughly 3,590 acres lie within the focal treatment area. The wilderness area consists of rugged juniper hills and a flat plateau dissected by numerous canyons. Approximately 15 miles of the North Fork Owyhee River meanders through this wilderness. This section of river was designated as a "wild" river in OPLMA. Special features recognized for the North Fork Owyhee Wilderness include exceptional scenic quality because of its spectacular sheer-walled canyons and rock outcrops highlighted with gnarled juniper. Sensitive wildlife species are also included as special features in the wilderness area (USDI BLM 1991).

Owyhee River Wilderness
The Owyhee River Wilderness includes approximately 267,328 acres; roughly 21,584 acres lie within the focal treatment area and are proposed for juniper treatment. This wilderness area consists of a flat desert shrub expanse that lies on a moderately eroded tableland. The wilderness is centered on the Owyhee River and its tributaries in the southwest portion of Idaho near the Oregon border. The land is defined by rivers cutting steep canyons out of high-desert sagebrush plateaus. The wilderness area provides good habitat for greater sage-grouse, bighorn sheep, and several other sagebrush obligate species. The Owyhee River Wilderness contains naturalness, outstanding opportunities for solitude due to excellent topographic and vegetative screening, outstanding opportunities for primitive and unconfined recreation, and supplemental values such as scenic, scientific, wildlife, and cultural values. It contains six wild river segments: the Owyhee and South Fork Owyhee rivers, Battle, Deep, Dickshooter, and Red

Canyon creeks. The Owyhee River Wilderness also has 11 cherrystem routes, 5 of which cross through the wilderness, splitting it into six subunits.

Pole Creek Wilderness
The Pole Creek Wilderness includes roughly 12,533 acres. The majority of this wilderness area is proposed for treatment with only roughly 900 acres lying outside of the treatment area. The only direct public access to the Pole Creek Wilderness is from Mud Flat Road, which forms the wilderness boundary along its northwest corner. Other access routes are across private land and require landowner permission.

The Pole Creek Wilderness contains historic, cultural, scenic, and wildlife values, but contains no wild and scenic river segments. Many of the historic sites are associated with early homesteading and Basque settlement. The wilderness incorporates portions of the Camas and Pole Creeks Archaeological District, which is listed on the National Register of Historic Places. The area supports various sensitive species, including populations of Columbia spotted frog, greater sage-grouse, migratory birds, Mudflat milkvetch, and Bacigalupi's downingia.

Wild and Scenic Rivers
There are no proposed treatments within the wild river corridors; therefore, wild and scenic rivers will not be analyzed in this document.

Lands with Wilderness Characteristics
Because there are no proposed improvements or any new construction within these areas, and because these lands would endure negligible effects from the proposed project, lands with wilderness characteristics will not be analyzed in this document. Effects to these lands would be similar to those identified within the wilderness section of this document; however, these lands are not managed as wilderness.

3.9.2 Environmental Consequences - Wilderness

3.9.2.1 Alternative A – No Action

There would be no direct or indirect impacts to wilderness values such as untrammeled, undeveloped, natural, and primitive recreation under this alternative. The continued encroachment of juniper would provide some minor benefits to the wilderness area over the next 10+ years by increasing the areas vegetative screening, thus allowing more opportunities for solitude.

Impacts to other wilderness features such as wildlife would be negatively affected with the no action alternative. Juniper would continue to expand into essential habitat for sage-grouse (i.e., lekking, nesting, and brood rearing habitat). In the long term (10+ years), these habitats would be degraded to the point that they are no longer suitable for sage-grouse. Further loss of habitat would have a negative impact on other sagebrush obligate species and species closely associated with sagebrush habitat (see Section 3.6 for details).

3.9.2.2 **Alternative B – Proposed Action**

Minimum Requirements Decision Guide

A Minimum Requirements Decision Guide (MRDG) was used to evaluate the proposed treatment within wilderness. If juniper treatments are undertaken within wilderness the following tools and methods were analyzed and determined to be the minimum necessary to accomplish project objectives:

1. Only hand saws would be used;
2. Access to trees would be on foot only (all vehicles would be restricted to designated roads and trails);
3. Only trees ≤8-inches diameter at breast height (DBH) would be treated; and
4. Only trees in the early stages of encroachment (roughly 10% cover) would be treated (see Design Features, section 2.2.2.6). The 8-inch DBH criterion was assigned because treatment of juniper with hand tools becomes too difficult when the DBH is greater than 8 inches.

This analysis was completed to ensure that juniper treatments in wilderness areas would produce the least disturbance possible.

Site Specific Impacts

Juniper treatment within portions of the wilderness areas would have a minor impact to the wilderness areas' untrammeled and undeveloped characteristics by creating a "modern human control" through vegetation manipulation. The project would also impact the immediate areas' naturalness by leaving an imprint of human work within the wilderness areas. The project work may be noticeable for several years as trees deteriorate, however; this impact would be considered minor due to the fact that it would only be noticeable to those within the direct vicinity of the project and because the project occurs within such a small portion (roughly 10%) of the wilderness areas.

Removal of juniper would reduce vegetative screening within early phase stands. However, outstanding opportunities for solitude would still exist due to the excellent topographic screening of the wilderness areas, river corridors, and the more encroached juniper stands in the project vicinity. Short-term impacts may also occur during actual treatment operations while crews are working in the area, potentially reducing visitor opportunities for solitude; however these impacts would be temporary, during treatment work only, and negligible.

Impacts from the treatment would be mitigated by utilizing the minimum tool (handsaws only), conducting work within wilderness on foot, treating early stage juniper with less than 10% canopy cover, and only removing trees with less than 8-inch DBH within wilderness.

Unique features such as sage-grouse and suitable sage-grouse habitat, identified in the designation of these wilderness areas, would benefit from implementation of the proposed project. Juniper treatments would improve riparian and vegetative health conditions throughout the area, restoring existing shrub steppe, aspen and riparian communities, thus restoring, improving, and maintaining suitable sage-grouse habitat within the wilderness areas for years to come.

Overall Impacts

Overall, impacts to the wilderness area would be minor and, in the long-term, would only be noticeable to visitors within the direct vicinity of the treatments. The five wilderness areas identified total roughly 427,500 acres; a little over 10% (approximately 47,000 acres) would be treated with implementation of Alternative B. The proposed treatments would have some impacts to wilderness characteristics in the short-term, as discussed above, but long-term (10+ years) impacts would not be anticipated. The long-term benefits to sage-grouse and its associated habitat would be greater than the minor impacts that were identified to wilderness character. The proposed project would have some minor short-term impacts but would not impair wilderness character.

3.9.2.3 Alternative C – No Treatment in Wilderness

Impacts to wilderness would be identical to those discussed in Alternative A.

3.9.3 Cumulative Impacts – Wilderness

3.9.3.1 Scope of Analysis

The area of analysis for cumulative effects is the 1.5 million-acre proposed project area plus the extent of the five designated wilderness areas (Big Jacks, Little Jacks, North Fork Owyhee, Owyhee River, and Pole Creek) within the two field offices. The timeframe considered is from the implementation of the OPLMA (2009) for current conditions and activities planned within the next three years, and the expected duration of effects from those activities (generally 10 to 20 years).

3.9.3.2 Current Conditions and Past, Present and Reasonably Foreseeable Future Actions

Current conditions of the wilderness areas are as described in the affected environment (3.9.1). The five wilderness areas spanning the project area offer a multitude of experiences for visitors ranging from wildlife viewing, camping, backpacking, hunting, fishing, and boating to name a few. Mountains, valleys, tablelands, and deep scenic canyons are just part of the make-up of these recently designated areas. Many of these canyons, streams, and upland plateaus provide key habitat for several BLM special status species, including greater sage-grouse, bighorn sheep, and redband trout.

Cumulative effects to wilderness in the analysis area would primarily be the result of livestock grazing, wildfire, future vegetation treatment projects such as broadcast burning in surrounding areas, and current and future actions that stem from the OPLMA. The passing of the Act designated roughly 517,000 acres of wilderness and 316 miles of wild and scenic rivers within Owyhee County. In addition, the Act also mandates the BLM to complete a transportation plan for all of Owyhee County.

3.9.3.3 Alternative A – Cumulative Impacts

Cumulatively, other wilderness features (namely wildlife) are the most likely to be impacted. Sage-grouse habitat within wilderness will continue to be encroached upon by juniper and the

area eventually would not provide suitable habitat. Further loss of habitat would put sage-grouse at greater risk. Conversely, the continued encroachment of juniper would be beneficial to the wilderness areas solitude over the years, by increasing vegetative screening, and allowing more opportunities for solitude. There would be no impacts to wilderness character such as untrammeled, undeveloped, natural, and primitive recreation.

Impacts outside of the wilderness areas as a result of juniper treatment projects, travel management planning, and improved grazing operations would be beneficial to the area as a whole. These actions would have negligible impacts to wilderness itself as most occur outside of these designated areas. The OPLMA [Sec. 1503(10)(B)] states, "The fact that non-wilderness activities or uses can be seen or heard from areas within a wilderness area designated by this subtitle shall not preclude the conduct of those activities or uses outside the boundary of the wilderness area."

3.9.3.4 Alternative B – Cumulative Impacts

Impacts to wilderness under this alternative would be the similar to those discussed in section 3.9.3.3. The impacts of this alternative, when combined with those actions outside of the wilderness areas would be beneficial to the analysis area as a whole.

3.9.3.5 Alternative C – Cumulative Impacts

Cumulative impacts associated with this alternative would be the same as those discussed in Alternative A.

3.10 Recreation and Visual Resource Management

3.10.1 Affected Environment – Recreation and Visual Resource Management

Recreation

Portions of numerous Special Recreation Management Areas (SRMAs) and the Owyhee Extensive Recreation Management Area (ERMA) lie within the proposed project area (Table 10, Map 17). SRMAs are designated for special or more intensive types of recreation management because greater investments for recreation management are anticipated due to the intensity of use the area receives (USDA BLM 1999a). An ERMA is an area where recreation management is only one of several management objectives, and where a limited commitment of resources is required to provide extensive and unstructured types of recreation activities (USDI BLM 1999a). The SRMAs contain an array of recreation opportunities due to their unique features including canyons, rivers, mountains, geology, wildlife habitat, and trails. Similarly, the ERMA contains diverse landforms providing a wide range of natural settings and recreational opportunities.

Table 10 - Recreation Management Areas, acres, and recreation values in the proposed project area.

Recreation Management Area	Acres in Project Area	Recreation Values
Blackstock SRMA	6,828	Dog trials, hunting, OHV use, hiking, sightseeing, horseback riding, camping
North Fork Backcountry SRMA	14,507	Hunting, camping, fishing, horseback riding, sightseeing, nature study, wilderness
North Fork Canyon SRMA	475	White water rafting, backpacking, camping, fishing, sightseeing, nature study
Owyhee River Canyon SRMA	24,290	Rafting, backpacking, hunting, camping, rock hounding, sightseeing
Owyhee Front SRMA	175,075	OHV use, mountain biking, hunting, wild horse viewing, horseback riding, rock hounding, camping
Silver City SRMA	581	Historic sights, camping, hunting, fishing, hiking, OHV riding, cross country skiing, snowmobiling
Snake River Birds of Prey SRMA	3,862	Raptor viewing, prehistoric rock art, boating, rafting, fishing, OHV riding, mountain biking, hunting, hiking, horseback riding
Upper Deep Creek & Lower Deep Creek SRMAs	6,341	Hunting ,backpacking, fishing, camping, rafting, sightseeing, nature study
Owyhee ERMA	699,557	Hunting, fishing, horseback riding, rock hounding, nature study, camping, OHV riding, mountain biking, hiking, wilderness, sightseeing

The off-highway motorized vehicle use designations for the proposed project area are “limited to designated roads and trails”, “limited to existing roads and trails”, and “closed”. Motorized/mechanized cross-country travel is prohibited on BLM lands within the Owyhee and Bruneau Field Office boundaries. These regulations apply to permitted uses as well as to general public use. Areas identified as “limited to designated roads and trails” are the areas within the Murphy and Wilson Creek subregion travel management areas, which contain roughly 950 miles of designated routes combined. The areas identified as “closed” are within the North Fork Owyhee Wilderness, Owyhee River Wilderness, Pole Creek Wilderness, Big Jacks Wilderness, and Little Jacks Wilderness. The Badlands Resource Natural Area (RNA) and Area of Critical Environmental Concern (ACEC) and the McBride Creek ACEC are also closed to motorized/mechanized travel. The remainder of the area is categorized as “limited to existing roads and trails” in the Owyhee RMP; however, that designation will change “limited to designated roads and trails” within the next 5 years as BLM is currently developing a travel management plans, within Owyhee County, per the OPLMA.

Recreation Opportunity Spectrum

The Recreation Opportunity Spectrum (ROS) classification is used to characterize the type of recreational opportunity settings, activities, and experience opportunities that can be expected in different areas of public land. The proposed project area covers the entire spectrum of settings

for recreationists, ranging from primitive (unmodified natural environment), to roaded natural (generally natural with moderate evidence of manmade sights and sounds), to semi-primitive motorized and semi-primitive non-motorized (primarily unmodified natural environment but with evidence of other users), and rural classifications (substantially modified natural environment with moderate to high concentration of users). Overall, recreation is abundant and diverse throughout the proposed project area. The highest recreation use occurs in the northern portion of the project area within the Owyhee Front SRMA, as well as within the Silver City SRMA. These areas receive a substantial OHV riding, hunting, horseback riding, mountain biking, and wildlife viewing.

Visual Resource Management

The visual resource management (VRM) classes within the proposed project area consist of I, II, III, and IV (Table 11). The majority of the project area is VRM class IV, followed by VRM class III, class II, and class I. Areas containing VRM class I consist primarily of the wilderness areas identified within this project area, as well as an area within Nickel Creek Canyon (Map 16).

Table 11 – Visual Resource Management classes and acres of each in the proposed project area.

VRM Class[1]	Acres in Project Area	Portion of Project Area
I	185,217	12%
II	277,144	18%
III	284,142	19%
IV	791,009	51%

1 - VRM class management objectives are described fully in the ORMP (USDI BLM 1999b)

3.10.2 Environmental Consequences – Recreation and Visual Resource Management

3.10.2.1 Alternative A – No Action

Recreation and visual resources would remain in their current state, as landscape scale treatment of encroaching juniper would not occur. Over time, open areas and scenic vistas may be lost to juniper encroachment; however, this change in landscape may appeal to those that desire a densely populated forest. Additionally, as sage-grouse habitat is lost, so too are hunting opportunities for upland game bird hunters within these areas.

3.10.2.2 Alternative B – Proposed Action

Recreation

Hunting and camping would be the most likely recreational pursuits to be affected during juniper treatment operations. Depending on the time of year cutting and burning operations occur, big game and upland bird hunters, as well as campers, within the treatment areas may experience BLM crews, vehicles, noise, and smoke in the vicinity. Recreationists and sightseers in areas like the Owyhee Backcountry Byway or within wilderness areas could also be affected during operations.

Recreationists who enjoy the wilderness experience may encounter short-term impacts to portions of the wilderness areas naturalness as well as solitude, depending upon the timing of the visit and treatment operations. While there will be no motorized activity within wilderness and only hand cutting operations, visitors may encounter, depending on the timing, a number of

BLM crews within wilderness, which would detract from the areas' opportunities for solitude. Cutting operations will also impact the areas naturalness, as visitors come across downed juniper within wilderness. These impacts are somewhat mitigated however, by flush cutting of trees and jackpot burning operations. The size and topography of the wilderness areas, in relationship to the small scale treatment areas within wilderness, will also assist in minimizing the impacts to recreationists.

Impacts to recreationists along the Owyhee Front where the majority of recreational use occurs in the spring season would be negligible. Treatment areas are far enough away from the high density OHV use area that users may only experience light smoke in the distance during burning operations. In the long term (10+ years), juniper treatment operations would be beneficial to the overall health of the area, in turn benefitting hunters, sightseers, and other recreationists. Improved wildlife habitat conditions would increase wildlife viewing opportunities and potentially result in increased hunting success.

Visual Resource Management

The proposed treatments would occur within VRM classes I, II, III and IV; however, the vast majority (roughly 70%) would be in VRM classes III and IV (Table 11). The effects of juniper treatments on visual resources would be somewhat subjective (some may prefer densely populated juniper forests, while others may desire open areas and scenic vistas). With the proposed treatment, the BLM would achieve both while simultaneously accomplishing management objectives and improving greater sage-grouse habitat throughout the area.

Juniper treatments would have wide-ranging effects on visual resources. Juniper treatments would focus primarily on early stage juniper with less than 20% canopy cover, which would have a beneficial long-term effect on visual quality as scenic vistas open up and aspen, perennial grasses, and other vegetation increase. Additionally, retaining later stage, more established juniper, including old growth juniper and mahogany stands, would assist in maintaining the current scenic quality throughout the area.

Effects to visual resources during juniper treatments would be evident for several years. Shearing, mastication, and hand-cutting in areas that are not piled and burned after the fact would create the most noticeable effects. Downed junipers scattered across the landscape would be noticeable for several years, and some would be apparent for the foreseeable future. Visual effects of the cut trees would be reduced somewhat by flush cutting, and lopping and scattering the trunk and branches. In areas where downed materials are burned, these effects would end after burning and once perennial grasses recover.

Jackpot and pile burning would have short-term effects on the visual resources within the project area. Once burning operations were completed, fire-blackened areas and dead vegetation would be noticeable for several years. Visitors within the immediate area would see charred to partially charred tree skeletons and blackened earth and rock. However, visual effects would improve over time after grasses and shrubs begin to reestablish (1 to 3 years for herbaceous vegetation and up to 10 years for shrubs). The use of fire in the vegetation treatments would give the area a more natural appearance. In the long term, burning would improve the overall health and scenic quality of the area.

Treatment areas within VRM class I, which are predominately wilderness, would result in a negligible to minor change to the landscape. VRM class I "…provides for natural ecological changes, but it does not preclude very limited management activity. The level of change to the characteristic of the landscape should be very low." With the project in limited areas of VRM class I, the utilization of treatment methods such as non-motorized equipment, hand tools, cutting trees flush with ground surface, and only removing trees under 8-inches DBH, would help minimize the impacts to the wilderness landscape (per the MRDG). Impacts would be greater and more evident with downed trees in the short term; however in the long term, as trees expire and perennial grasses and sage recover, impacts to visual resources would be minor and would provide more opportunities for scenic vistas within the area as the landscape opens up.

Off-road travel to access treatment areas outside of wilderness could lead to the establishment of new routes which would adversely impact visual resources throughout the area as new disturbances are created. However, best management practices and design features specific to vehicle travel (sections 2.2.2.5 and 2.2.2.6) would minimize or eliminate these impacts.

3.10.2.3 Alternative C – No Treatment in Wilderness

Impacts to recreation and visual resources would be nearly identical to those discussed for Alternative B, with the exception of those items related to wilderness and VRM class I which would not be impacted under this alternative.

3.10.3 Cumulative Impacts – Recreation and Visual Resource Management

3.10.3.1 Scope of Analysis

The OPLMA designated roughly 517,000 acres of wilderness and 316 miles of wild and scenic rivers within Owyhee County and directed the BLM to complete a transportation plan for all of Owyhee County. Therefore, the geographic and temporal cumulative impact analysis scope for recreation and VRM resources is the same as for Wilderness.

3.10.3.2 Current Conditions and Past, Present, and Reasonably Foreseeable Future Actions

Cumulative effects to recreation and visual resources within the project area would primarily be the result of grazing, wildfire, future vegetation treatment projects. Presently, the main recreational activities within the analysis area include hunting, camping, backpacking, horseback riding, OHV use, fishing, and sightseeing. Visitors to the field offices can also travel the Owyhee Backcountry Byway. The analysis area is home to five designated wilderness areas between the two offices, multiple SRMAs, and one ERMA (see section 3.9.1). Off-highway motor vehicle designations are limited to designated, limited to existing, and closed. The visual resource management classes within the analysis area consist of VRM classes I, II, III, and IV.

3.10.3.3 Alternative A – Cumulative Impacts

Recreation

Because few effects are expected from any past, present, or reasonably foreseeable actions, cumulative effects would be minor. Opportunities for recreational activities in the cumulative analysis area are abundant and would sustain minimal impact. Depending upon timing, access

may be limited during the burn treatments from the proposed project, as well as during other juniper treatment projects throughout the analysis area. This would affect the ability of hunters and other recreationists to access some areas. Any proposed range improvements for livestock grazing management within the analysis area, such as fencing, would reduce some opportunities for non-motorized cross-country travel. Improvements to vegetation resulting from future grazing management strategies, along with development of the travel management plan for all of Owyhee County per OPLMA, would improve recreation experiences.

VRM

Alternative A would not contribute to cumulative impacts to visual resources. Visual resources would remain in their current state.

3.10.3.4 Alternative B – Cumulative Impacts

Recreation

Cumulative impacts to recreation would be identical to Alternative A.

VRM

Proposed juniper treatments would have minor effects on visual resources in the cumulative analysis area. Other juniper treatment projects would also have some minor effects on visual resources. Under these projects, an estimated 50 to 70% reduction in seral junipers would have a beneficial long-term effect on visual quality as scenic vistas open up and aspen, perennial grasses, and other vegetation increase as a result of juniper removal. Additionally, retaining 30 to 50% of the existing juniper, as well as old growth juniper and mahogany stands, would remain and assist in maintaining the scenic quality throughout the area.

Burning associated with the multiple juniper treatment projects throughout the analysis area would have short-term effects on the visual resources within the project area. Once burning operations are complete, fire-blackened areas and dead vegetation would be noticeable for several years. In the long term, burning would improve the overall health and scenic quality of the area.

Class I visual resources, which are predominately within wilderness, would only be impacted by the proposed juniper treatment project. Other projects identified within the cumulative analysis area are outside of wilderness, and would have no impact within these areas.

Cumulatively, the impact of the past, present, and future projects would be minor when considering the analysis area as a whole. The analysis area is composed of such rugged terrain and abundant vegetation that most projects are screened and only visible to visitors within the immediate area of the project. In the long term, the combined effects of juniper treatment projects, designation of wilderness areas, wild and scenic rivers, travel management planning, and improved grazing management within the cumulative analysis area would be beneficial to the overall health and scenic quality of the area.

3.10.3.5 Alternative C – Cumulative Impacts

Recreation

Cumulative impacts to recreation would be identical to Alternative A.

VRM

Impacts to visual resources would be similar to those discussed under Alternative B, with the exception of those items related to wilderness and VRM class I areas which would not be impacted under this alternative.

3.11 Cultural and Paleontological Resources

3.11.1 Affected Environment – Cultural Resources

Cultural Resources

History

The 1.5 million-acre project area is within the western Snake River Plain of southwestern Idaho in the Northern Great Basin cultural region. Archeological studies throughout the region indicate people have lived in this area for at least 15,000 years before present (Plew 2008). Ethnographically the project area was occupied in the past and today by the Northern Paiute and Northern Shoshone. These people who lived around the Snake River were called Agaidüka (Salmon Eaters) or Yahandüka (ground hog eaters) (Steward 1938, Reprint 1997). Most groups wintered along the Snake River where it was warmer, but families ventured out along Snake River tributaries, which included the Owyhee River, to gather roots, berries, and salmon and other fish. In 1877, President Rutherford B. Hayes established the Duck Valley Indian Reservation. The reservation straddles the Idaho-Nevada state line in Owyhee and Elko Counties.

The first EuroAmericans to travel through southwestern Idaho were fur trappers led by Wilson Price Hunt in 1811 (Hiler 2005), followed by numerous expeditions led by other trappers (Peterson 1995). In 1832, fur trapper Benjamin Bonneville reached the Snake River country and was the first to drive wagons and oxen into the basin (Peterson 1995). In the mid-1830s missionaries began westward migration, traveling along the Snake River on their way to Oregon (Peterson 1995). Over the next 25 years, approximately 50,000 people made the trek on the Oregon Trail through the Snake River Plain heading west. Few, if any, people stayed in southwestern Idaho at that time due to the dry, hot, barren conditions.

The discovery of gold in the Boise Basin and subsequently in the Owyhee Mountains in the early 1860s was the motivation for settlement in southwest Idaho. Predominant mining communities in Owyhee County included Silver City, DeLamar and Flint. Silver City became the County seat in 1866 and remained so until 1934 (Adams 1960). The success of the mining industry was dependent upon a transportation network and associated support for the mines and miners. Eventually smaller communities, ranching, and agricultural areas developed along these roads to support the mining industry. Although there is still some small scale mineral extraction occurring in Owyhee County, ranching has become the main economic industry.

Data and Research

Archeological research and site inventory has been occurring in southwest Idaho since the 1930s. Early work was generally unsystematic and focused on finding large Native American village sites mainly along rivers and major drainages. Mark Plew's (1976 & 1979) archeological investigations in the Camas and Pole Creek drainages during the 1970s provided a prehistoric cultural chronology for the Owyhee uplands. Due to the archeological significance of this area,

towards our understanding of Native American settlement and subsistence, an approximate 33,220 acre block was designated a NRHP Archaeological District.

The BLM's records indicate that approximately 555 cultural resource inventories have occurred in the project area since the 1970s, covering roughly 119,554 acres (around 8% of the project area). Some of the larger block surveys were completed for fuel reduction projects or for the Idaho Training Range. Otherwise, inventories were completed based on proposed projects such as range improvements, recreation, and mineral prospecting projects. Cultural sites cover roughly 5,441 acres (<1% of the project area) based on the best available data, including areas of site polygons and site area as documented in site records. In addition, there are approximately 38.5 miles of linear sites within the project boundary that include features such as historic roads and water conveyance ditches.

Approximately 2,216 archeological sites have been recorded in the project area; 1,776 are prehistoric, 331 are historic, and 109 are multicomponent, meaning they possess both prehistoric and historic components. Additionally, 648 isolated finds, either historic or prehistoric, have been recorded in the project area.

Archaeological districts cover 36,662 acres (2.4%) of the total project area. Two National Register of Historic Places (NRHP) archaeological districts and a very small sliver of a third district are within the project boundaries. Archaeological districts are areas with significant cultural resources that have been deemed worthy of preservation. They possess "…a significant concentration, linkage, or continuity of sites, buildings, structures, or objects united historically or aesthetically by plan or physical development" (USDI 1991).

Prehistoric sites include open lithic scatters, stone features such as hunting blinds and rock cairns, rock art and rock shelters. Of the 1,776 prehistoric sites, 353 (19.9%) are listed on the NRHP, 92 (5.2%) have been determined eligible for listing on the NRHP, 115 (6.5%) have been determined not eligible for listing, and 1,216 (68.5%) have been left unevaluated[6] pending further research (Table 12).

Historic sites include artifact scatters, mining related sites, historic buildings and/or foundations, water features such as conveyance ditches or dams, and rock features such as walls and cairns. Of the known 331 historic sites, 2 (0.6%) are listed on the NRHP, 28 (8.5%) have been determined eligible for listing, 91 (27.5%) have been determined ineligible for listing, 178 (53.8%) have been left unevaluated pending further research, and 32 (9.7%) have an unknown eligibility determination (Table 12). There is also approximately 2 miles of the NRHP eligible South Alternate Oregon Trail within the project boundaries.

Multicomponent sites contain features or artifacts attributed to both prehistoric and historic time periods. One or both of the temporal components may be evaluated as eligible, not eligible or be left unevaluated. A total of 109 multicomponent sites have been recorded with 8 (7.3%) sites

[6] Unevaluated sites are treated similar to eligible sites until their official significance determination has been made.

listed on the NRHP, 9 (8.3%) sites eligible for listing, 13 (11.9%) sites not eligible and 79 (72.5%) sites remain unevaluated.

Table 12 – Number of NRHP listed, eligible, not eligible, and unevaluated archaeological sites in the proposed project area boundary.

Site Type	# NRHP Listed Sites	# NRHP Eligible Sites	# NRHP Not Eligible Sites	# Unevaluated Sites	Unknown Eligibility	Total Sites
Prehistoric	353	92	115	1,216	0	1,776
Historic	2	28	91	178	32	331
Multicomponent	8	9	13	79	0	109

Paleontological Resources

Paleontological sites (fossils) are also within the project area. A total of 146 fossil bearing locations (totaling approximately 477 acres) have been identified within the project boundary, though more are likely. These fossils range in age with the earliest dating as far back as 16.3 million years. The paleontological sites contain a variety of fish and other vertebrate fossils that include numerous large and small mammals. Paleontological sites are typically in bare areas or in areas with little vegetation. Not all fossil locations warrant protection.

3.11.2 Environmental Consequences – Cultural Resources

3.11.2.1 Alternative A – No Action

There would be no new disturbance to cultural or paleontological resource sites in the project area. Sites in sagebrush habitat with encroaching juniper would continue to see encroachment of juniper and the potential for reduced shrub and herbaceous plant components that stabilizes the soil. Increased erosion potential could, in turn, increase the potential for disturbance to or damage to cultural and paleontological sites.

3.11.2.2 Comparison of Action Alternatives

In Alternative B, the number of acres previously surveyed for cultural resources is 119,554 acres or about 8% of the proposed project area. In Alternative C there have been 70,223 acres surveyed or 4.7% of the Alternative C project area. Table 13 provides a comparison of the number of cultural and paleontological sites that are known to occur under Alternative B and C. Also, there are 36,662 NRHP archaeological district acres in the proposed project boundary for Alternative B and 24,319 acres for Alternative C.

Table 13 – Comparison of Cultural and Paleontological Sites within Proposed Project Area

Cultural	Alternative B – Proposed Action	Alternative C – No Wilderness
Prehistoric Sites	1,776	1,507
Historic Sites	331	235
Multicomponent Sites	109	107
Total # of Sites	2,216	1,921
Linear Sites	38.5 miles	27 miles
Isolated Finds	648	191
Paleontological	**Alternative B – Proposed Action**	**Alternative C – No Wilderness**
Fossil Locations	146	127

3.11.2.3 **Alternative B – Proposed Action**

Inventories

Treatment areas would be delineated at least one year prior to treatment in order for cultural resource inventories to be completed. Treatments would target early and sometimes later stages of juniper encroachment; wet meadows and spring locations would also be targeted for juniper removal. Archaeological site density near wet meadows and springs is typically higher than in the dry upland areas, so these areas would require cultural resource inventories if they have not been previously inventoried. In treatment areas where heavy machinery would be used or jackpot burning is prescribed, cultural resource inventories may be required prior to project implementation.

Exemptions and Cultural Site Predictability Model

Because of the extensive project area, diverse nature of the treatment areas, and the expected lack of adverse impacts in many treatment locations, not all treatment areas would require cultural resource inventories. In the Idaho BLM's State Protocol Agreement with the Idaho State Historic Preservation Office, hand cutting of young juniper (less than 100 years old) where access is by foot is considered an exempted undertaking and may be excluded from cultural resource inventories. Additionally, timber management activities on slopes exceeding 30% may also be exempt from cultural resource inventories. These two exemptions would be applied if appropriate when specific treatment areas are identified.

Many areas may not meet the exemptions listed above and there is a possibility of significant sites being on slopes greater than 30%; therefore, a cultural resource predictability model for prehistoric sites may be used. The model would help identify areas where cultural site probability is low, moderate, or high and, therefore, where treatments may impact historic properties (sites listed or eligible for the NRHP). The model would take into account slope, access to water, and other variables that attracted use of particular areas by Native Americans. The model would be tested for its accuracy by conducting cultural resource inventories strategically across all probability levels. It would be used to guide cultural resource inventories within the proposed treatment areas. The model would be designed in consultation with the Idaho State Historic Preservation Office and the local Native American Tribes as directed in the State Protocol Agreement between the Idaho State Director of the BLM and the Idaho State Historic Preservation Officer (2014). The model will not predict the presence or absence of historic archaeological sites; therefore, other methods of determining the location of historic sites may be used, such as historic General Land Office Maps and previous research in the area.

Impacts

Effects from the proposed juniper treatments would depend upon the treatment type, the location of the treatment, and the density of juniper trees. Pre-treatment inventories, design features (section 2.2.2.6), and mitigation measures specific to cultural resources would limit or eliminate the potential for impacts to occur. The impacts identified below would largely be confined to potential sites that may go undetected by the predictability model and historic research; however, the likelihood of this occurring should be low. If a previously undetected site is discovered during treatment implementation, adjustments would immediately be made to minimize impacts (e.g., by applying appropriate design features and/or mitigation measures).

In treatment areas where juniper trees are small and widely scattered, adverse effects to cultural resources would be negligible or non-existent because these areas would be treated on foot and by hand. Where juniper trees are denser, impacts from mastication with heavy machinery could disturb or damage features such as hearths, break artifacts, and displace lithics from distinct tool manufacture or activity areas. Adverse impacts from jackpot burning could include destruction of combustible materials, melting of glass, changes in obsidian hydration rims when temperatures exceed 400°F, and spalling and cracking of stone artifacts and ceramics from heat exposure.

In wilderness areas, only trees less than 8 inches in diameter would be cut and only using handsaws. This method of treatment may be used within sites since it would cause a minimal disturbance, but this treatment would be determined on a site by site basis. In areas with thickets of small diameter juniper, the biomass left on top of a site may result in indirect impacts to a site if a wildfire passes through the area burning the dried biomass. The extent of impacts from wildfire would depend on the amount of biomass and the intensity of the fire.

The use of OHVs (i.e., ATVs or UTVs) to access juniper cutting areas would be limited across the project area. Although OHVs have the potential to create long-term major damage on sites if redundant, design features – single-pass cross-country travel only, rubber tired vehicles only, traveling only on firm soils, and not accessing cutting areas from main roads – would limit or eliminate the potential for adverse impacts.

Mitigation

All cultural resource sites left unevaluated or determined eligible for listing on the NRHP would be avoided during treatments or the potential for adverse effects would be mitigated. Mitigation may include site avoidance, or some other action that would produce negligible to no effect on the properties that make a site eligible for listing on the NRHP. For example, one mitigation treatment may include felling juniper by chainsaw then piling branches off site to burn. Another mitigation method may be limbing the juniper prior to burning and letting the tree burn standing. Mitigation measures would be evaluated on a site by site basis.

Paleontological Resources

Treatments in paleontological sites would be addressed on an individual basis. If juniper treatments occur in or near a site, fossils could be damaged. Since paleontological sites are typically in bare areas or in areas with little vegetation, the risk of disturbance to paleontological sites would be minor as treatments in these areas would be improbable. There is little data concerning fire's impact on paleontological resources. Research conducted in the Badlands National Park confirmed that fossil specimens that come in contact with burning fuel will discolor and fracture depending on the intensity of the fire (Benton and Reardon 2006). They also found that under high intensity burns fossils exhibit discoloration even when not in contact with fuels. Therefore, jackpot burning would not be allowed in areas of paleontological resources and juniper materials piled for burning must be at least 10 meters from paleontological sites (see section 2.2.2.6, Design Features).

3.11.2.4 Alternative C – No Treatment in Wilderness

All of the design criteria specific to cultural and paleontological resources described in section 2.2.2.6 and mitigation measures mentioned in Alternative B would apply here (except for wilderness specific actions). Of the 553,000 acres proposed for treatment, 70,223 acres (4.7 %) have been surveyed for cultural resources. Approximately 47,000 fewer acres than Alternative B would be treated, so 295 fewer known cultural sites, 11.5 fewer linear miles, 12,343 of archaeological district acres, and 19 fewer paleontological sites (183 fewer acres) would require application of design features or mitigation. Impacts to unknown cultural and paleontological resources would be similar to those described for Alternative B.

3.11.3 Cumulative Impacts – Cultural Resources

3.11.3.1 Scope of Analysis

The spatial boundary for cumulative effects is the proposed project area which includes state administered lands. The temporal scope will be for the duration of the project. The following cumulative impacts analysis would apply to all alternatives.

3.11.3.2 Current Conditions and Past, Present, and Reasonably Foreseeable Future Actions

Wildfires

Past large fires in the larger project area have had adverse impacts on sites that contain combustible materials. Additionally, fires that burn across any type of archeological site may leave them vulnerable to erosion and unauthorized collection from exposing artifacts. Future wildfires in areas that have not previously burned may also burn combustible materials and expose artifacts for collection. In areas where heavy concentrations of juniper trees would be dropped during implementation of the BOSH project, but not jackpot or pile burned, there may be cumulative impacts to sites if a wildfire burns through the area and the fuels burn for a long duration. These impacts could range from short term to long term and could range from no effect to major effects dependent upon the intensity of the wildfire, the vegetation component, and the artifacts or features present on the historic property.

Livestock Grazing

Several studies indicate that livestock grazing can have adverse direct and indirect impacts on archeological sites. "Direct impacts include trampling, chiseling, and churning of site soils, cultural features, and cultural artifacts including artifact breakage. Impacts occurred from standing, leaning, and rubbing against historic and prehistoric structures and features including rock art panels. Indirect impacts included soil erosion and gully formation and increased access from roads and trails that attract higher recreational use and vandalism. The studies concluded that areas of livestock concentration could cause substantial ground disturbance and cumulative, long-term, irreversible adverse effects to historic properties" (USDI BLM 2006).

Livestock grazing will continue to impact sites when livestock congregate around gates, corrals, salt licks, troughs, water gaps and wet areas. Livestock congregation areas typically result in trampling of sites and churning soils to a depth greater than 3 inches. If cutting juniper along streams and springs results in more water in streams and springs that will attract livestock, then there may be additional adverse effects to sites. There will be cumulative adverse effects to sites

if this occurs. These impacts could range from short term to long term and could range from no effect to major effects dependent upon the intensity of livestock grazing in the area and the artifacts or features present on the historic property.

Dispersed Recreation

It is inherently difficult to determine where dispersed recreation will occur on the landscape; however, most people gravitate to areas with water. Water was more prevalent across the landscape in the past and that is where humans camped, along streams, near springs and along lake edges. Humans have always camped in similar areas through time because those areas provide certain characteristics that make them attractive camp site locations. Many archeological sites have been impacted in the past by dispersed camping and OHV use and will continue to be impacted. An increase in water near springs and meadows may attract people to those areas where they have not camped previously but were used in prehistoric or historic times. There may be cumulative impacts from dispersed recreation.

These impacts could range from short term to long term and could range from no effect to major effects dependent upon the artifacts or features present on the historic property. It is not uncommon for people to collect historic or prehistoric artifacts, use grinding stones in campfire rings, use wood from historic structures or features as firewood, or dig pits and trenches in recreation sites. These actions could destroy the integrity of a site by moving artifacts from their original location or off site, destruction of features, and ground disturbing activities that adversely affect the integrity of subsurface resources. OHV use on an archeological site could damage the site through loss of soil and vegetation, gullying, deflation of cultural deposits, and displacement and damage to artifacts and features (Sampson 2007). These impacts are typically done through repeatedly driving through a site and the magnitude of the impacts would be dependent upon soil types and the type of historic resource being impacted.

Exurban Development

Development for energy, agriculture, housing etc. on lands adjacent to public lands can impact sites by fragmenting them or destroying portions of larger sites that cross land boundaries. These impacts are typically long-term, major and finite. Section 106 of the National Historic Preservation Act would be applied to developments on public lands; therefore impacts to sites would be avoided or mitigated. There could be cumulative effects to sites that cross property boundaries from exurban development.

Tri-state & Bruneau Fuel Breaks

Development of fuel breaks within southwest Idaho may reduce large scale fires thus potentially reducing adverse effects to archeological sites with combustible material. Reducing vegetation in fuel breaks may make sites more visible to the public which in turn may cause indirect adverse effects from unauthorized collection or excavation. Conversely if a site is avoided by project activities it may signal that there is potentially an archeological site there. All unevaluated or eligible archeological sites will be avoided or adverse impacts mitigated in those projects, therefore there will be no cumulative impacts from these projects.

Juniper Treatments

Pole Creek, Trout Springs, South Mountain, Johnston Draw projects have design features in place, so cultural sites will be avoided or burned over but no adverse effects are anticipated. Eligible and unevaluated archeological sites with combustible material will be avoided in these projects. No adverse effects to any sites within these projects have occurred or will occur due to site mitigation or design features built into the projects. Therefore, these projects would not add to the impacts of other actions occurring in the project analysis area.

3.11.3.3 Alternative A – Cumulative Impacts

In the absence of juniper treatments cumulative impacts to sites would continue from wildfire, livestock grazing and dispersed recreation. The increase in juniper across the landscape may increase the risk of erosion from a decrease in the soil stabilizing brush and grass component. These impacts could range from minor to major and for a short to long term dependent upon the affected resource.

3.11.3.4 Alternative B – Cumulative Impacts

Cumulative impacts to cultural resource sites may occur near springs or streams if juniper reduction results in an increase in water that attracts more dispersed recreation or livestock use. Cumulative impacts may also occur in areas where juniper have been cut creating biomass that ultimately burns in a wildfire or by increasing the shrub and grass component which also readily burns. These impacts would be minor since mitigation measures and design criteria would be implemented to protect unevaluated and eligible cultural resource sites.

3.11.3.5 Alternative C – Cumulative Impacts

Cumulative impacts in wilderness (47,000 acres) would be the same as described for Alternative A and similar to those discussed in Alternative B in non-wilderness (53,000 acres). Since the treatments in wilderness areas are so light on the land, there would be little difference between cumulative effects for Alternative B and Alternative C.

3.12 Air Quality

3.12.1 Affected Environment – Air Quality

The smoke management program for the State of Idaho is regulated by Idaho-Montana Airshed group. This group is comprised of federal, state, and local agencies and the forest products industry to monitor and coordinate smoke emissions for wildfires and prescribed burning. All requests for approval are sent to the Idaho–Montana Airshed group for each day that burning occurs. In the event the airshed group determines that the air quality is not acceptable and the planned prescribed fire would have a negative impact, approval would be denied and burning would not happen.

The 600,000-acre focal treatment area falls within the Owyhee and Bruneau Field Office boundaries. Both land management areas are designated as Class II airsheds, which allows moderate deterioration associated with moderate, well controlled industrial and population growth. The project lies within or adjacent to five designated wilderness areas: North Fork Owyhee, Pole Creek, Little Jacks Creek, Big Jacks creek and Owyhee River. These wilderness areas are also classified as Class II, unless reclassified by the state as a result in procedures prescribed in the Clean Air Act (USDI BLM 2012). The Jarbidge wilderness area (approximately 90 miles to the southeast) is the closest designated Class I airshed.

Currently air quality parameters comply with federal and state standards due to a lack of emission sources throughout much of the area and its rural setting. The major emission sources in the area result from seasonal burning of farm fields. Most livestock operations in the area contribute only small amounts of particulate matter into the atmosphere. Large feedlot operations can be a major source of ammonia; there is a dairy farm near the Hemmingway Butte Recreation Area and two feedlots in the town of Melba.

3.12.2 Environmental Consequences – Air Quality

3.12.2.1 Alternative A – No Action

Currently air quality in the area complies with and meets Federal and State standards. This trend would continue with no action.

3.12.2.2 Alternative B – Proposed Action

The use of prescribed fire by use of slash and pile burning would result in a moderate short term negative effect on air quality and visibility, in the immediate area, during the immediately following the actual activity. Within the project area having 1-20% canopy cover to be treated is 201,300 acres. Prescribed pile and slash burning would be done over the course of 5 years and during winter months or times with snow on the ground. Prescribed fire operations would be completed on acceptable moderate to high air quality days with appropriate winds to minimalize the impact zones of Boise and the greater Treasure Valley population. Smoke impact within the project area would be minimal. No Class 1 airsheds would be affected. Wilderness areas may see short term localized smoke within 1 to 2 days of burn days.

Emissions and emissions factors were calculated within the project area where 1-20% canopy cover is present (Table 14). The biomass available for pile and slash burning consumption would be an average of 1.6 tons per/acre over the entire project area. However, the amount to be burned would be significantly less. Most slash would be scattered. Considering complete consumption of biomass during pile and slash burning, emissions emitted could reach 161.1 pounds per acre. During a wildfire with an average total biomass availability of 6 tons per acre based on relative photo series, emissions emitted could reach 606 pounds per acre. Emissions emitted per acre during a wildfire could be four times or more than the amount of pile and slash burning.

Moreover, several studies have shown prescribed fire reduces overall carbon emissions and promotes long term carbon sequestration (AFE 2013, Rau et al. 2010; Wiedinmyer and Neff 2007). Felled juniper stems would not be burned or provide long term carbon storage with minimal decomposition in the next 50 years. Any decomposition would likely result in a slow release of carbon with some returning into the soil and be converted to humus over time (Rau et al. 2010). Juniper root biomass would also provide carbon storage. Carbon would be returned to the soil following decomposition as opposed to above ground biomass that would be returned to the atmosphere after burning.

Table 14 – Emissions Factors for Project Area.

Treatment	Project Area Biomass (1-20% canopy cover)	Total Consumption (tons/acre)	Emission Factors[1] (lbs/acre)	Total Emissions[1] (tons)
Total biomass (wildfire)	1207,800 tons	6.0	606.0	60,994
Juniper	662,652 tons	3.3	333.3	33,547
Alternative B (juniper branches and leafy material)	324,324 tons	1.6	161.6	16,265

[1]Combined particulates, CO, CH_4,NO_x and SO_x; See Appendix B for calculation formulas.

3.12.2.3 Alternative C – No Treatment in Wilderness

Effects would be the same as Alternative B since there would be no burning in wilderness for either alternative.

3.12.3 Cumulative Impacts – Air Quality

3.12.3.1 Scope of Analysis

The Scope of the Analysis would include Owyhee, Malheur, Humboldt and Elko County. The short term time frame would occur for a month before and after to allow the prescribed burns to allow for any drift smoke of smoke from this burn and neighboring burns or wildfires. Planned burn areas in Trout Springs, Pole Creek, Pole Creek, Silver City, South Mountain, Reynolds Creek, Vale District BLM and Oregon State lands.

3.12.3.2 Current Conditions and Past, Present, and Reasonably Foreseeable Future Actions

Air Quality in the project area and surrounding landscape is generally good except for the short-term effects from prescribed fire and wildfire events. Dairy, feedlot and industrialized pollution from neighboring towns and cities contribute to localized air quality effects.

3.12.3.3 Alternative A – Cumulative Impacts

Existing prescribed fire projects in Owyhee, Malheur, Humboldt and Elko could reduce air quality from particulate matter and gas emissions in the short term. Dairy farms, feedlots and industrialized pollution could impact air quality on a small scale. Grazing, recreation, wood cutting and fire suppression would be negligible over the long term.

3.12.3.4 Alternatives B and C – Cumulative Impacts

Impacts would be identical to alternative A except for a slight in increase of particulate matter and gas emissions from prescribed burning, mastication, and chainsaw use. All impacts combined would still produce negligible long term impacts to air quality in the analysis area.

3.13 Social Characteristics

3.13.1 Affected Environment – Social Characteristics

This section describes the existing social characteristics and conditions in the area that would be affected by the project and estimates potential impacts to people and their sense of well-being

that could result from project implementation. The project area for the analysis of social-economic-ecological values and for the analysis of potential environmental changes and consequential impacts to people is Owyhee County.

The University of Idaho (Social Analysis Team) conducted research regarding the effects to social values in Owyhee County as a result of this project. The team held meetings and workshops in various locations across Southwest Idaho and with various potential stakeholders and interested public (University of Idaho 2015).

Owyhee County is comprised of 76% public land (managed mostly by BLM), 517,000 acres of which is designated wilderness (Owyhee Initiative 2012). Agriculture comprises 26.1% of total Owyhee County employment with two-thirds of that sector as ranching (University of Idaho Extension 2015). Most ranches are not economically viable with private land alone; these operations rely on permitted grazing on BLM allotments (Bartlett et al. 2002). Although Owyhee County is rural, it is in close proximity to the greater Boise metropolitan area (Mackun & Wilson 2011), and many people travel from the metropolitan area for hunting, fishing, rafting, bird watching, hiking, and OHV riding (among other activities). The large wilderness areas within Owyhee County provide an added layer of complexity, with some stakeholders advocating for multiple-use activities and others preferring preservation or restricted activity (Wulfhorst et al. 2006).

In addition to population characteristics, stakeholders' perceptions of current conditions are included as part of the Affected Environment. That is to say, proposed changes to management can affect perceptions and as such are included in the social impact assessment. Workshop participants expressed value in the social, ecological, cultural, and economic characteristics in project area.

3.13.2 Environmental Consequences – All Alternatives

For all proposed alternatives, workshop participants described 46 environmental changes they expect could occur in the project area as a result of the proposed action and alternatives, and that both social and ecological changes are expected to impact people and their communities positively and negatively. The project is expected to affect social conditions in Owyhee County. The context within and extent to which these effects would occur would vary according to a given perception, whether positive or negative. Among workshop participants, there was very little consensus on which alternative would present the least impacts to the Socio-Economic Character of the project area. Therefore, there was not a measureable and meaningful effect as a result of any one alternative.

3.13.3 Cumulative Impacts – Social Characteristics

A cumulative impacts analysis would not be meaningful since there are no measureable direct or indirect impacts. Also, it may be assumed that the same perceptions associated with juniper treatments would extend to the cumulative actions across the landscape.

4.0 Consultation and Coordination

4.1 List of Preparers

Name	Position
Janelle Alleman	Fish Biologist, Boise District
M.J. Byrne	Public Affairs, Boise District
Trisha Cracroft	Ecologist, NRCS
Chris Clay	GIS Specialist, Boise District
Seth Flanigan	NEPA Specialist, Boise District
Lara Hannon	Writer-Editor, Boise District - Fuels
Ryan Homan	Outdoor Recreation Planner, Owyhee Field Office
Karen Kumiega	Archaeologist, Boise District - Fuels
Mike McGee	Project Lead/Wildlife Biologist, Boise District - Fuels
Kevin Moriarty	Fire Information Officer, Boise District - Fire/Fuels
Lance Okeson	Assistant Fire Management Officer, Boise District - Fuels
Kyle Paffett	Hydrologist, Boise District
Michelle Ryerson	Field Office Manager, Owyhee Field Office
Julie Suhr Pierce	Socioeconomic Specialist, Washington Office
Tanya Thrift	Field Office Manager, Bruneau Field Office

4.2 List of Agencies, Organizations, and Individuals Consulted

Affected land owners and permittees
Governor's Office of Species Conservation
Idaho Department of Fish and Game
Idaho Department of Lands
Natural Resources Conservation Service
Owyhee County Commissioners
Owyhee Local Working Group,
Pheasants Forever
Trout Unlimited Forever
The Nature Conservancy
University of Idaho
U.S. Fish and Wildlife Service

Native American Consultation

The BLM is required to consult with Native American tribes to "help assure that (1) federally recognized tribal governments and Native American individuals, whose traditional uses of public land might be affected by a proposed action, will have sufficient opportunity to contribute to the decision, and (2) the decision maker will give tribal concerns proper consideration" (U.S. Department of the Interior, *BLM Manual Handbook H-8120-1*). Tribal coordination and consultation responsibilities are implemented under laws and executive orders that are specific to cultural resources which are referred to as "cultural resource authorities," and under regulations that are not specific which are termed "general authorities." Cultural resource authorities include: the *National Historic Preservation Act of 1966*, as amended (NHPA); the

Archaeological Resources Protection Act of 1979; and the *Native American Graves Protection and Repatriation Act of 1990, as amended*. General authorities include: the *American Indian Religious Freedom Act of 1979*; the NEPA; the FLPMA; and *Executive Order 13007-Indian Sacred Sites*. The proposed action is in compliance with the aforementioned authorities.

Southwest Idaho is the homeland of two culturally and linguistically related tribes: the Northern Shoshone and the Northern Paiute. In the latter half of the 19th century, a reservation was established at Duck Valley on the Nevada/Idaho border west of the Bruneau River. Today, the Shoshone-Paiute Tribes residing on the Duck Valley Reservation actively practice their culture and retain aboriginal rights and/or interests in this area. The Shoshone-Paiute Tribes assert aboriginal rights to their traditional homelands as their treaties with the United States, the Boise Valley Treaty of 1864 and the Bruneau Valley Treaty of 1866, which would have extinguished aboriginal title to the lands now federally administered, were never ratified.

Other tribes that have ties to southwest Idaho include the Bannock Tribe and the Nez Perce Tribe. Southeast Idaho is the homeland of the Northern Shoshone Tribe and the Bannock Tribe. In 1867 a reservation was established at Fort Hall in southeastern Idaho. The Fort Bridger Treaty of 1868 applies to BLM's relationship with the Shoshone-Bannock Tribes. The northern part of the BLM's Boise District was also inhabited by the Nez Perce Tribe. The Nez Perce signed treaties in 1855, 1863 and 1868. The BLM considers off-reservation treaty-reserved fishing, hunting, gathering, and similar rights of access and resource use on the public lands for all tribes that may be affected by a proposed action.

The BLM provided an early alert to the Shoshone-Paiute Tribes during the June 19, 2014, Wings and Roots Program, Native American Campfire meeting.

4.3 Public Participation

The BLM received public scoping comments from the following individuals and entities:

Allen, Michael
American Wild Horse Preservation Campaign
Christman, Dan
Conley, Pam
Dougal, Frankie
Hoagland, Jerry
Fauci, Joanie
Golden Eagle Audubon Society
Idaho Conservation League
Idaho Department of Parks and Recreation
Idaho Office of Species Conservation
Idaho State Department of Agriculture
Miller Land Company
Nettleton, Paul
Owyhee Cattlemen's Association
Owyhee County Board of Commissioners
Payne, Ted
Ratcliff, Thomas
Schneider, Mark
Soran, Stan
Stanford, Dennis
Thompson, Robyn and Breuer, Ernie
The Nature Conservancy
The Wilderness Society
Western Watersheds Project
Wild Earth Guardians
Wilderness Watch
Wildlands Defense
Weyen, Matt

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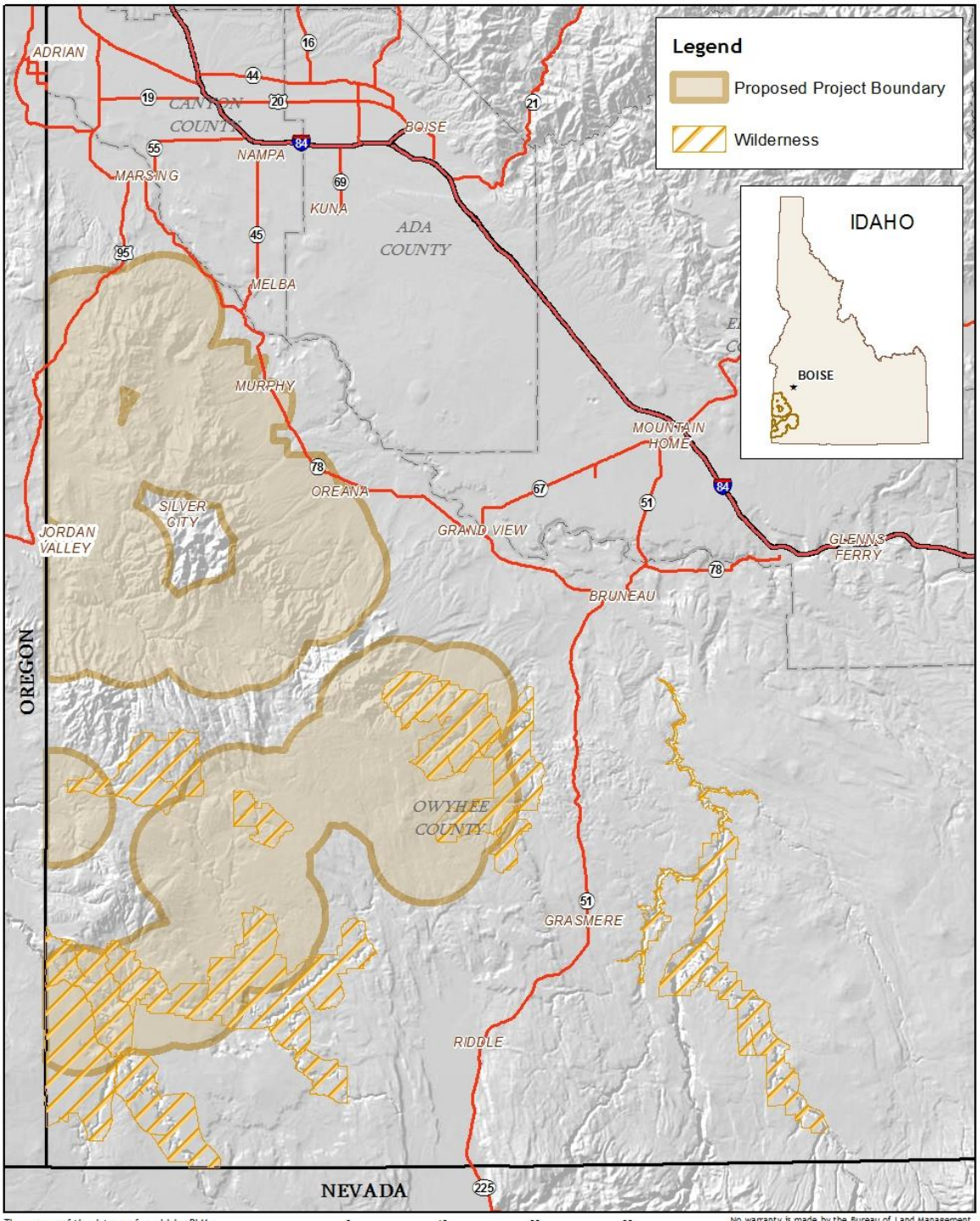
6.0 Maps

1. Project Area Overview



The sources of the data are from Idaho-BLM Corporate Data, and the USGS.

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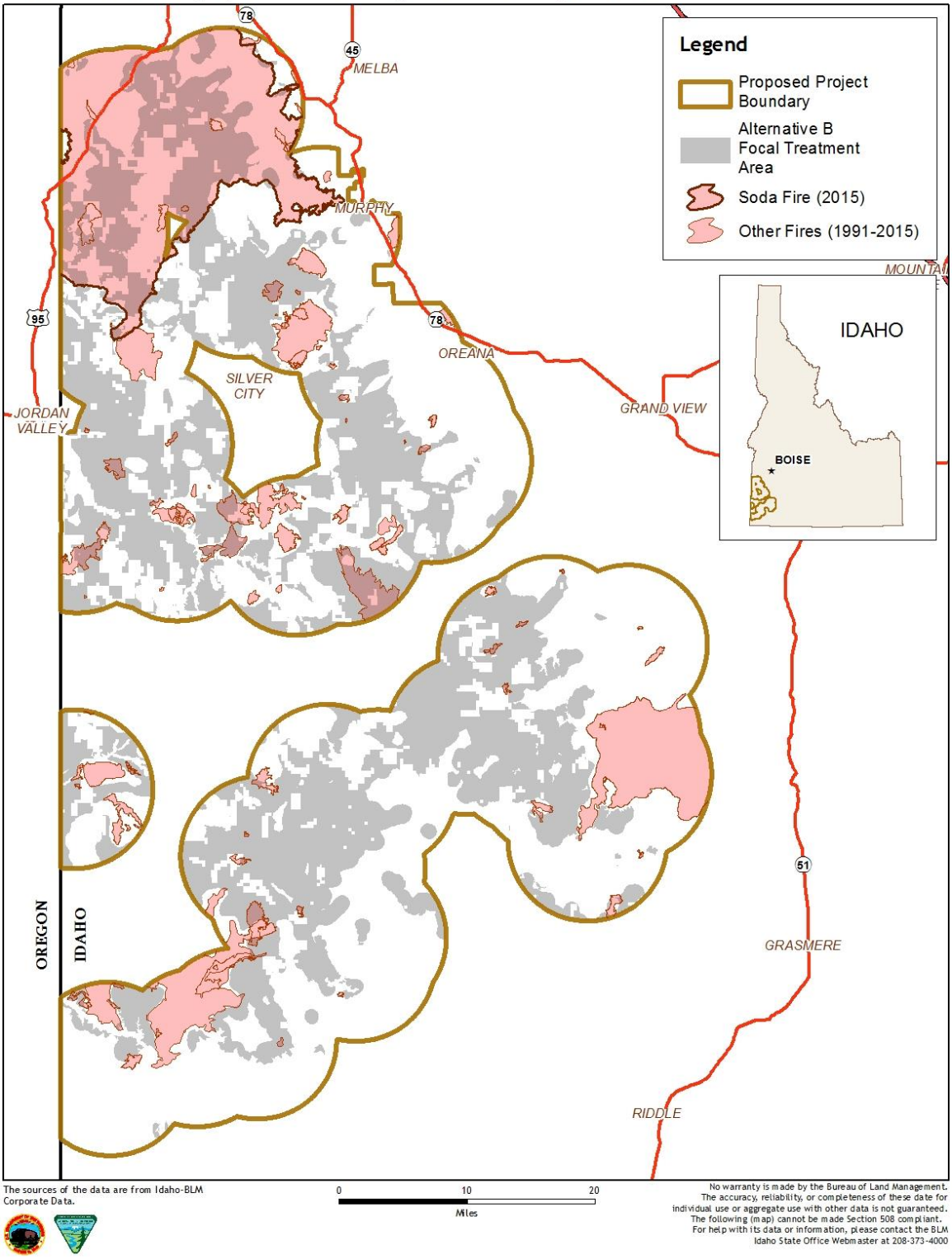
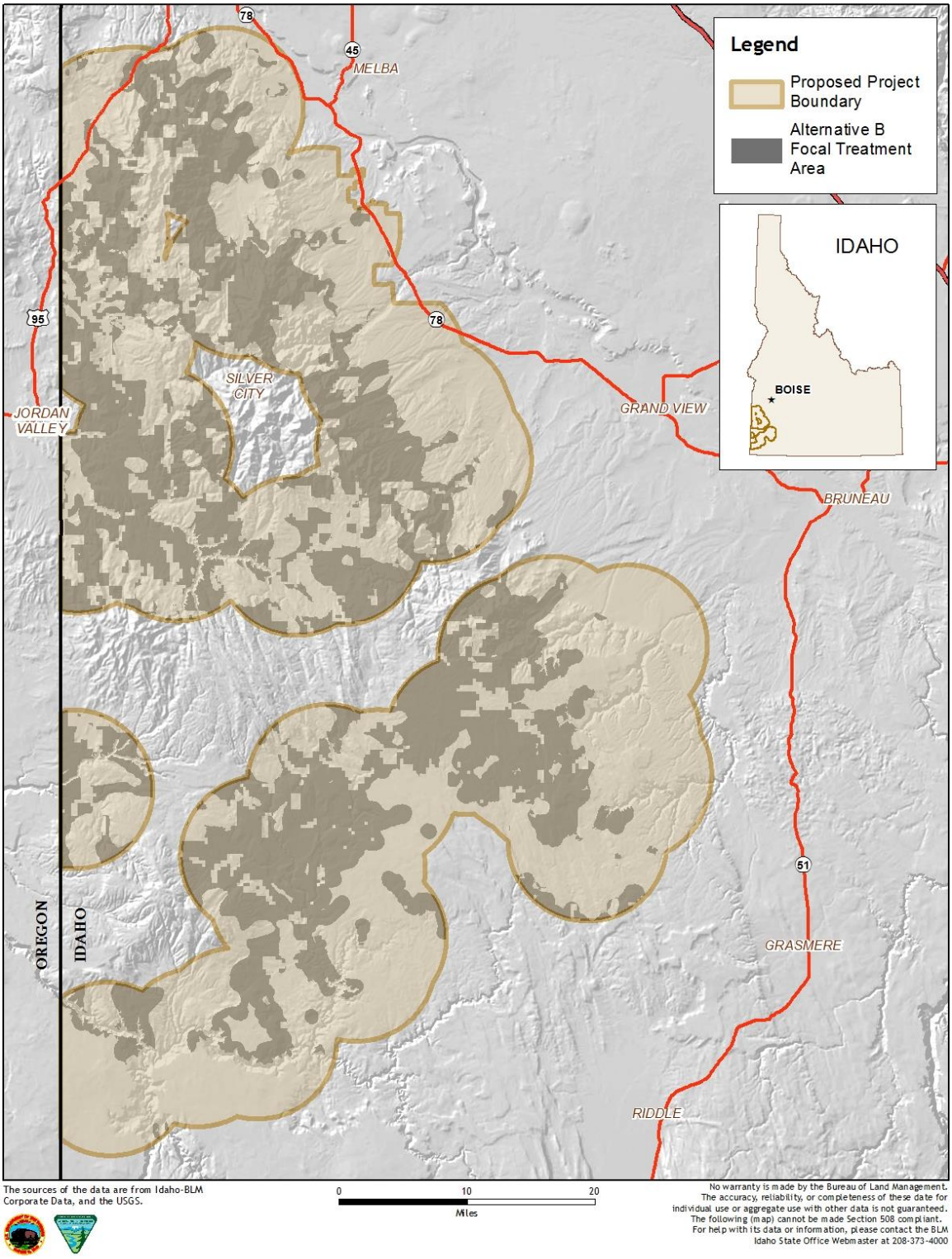
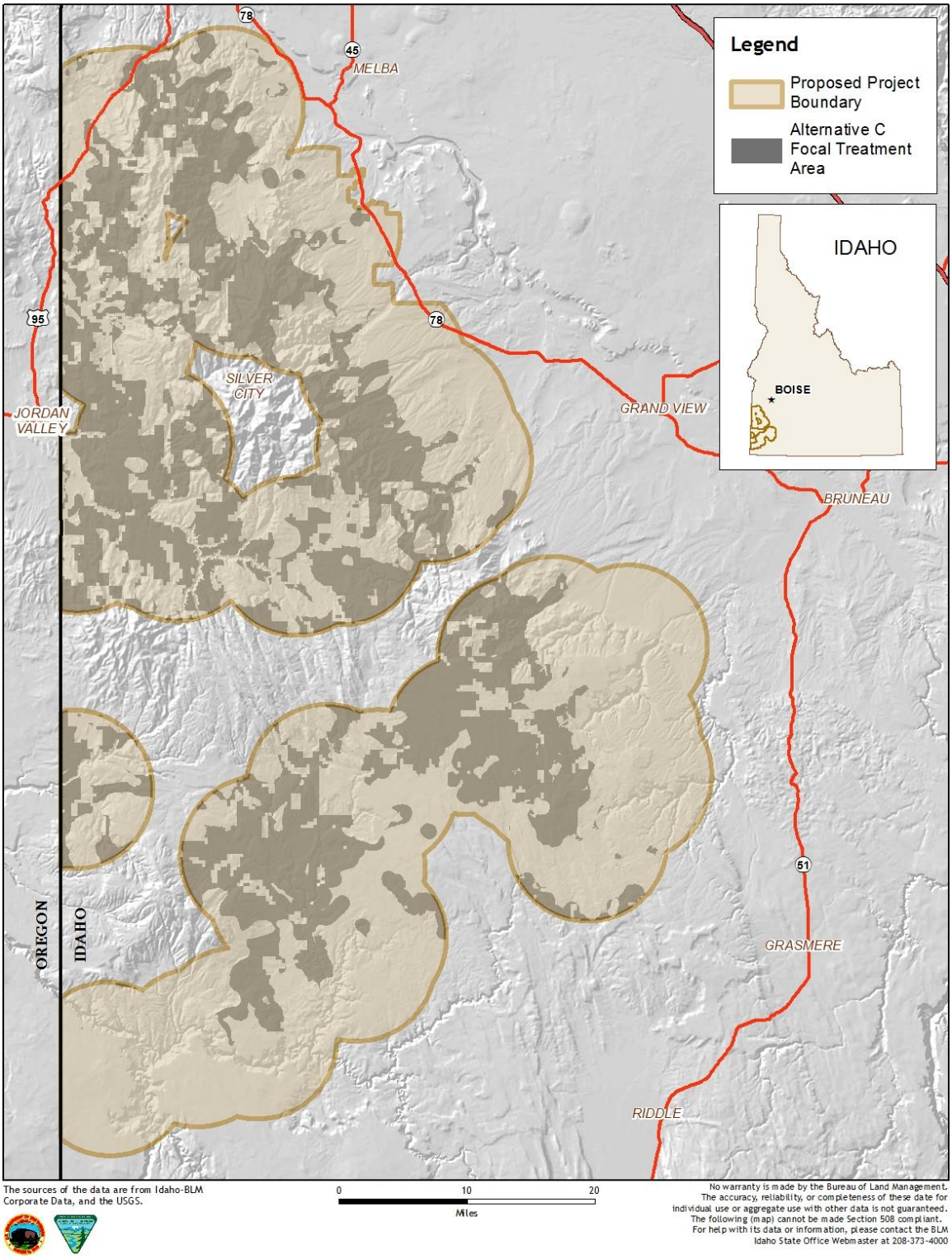
2. Fire History (1991-2015) in the Project Area



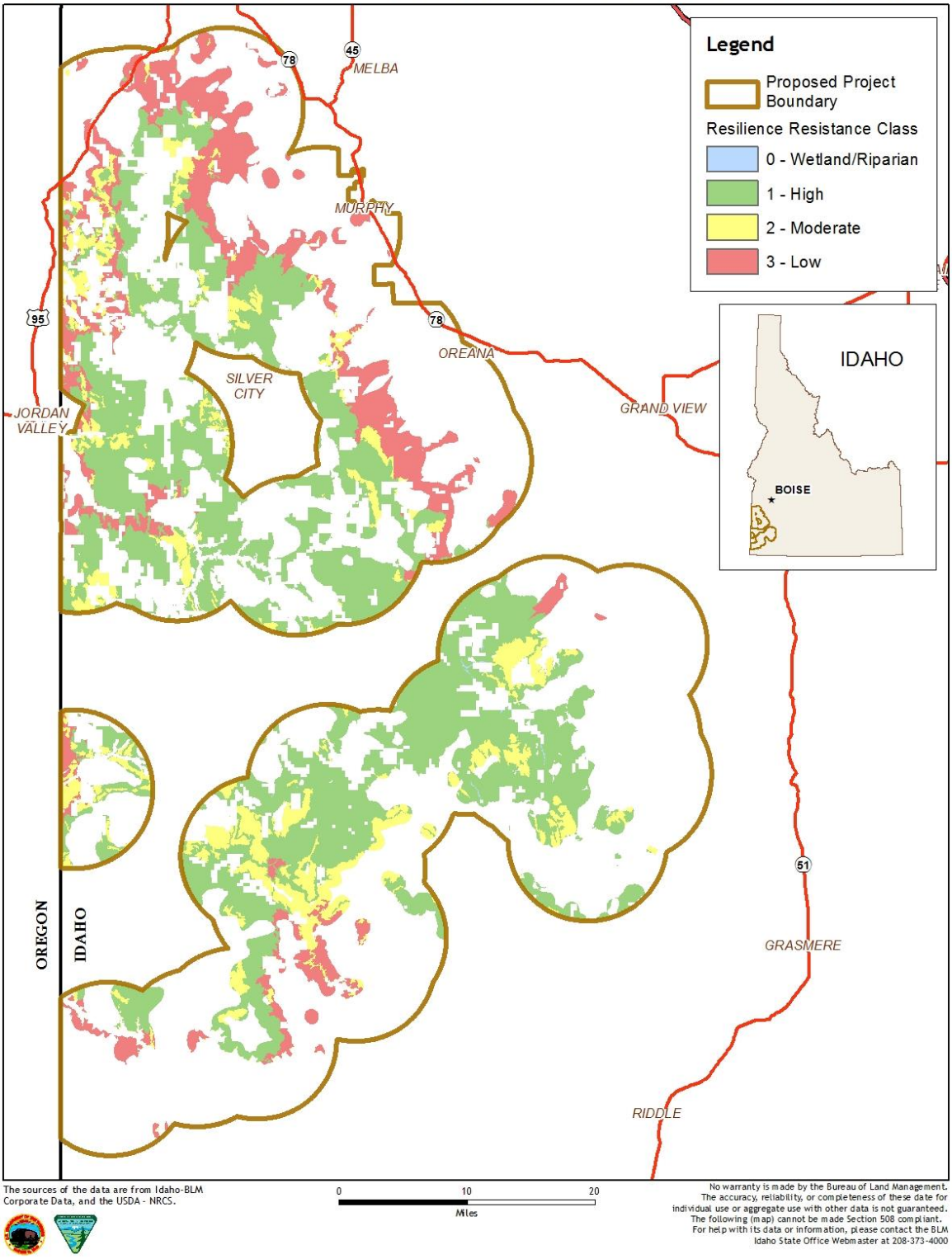
3. Alternative B



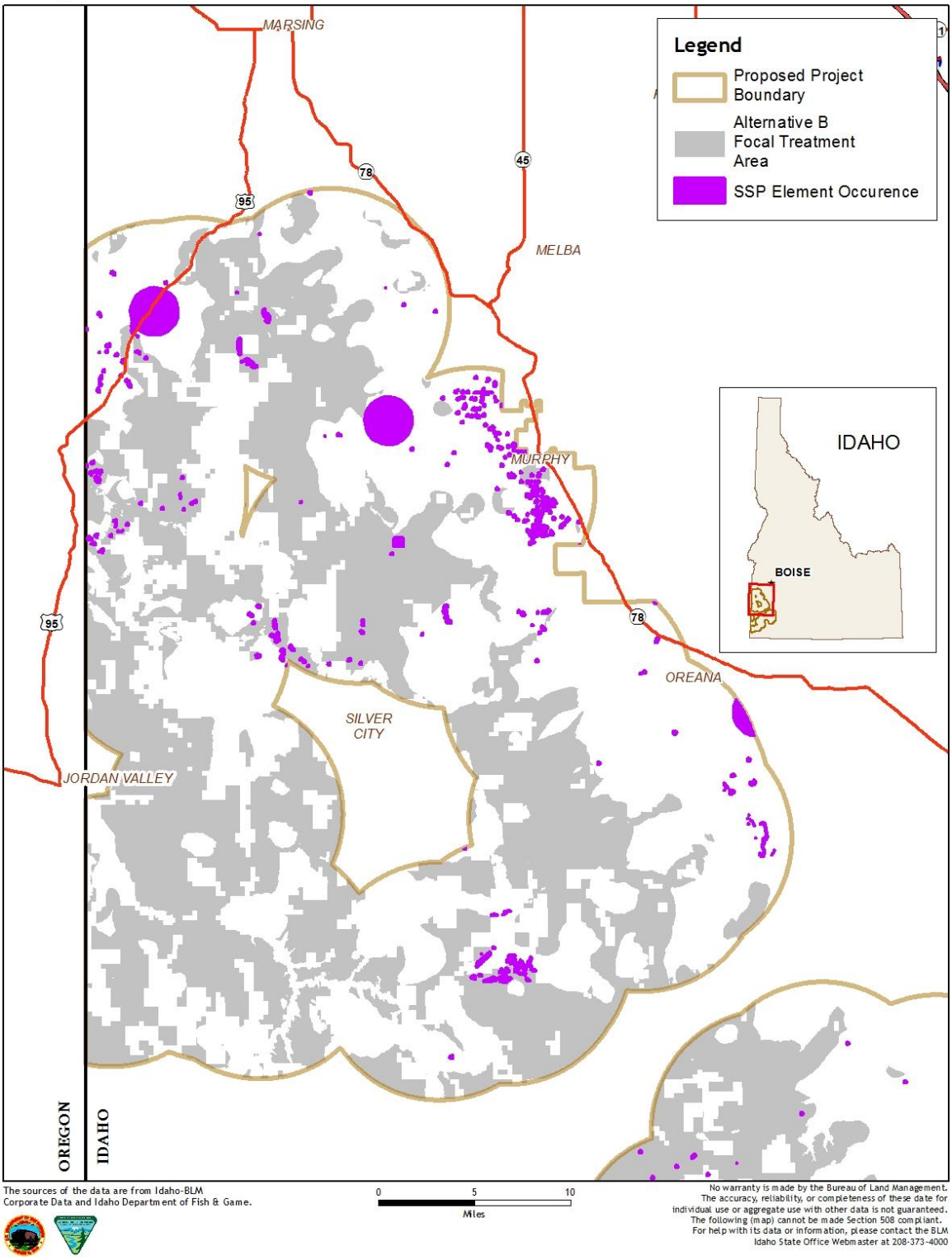
4. Alternative C



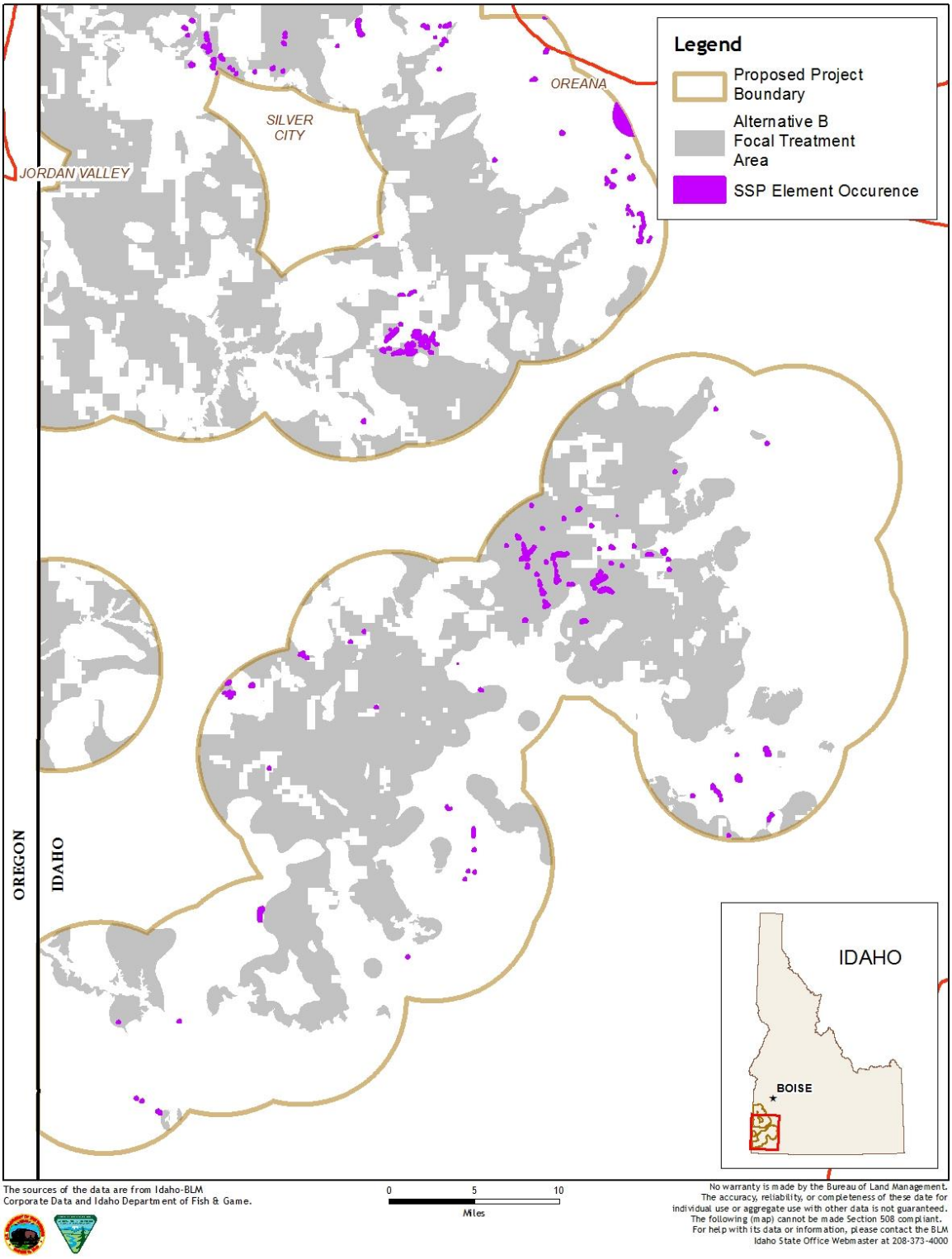
5. Resilience/Resistance In Alternative B Focal Treatment Area



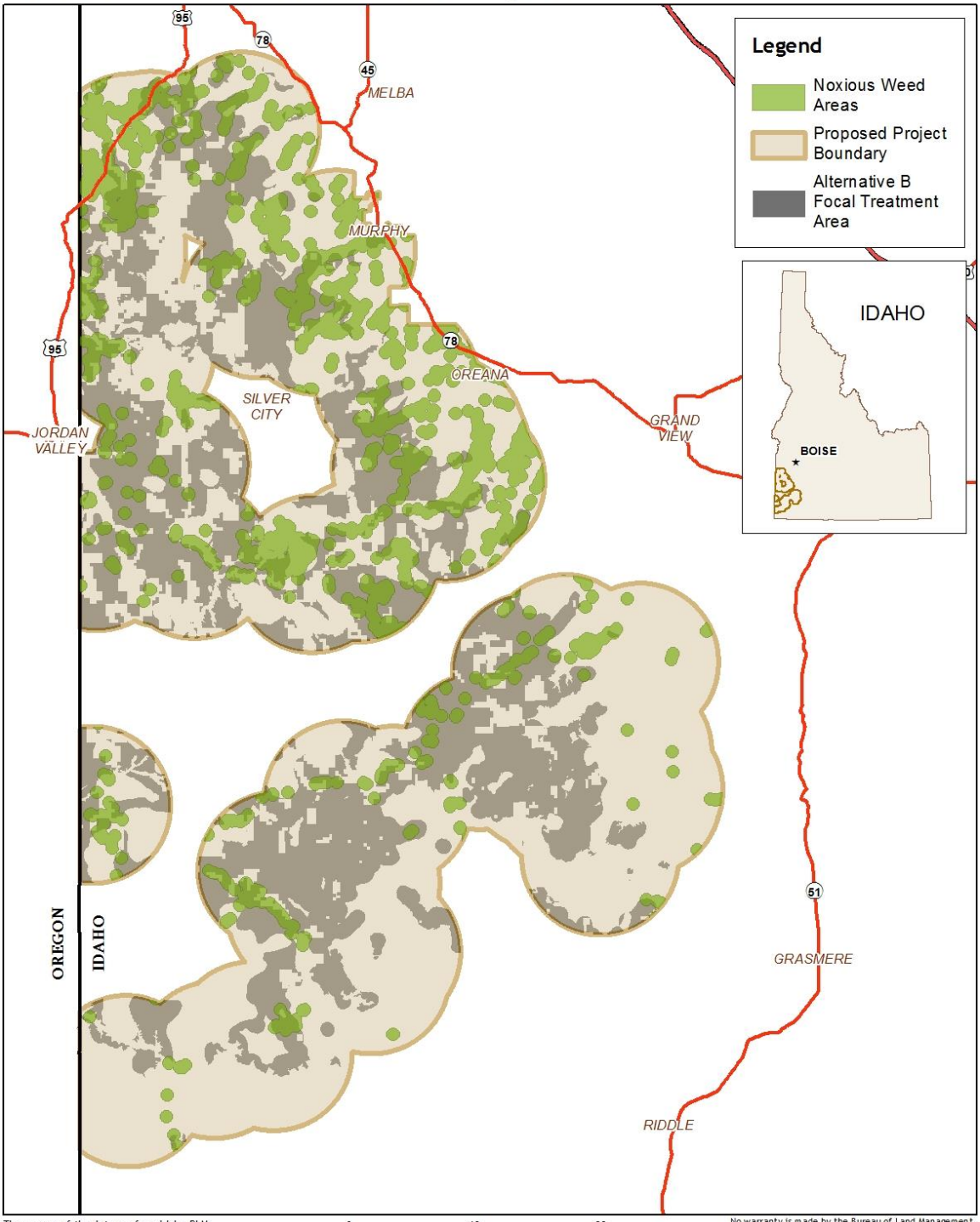
6. Special Status Plant Element Occurrences



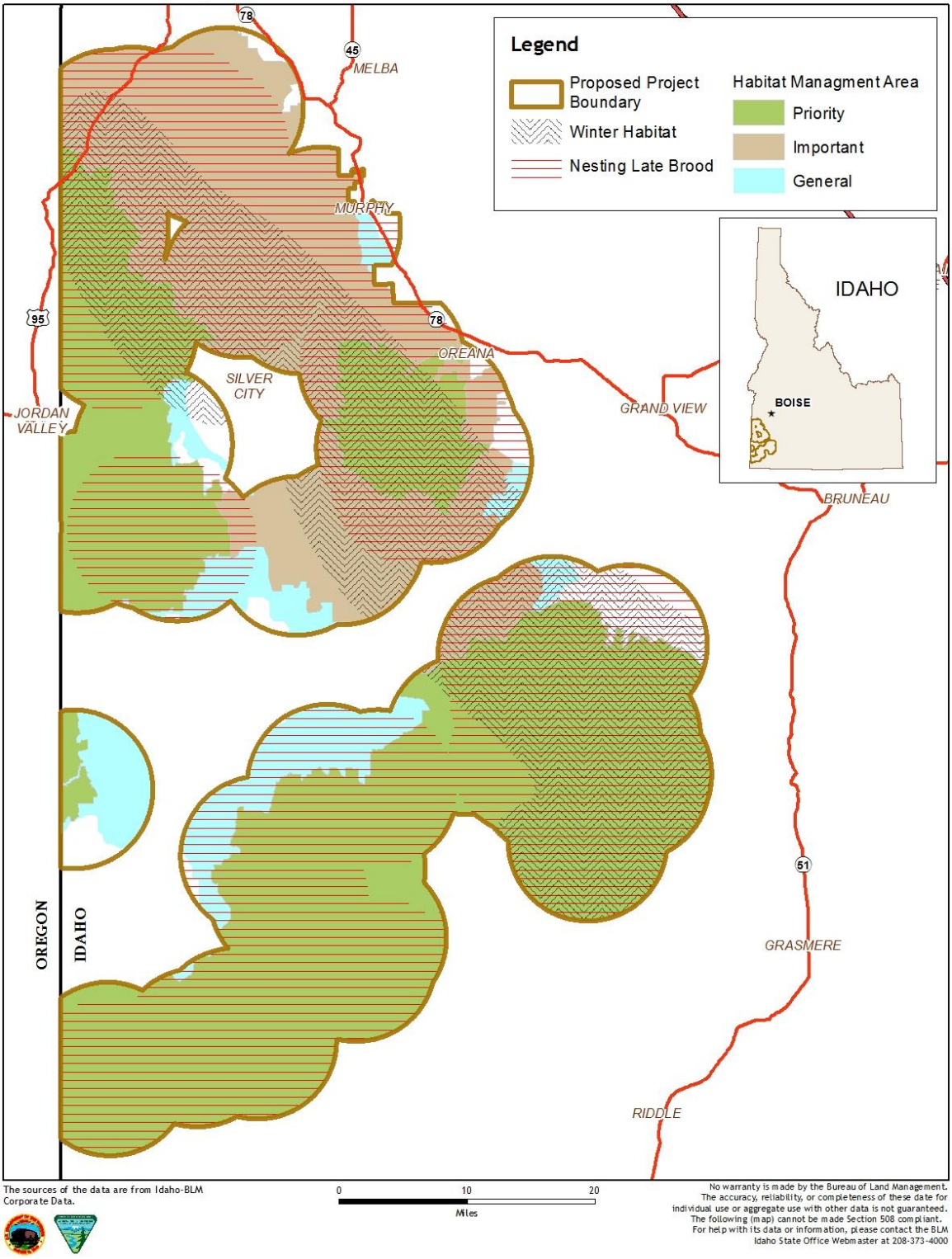
7. Special Status Plant Element Occurrences



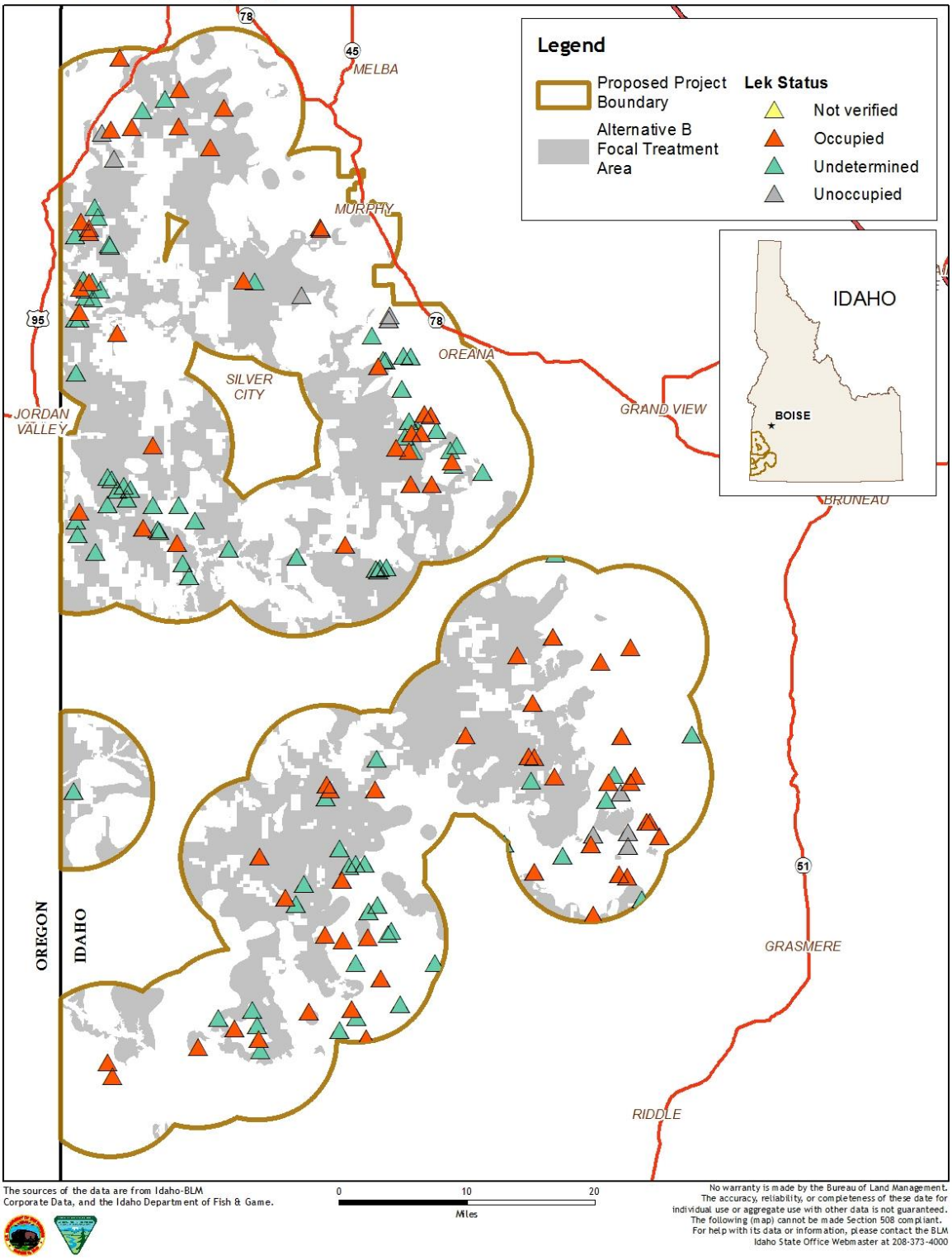
8. Noxious Weeds Within The Project Area



9. Greater Sage-grouse Habitat



10. Greater Sage-grouse Leks



The sources of the data are from Idaho-BLM Corporate Data, and the Idaho Department of Fish & Game.

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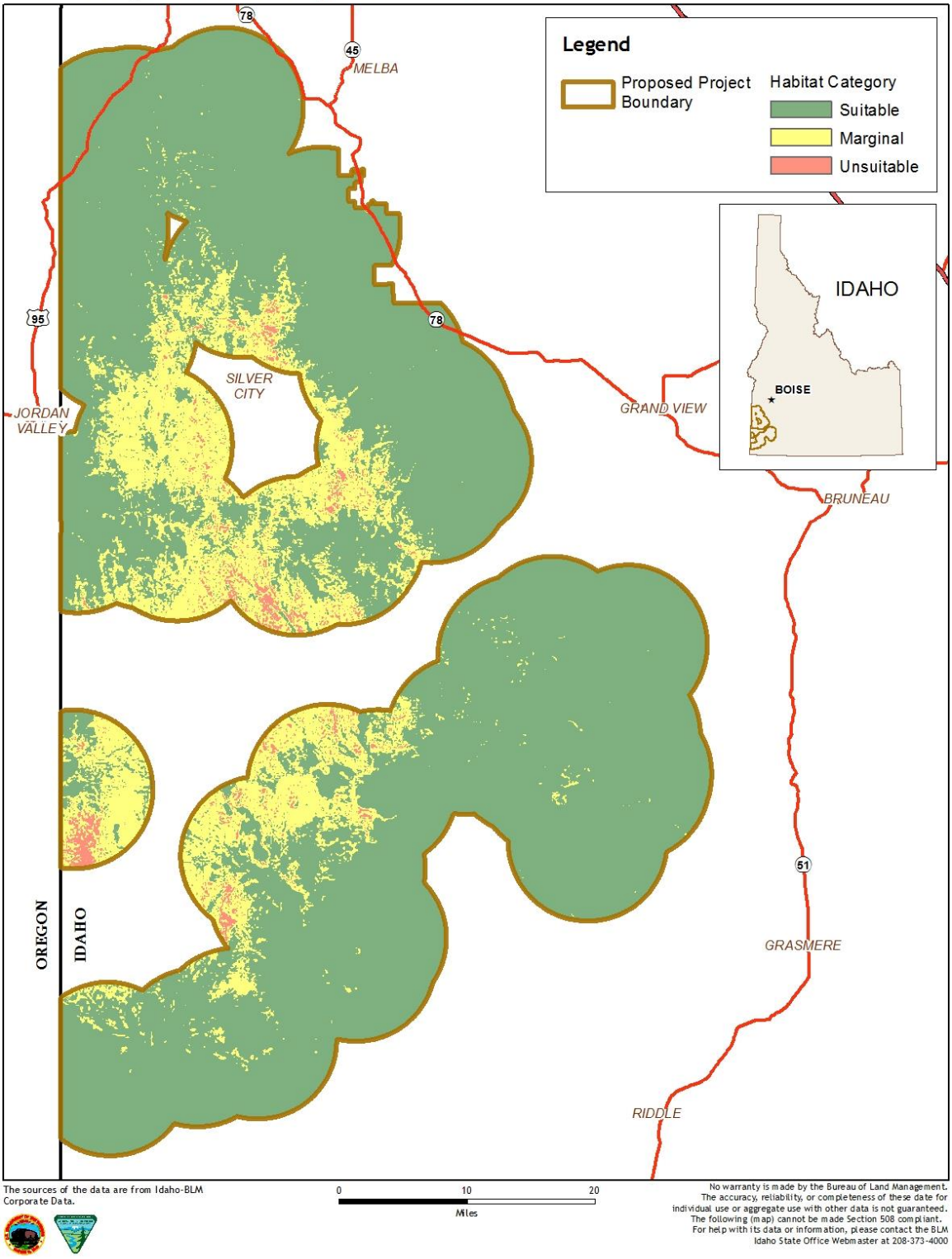
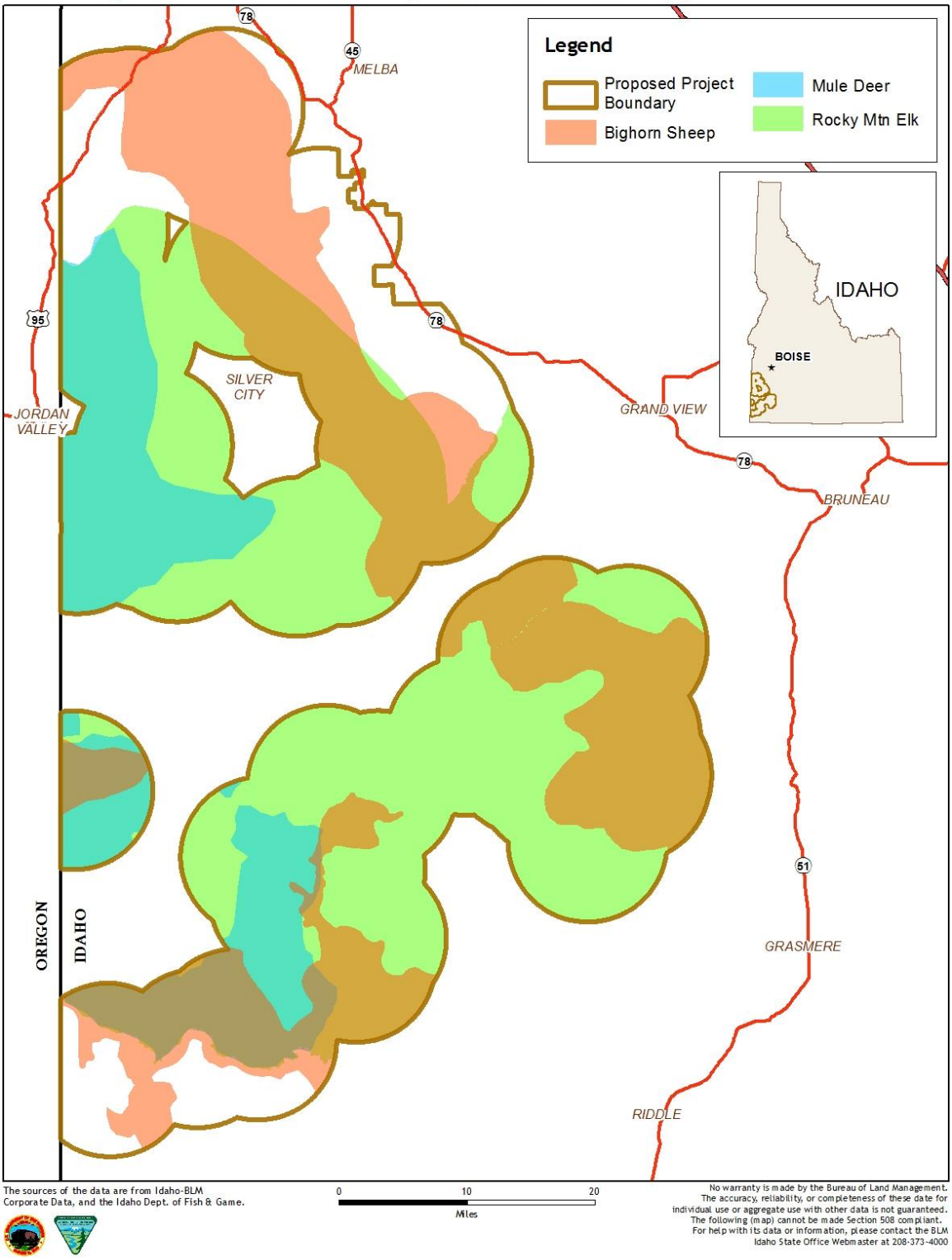
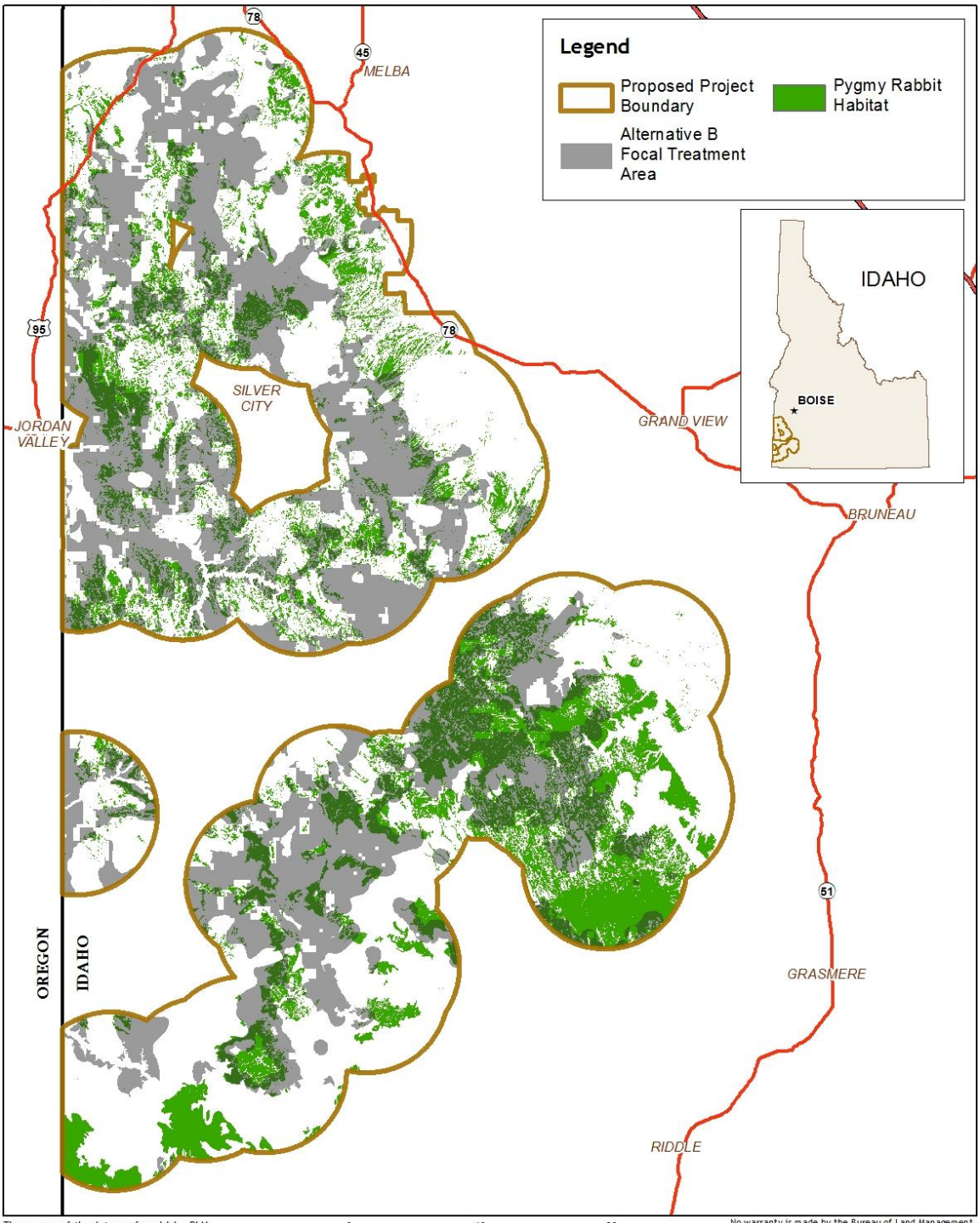
11. Pronghorn Antelope Habitat



12. Large Mammal Habitat (Elk, Deer & Sheep)



13. Pygmy Rabbit Habitat



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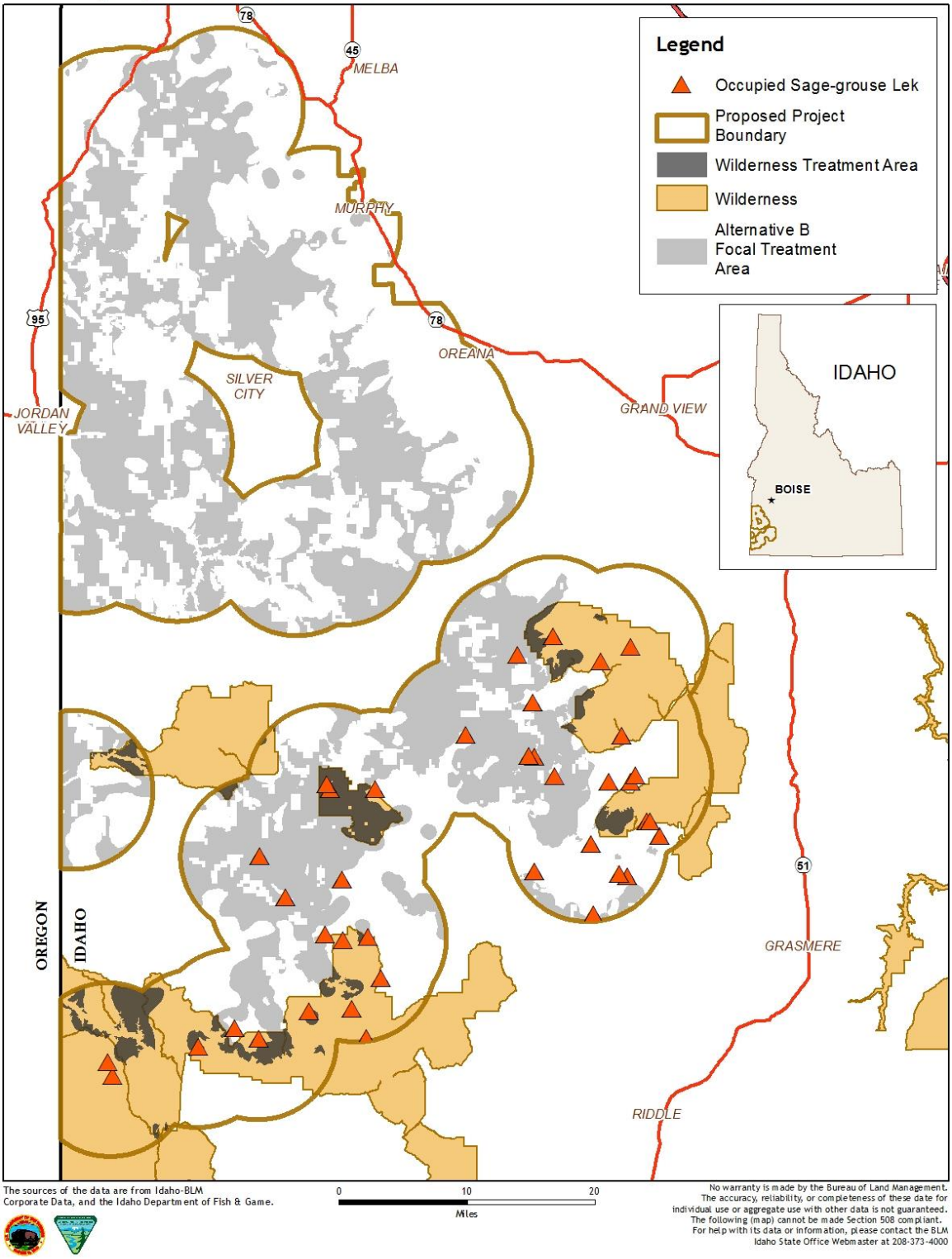
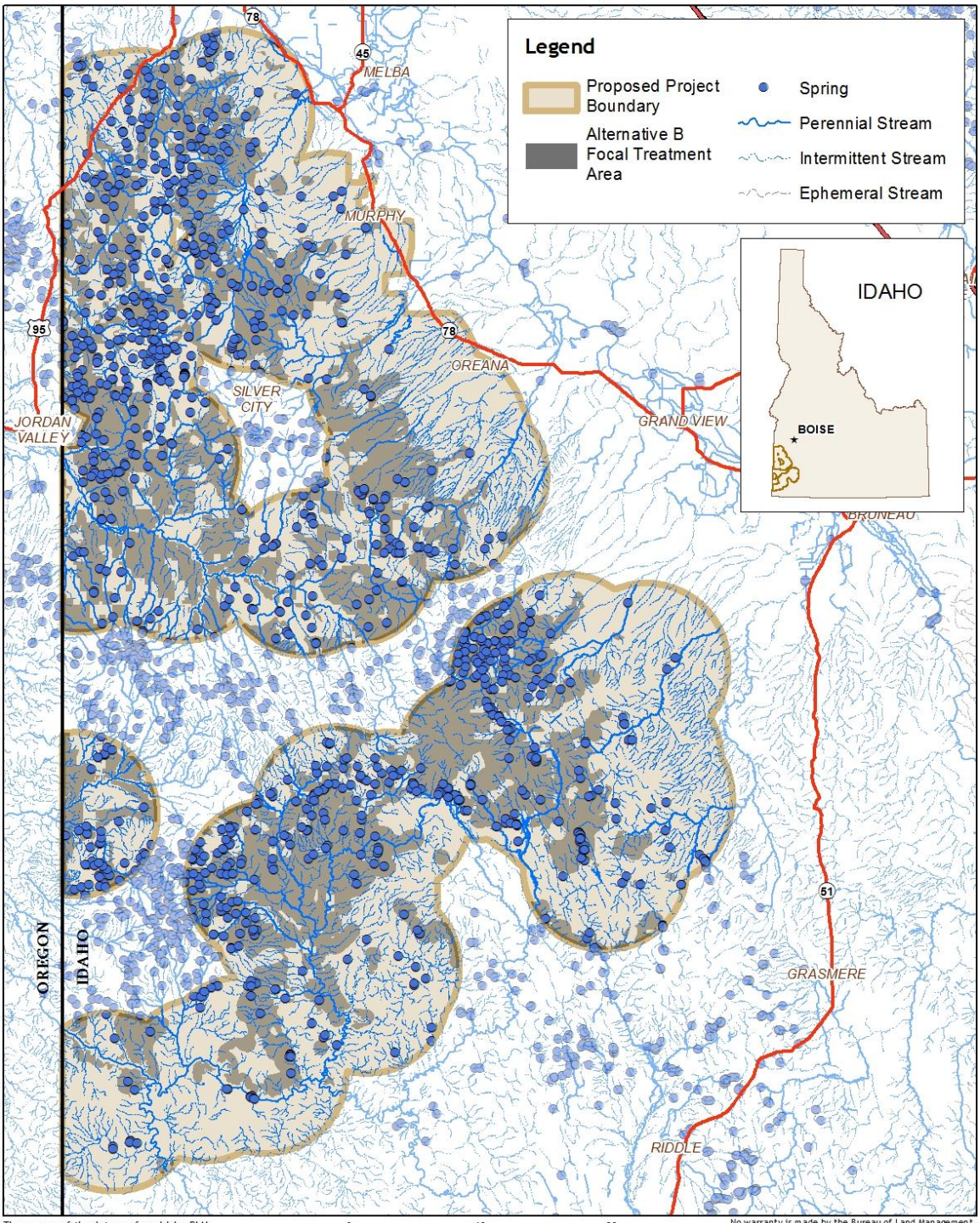
14. Sage-grouse Leks in/near Wilderness Treatment Areas



15. Streams and Springs within the Project Area



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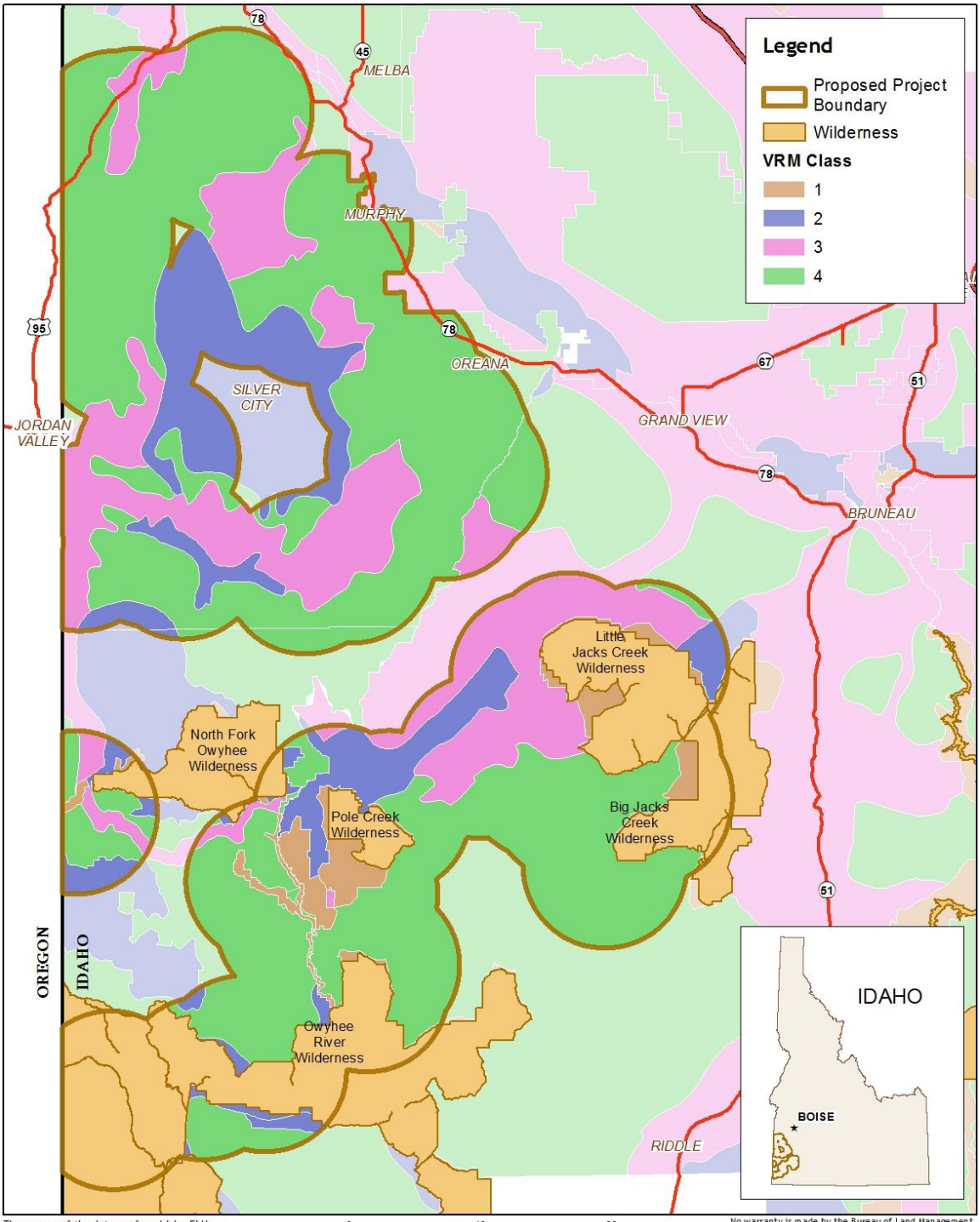
16. Wilderness and Visual Resource Management Areas



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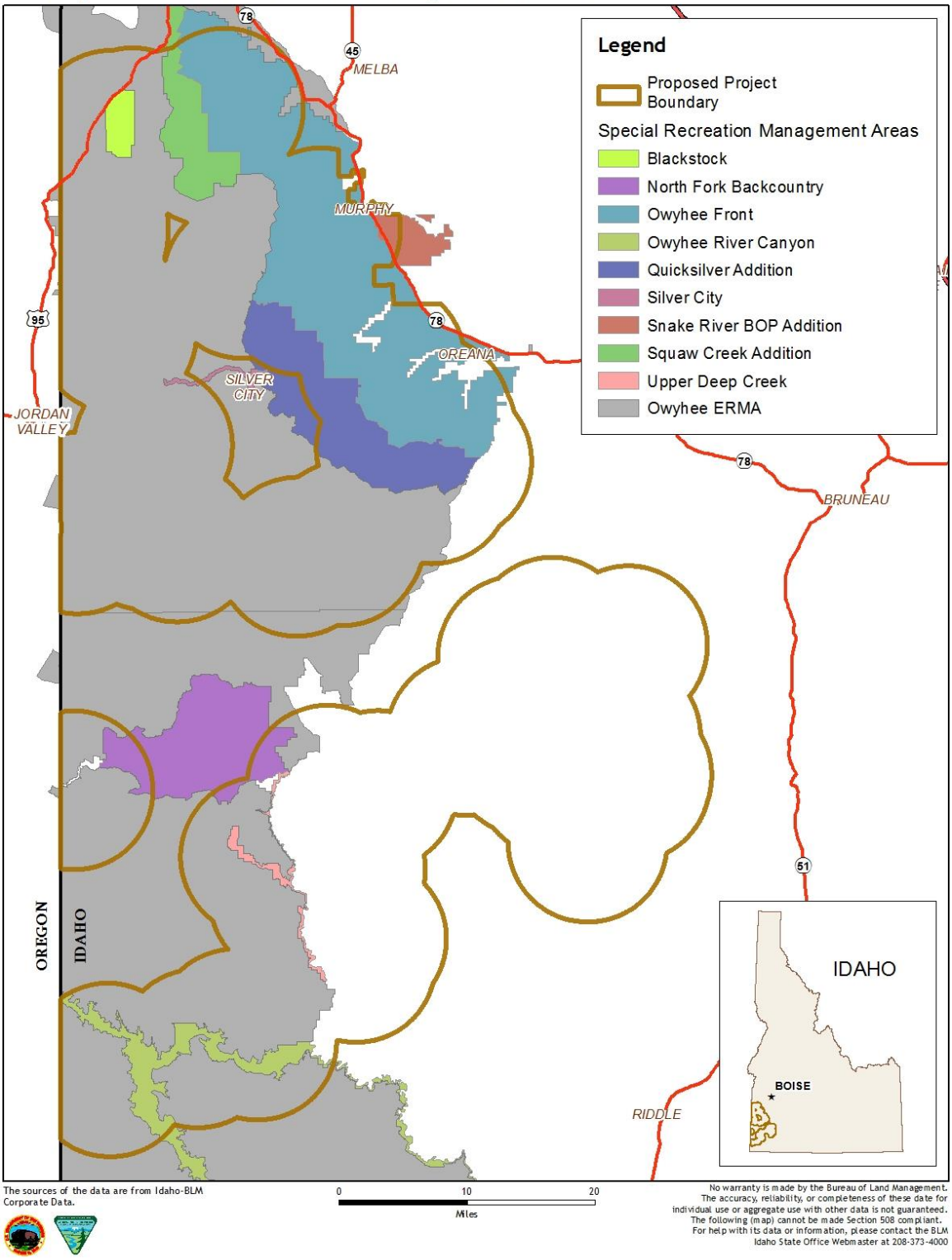
17. Special Recreation Management Areas



7.0 Appendices

7.1 Appendix A – Monitoring Plan

Implementation Monitoring

Treatment implementation monitoring is the inspection of operations during treatment implementation to document adherence to applicable design features such as; juniper mortality, clean stumps, low laying material etc. Implementation monitoring documents resource conditions during implementation, equipment issues, and/or resolutions, and any necessary adjustments to the prescribed designs. Information derived through implementation monitoring would be used to improve future juniper project design.

Effectiveness Monitoring

Treatment effectiveness monitoring includes the initial and subsequent collection of qualitative and quantitative information at randomly established monitoring sites. Effectiveness monitoring would be conducted at regularly scheduled intervals (annually at a minimum) to inform whether treatments are becoming adequately established, whether re-treatments are necessary, and whether maintenance is required to ensure effectiveness. A minimum of one monitoring site would be established for every treatment.

Effectiveness Monitoring consists of the following:
1. Pre-implementation inventory to establish a baseline of existing vegetation conditions in and adjacent to the proposed treatment and would be used to inform which treatment method would be most appropriate for a given site.
2. Post-implementation monitoring to inform management of resource conditions and would be used to spatially and temporally compare treatments, if subsequent treatments or maintenance is needed, and to determine progress towards meeting long-term goals.

Treatment Mapping

The actual treatment footprint would be mapped immediately post-implementation using Trimble global positioning system (GPS) technology and incorporated into Idaho BLM Vegetation Treatment Geodatabase (VTG). The resulting Geographic Information System (GIS) shape-file would define the physical extent of the treatments. Plot locations would be marked with witness posts (see Monitoring Methodology below) and would be recorded using Trimble GPS technology therefore providing reference points to verify GPS accuracy.

Landscape photo plots

Monitoring would be conducted at a landscape level using photo plots that encompass as much of treatment area as possible. Landscape photos will show early juniper encroachment into sagebrush stands prior to treatment and post treatment, as well as overall vegetation response (i.e., changes in native perennial and/or invasive vegetation).

Sage-grouse Habitat Monitoring/HAF

Habitat condition would be evaluated before treatment on ten permanent transects established across the project area. Vegetation response and trend would be monitored after juniper removal. Trend would not be expected to show measurable change where the level of juniper encroachment has not caused a reduction in sagebrush steppe vegetation. However, where encroaching juniper has led to the loss of sagebrush and desirable herbaceous vegetation, a positive trend would be expected following juniper treatments. Vegetation trend would be

evaluated by following the Site Scale habitat assessment and monitoring protocols identified in the Sage-Grouse Habitat Assessment Framework or HAF (2015).

Hydrology/Riparian Monitoring

The BLM would monitor ongoing treatment response for other resources of concern. Types of monitoring would include, but not be limited to, the following:

- Hydrologic response – Springs and wet meadows would be monitored for water discharge through the use of flumes and other water discharge measurement methods (Rantz et al., 1982). Monitoring sites would be established and discharge measurements would be recorded seasonally through the life of the project.
- Riparian vegetation response – Photo documentation would be employed to capture vegetation response to treatment within riparian areas. Photo documentation sites would be established and site visits would occur yearly through the life of the project (Hall, 2001).
- Water temperature – Data-loggers would be employed to record thermographs for select reaches of streams.

Monitoring plans would be designed and included for each treatment unit (see Annual Treatment Unit Development, section 2.3.2.4 above). For example, if a treatment unit includes juniper removal from a stream bank, the monitoring plan may include installation of a thermograph prior to treatment followed by post-treatment water temperature data collection and/or before- and after- treatment monitoring of water flows from springs will also be implemented. Inventories and surveys for noxious weeds, special status and other plants and wildlife, and cultural sites would also be ongoing.

Noxious Weed Monitoring

Noxious weeds encountered within or adjacent to the project area would be photographed and a GPS position would be recorded in Universal Transverse Mercator coordinate system (UTMs). This information would be provided to the District Weeds Specialist for entry into the National Invasive Species Information Management System (NISIMS) per reporting requirements and to ensure an appropriate weed treatment occurs.

7.2 Appendix B – Air Quality Formulas

Emissions and emission factors displayed in Table 14were calculated using the following formulas:

$F_i = P_i L$

$E_i = F_i A = P_i LA$

F_i = emission factor (mass of pollutant/unit area of forest consumed)

P_i = yield for pollutant "i" (mass of pollutant/unit mass of forest fuel consumed)

= 8.5 kilograms per megagram (kg/Mg) (17 pound per ton [lbs/ton]) for total particulate

= 70 kg/Mg (140 lbs/ton) for carbon monoxide

= 12 kg/Mg (24 lbs/ton) for total hydrocarbon (as CH_4)

= 2 kg/Mg (4 lbs/ton) for nitrogen oxides (NO_x)

= negligible for sulfur oxides (SO_x)

L= fuel loading consumed (mass of forest fuel/unit land area burned)

A = land area burned

E_i = total emissions of pollutant "i" (mass pollutant)

7.3 Appendix C – GRSG ARMPA Conformance Review

As part of Idaho's GRSG ARMPA implementation, BLM actions must be reviewed by Idaho's (BLM) Core Sage-grouse Team (Implementation Team) for compliance with the ARMPA. During review, the Implementation Team may suggest MDs or RDFs for incorporation not previously identified by project planners. Project planners can then incorporate the recommended MDs and RDFs if deemed applicable to the project, or provide rationale as to why a suggested MD or RFD is not applicable to the project. The MDs and RDFs identified for the BOSH Project, as well as rationale for MDs deemed unrelated to the BOSH Project are presented in the tables below.

ARMPA MDs identified for the BOSH Project:

MD Number and Program Area	Description of the Management Decisions Authorizing the BOSH Project	Where the MD is Addressed or Why it is Not Applicable (N/A)
MD SSS 5	Prioritize activities and mitigation to conserve, enhance and restore 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** (of the HAF). This can include projects outside GRSG habitat when those projects will provide a benefit to GRSG habitat.	Pgs. 13, 21, 54
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.	Chapters 2 and 3 (all pgs.)
MD SSS 33	Conduct implementation and project activities, including construction and short-term anthropogenic disturbances consistent with seasonal habitat restrictions described in Appendix C.	Pgs. 19-20
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.	Pgs. 13-15 and Appendix A (pg. 146)
MD SSS 39	Monitor invasive vegetation post vegetation management treatment.	Appendix A (pg. 146)
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.	Pgs. 12-13

MD Number and Program Area	Description of the Management Decisions Authorizing the BOSH Project	Where the MD is Addressed or Why it is Not Applicable (N/A)
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, 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.	Pgs. 12-13 and Appendix A (pgs. 146-147)
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.	Current management doesn't threaten treatment success.
MD VEG 8	Remove conifers encroaching into sagebrush habitats, in a manner that considers tribal cultural values. Prioritize treatments closest to occupied GRSG habitats and near occupied leks, and where juniper encroachment is phase 1 or phase 2. Use of site-specific analysis and tools like the FIAT report (Chambers et. al., 2014) will help refine the location for specific areas to be treated.	Pgs. 8-9
MD VEG 9	Incorporate results of the FIAT assessments in to projects and activities addressing invasive species as appropriate.	Pg. 3
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.	Pg. 20
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.	Pgs. 19-20
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.	Pgs. 10, 20
MD FIRE 26	Protect vegetation restoration and rehabilitation efforts/projects from subsequent fire events.	The project area is already identified as a high priority for fire suppression.

ARMPA RDFs identified for the BOSH Project:

RDF Number	Description of the Required Design Features Associated with the BOSH Project	Where the RDF is Addressed or Why it is Not Applicable (N/A)
RDF 1	Solicit and consider expertise and ideas from local landowners, working groups, and other federal, state, county, and private organizations during development of projects.	Pgs. 10, 20
RDF 2	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 km) of leks during the lekking season.	Pg. 19
RDF 3	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.	Pg. 19
RDF 4	Avoid mechanized anthropogenic disturbance during the winter, in wintering areas when implementing: 1) fuels/vegetation/habitat restoration management projects, 2) infrastructure construction or maintenance, 3) geophysical exploration activities; 4) organized motorized recreational events.	Pg. 19
RDF 20	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.	Pg. 15
RDF 22	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).	Pg. 15
RDF 26	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.	Pg. 20
RDF 30	Remove standing and encroaching trees within at least 110 yards of occupied sage-grouse leks and other habitats (e.g., nesting, wintering and brood rearing) to reduce the availability of perch sites for avian predators, as resources permit.	Pgs. 12-13, 21
RDF 40	Utilize available plant species based on their adaptation to the site when developing seed mixes.	Pg. 19
RDF 45	Assess existing on-site vegetation to ascertain if enough desirable perennial vegetation exists to consider techniques to increase on-site seed production to facilitate an increase in density of desired species.	The project is designed to meet this RDF; pgs. 12-13
RDF 46	Use site preparation techniques that retain existing desirable vegetation.	The project is designed to meet this RDF; pgs. 12-13
RDF 48	Utilize post-treatment control of annual grass and other invasive species.	Pg. 20
RDF 49	Utilize new tools and use of new science and research as it becomes available.	Pg. 16
RDF 50	Give higher priority to vegetation rehabilitation or manipulation projects that include: • Sites where environmental variables contribute to improved chances for project success (Meinke et al. 2009). • Projects that address conifer encroachment into important GRSG habitats. In general the priority for treatment is 1) Phase 1 (≤10% conifer cover), 2) Phase 2 (10-30%), and 3) Phase 3 (greater than30%).	The project is designed to meet this RDF; pgs. 12-13

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MINIMUM REQUIREMENTS DECISION GUIDE

WORKBOOK

"…except as necessary to meet minimum requirements for the administration of the area for the purpose of this Act…"

-- The Wilderness Act of 1964

Project Title: **Bruneau-Owyhee Sage Grouse Habitat Restoration Project**

MRDG Step 1: Determination

Determine if Administrative Action is Necessary

Description of the Situation
What is the situation that may prompt administrative action?

Loss of suitable sage-grouse habitat from conversion of sagebrush steppe to juniper woodlands has occurred across hundreds of thousands of acres and juniper encroachment is continuing at a fast rate compromising the perpetuation of a BLM special status species. The proposed project would assist in the restoration of suitable sage-grouse habitat within the Bruneau and Owyhee BLM management areas by removing (hand cutting) juniper from functional sage-grouse habitat. Portions of 5 wilderness areas are within the project area, these include: Little Jack's Creek, Big Jack's Creek, Pole Creek, North Fork Owyhee, and the Owyhee River Wilderness areas.

Options Outside of Wilderness
Can action be taken outside of wilderness that adequately addresses the situation?

☐ YES **STOP – DO NOT TAKE ACTION IN WILDERNESS**

☒ NO **EXPLAIN AND COMPLETE STEP 1 OF THE MRDG**

Explain:

The proposed action of the Bruneau-Owyhee Sage-grouse Habitat Project (BOSH) is to maintain suitable habitat for greater sage-grouse, a BLM special status species. Sage-grouse leks within wilderness identified in need of treatment would continue to be encroached upon by juniper and eventually would not provide suitable habitat. Millions of acres of sagebrush habitat have been lost to encroachment of western juniper and there is a great need to maintain habitat that is currently occupied by sage-grouse. Because leks are extremely important for maintaining healthy populations of sage-grouse, the 2015 Idaho and Southwestern Montana Greater Sage-Grouse Approved Resource Management Plan Amendment and Final Environmental Impact Statement (USDI BLM & USDA FS 2015) includes the following management object: *Trees (i.e., in Idaho mainly juniper, conifers, and does not include old growth juniper, pinyon pine and mountain mahogany; in Montana mainly Douglas-fir) absent or uncommon on shrub/grassland ecological sites within 1.86 miles (3 km) of occupied leks.* Further, recent research identifies the importance of maintaining connectivity between leks across the landscape (Anushika 2015; Knick et al. 2013; Row et al 2015).
The presence of this native bird is an important and unique feature of the wilderness within the project area. Additionally, loss of sagebrush habitat to juniper encroachment degrades habitat for many other sagebrush obligate species and other species that regularly utilize sagebrush habitat such as mule deer. The loss of these species within the wilderness would take away from the wilderness characteristics of these areas.

Criteria for Determining Necessity
Is action necessary to meet any of the criteria below?

A. Valid Existing Rights or Special Provisions of Wilderness Legislation

Is action necessary to satisfy valid existing rights or a special provision in wilderness legislation (the Wilderness Act of 1964 or subsequent wilderness laws) that ***requires*** *action? Cite law and section.*

☐ YES ☒ NO

Explain:

B. Requirements of Other Legislation

Is action necessary to meet the requirements of other federal laws? Cite law and section.

☒ YES ☐ NO

Explain:

The Convention on Nature Protection and Wildlife Preservation in the Western Hemisphere preamble states: "…The Governments of the American Republics, wishing to protect and reserve in their natural habitat representatives of all species and genera of their native flora and fauna, including migratory birds, in sufficient numbers and over areas extensive enough to assure them from becoming extinct through any agency within man's control".

Article VIII states: "…The protection of the species mentioned in the Annex to the present convention is declared to be of special urgency and importance. Species included therein shall be protected as completely as possible, and their hunting, killing, capturing, or taking, shall be allowed only with the permission of the appropriate government authorities in the country".

Idaho State Sage-Grouse Plan – Primary goal states: "…Maintain, improve, and where possible, increase sage-grouse populations and habitats in Idaho, while considering the predictability and long-term sustainability of a variety of other land uses".

The plans population objectives state:

1.) "…Maintain, and increase where possible, the present distribution and abundance of sage-grouse in Idaho

The plans habitat objectives state:

1.) "…Maintain, enhance or restore sage-grouse habitat, and continuity of habitats, at multiple spatial scales; and
2.) "…Manage Idaho's landscape to foster a dynamic sagebrush ecosystem that includes a diverse species composition of sagebrush, grasses, and forbs; and incorporates structural characteristics that promote rangeland health in general, and sage-grouse habitat requirements in particular".

Section 4.3.10 of the plan also specifically identifies conifer encroachment as one of the major threats to the species and its habitat.

C. Wilderness Character

Is action necessary to preserve one or more of the qualities of wilderness character, including: Untrammeled, Undeveloped, Natural, Outstanding Opportunities for Solitude or Primitive and Unconfined Recreation, or Other Features of Value?

UNTRAMMELED

☐ YES ☒ NO

Explain:

UNDEVELOPED

☐ YES ☒ NO

Explain:

NATURAL

☒ YES ☐ NO

Explain:

Wilderness areas in the BOSH project area include several thousand acres of priority habitat for greater sage-grouse and that habitat is currently being encroached upon and degraded by past and current management of western juniper. Action is needed to maintain and improve suitable sage-grouse habitat within wilderness in order to maintain healthy populations of sage grouse in the wilderness and the surrounding BOSH. Currently occupied sage-grouse leks within wilderness would continue to be encroached upon by juniper and eventually would not provide suitable mating habitat, potentially leading to the loss of greater sage-grouse from the wilderness. The presence of this native bird is an important and unique natural feature of the wilderness. Additionally, loss of sagebrush habitat to human induced juniper encroachment degrades habitat for many other sagebrush obligate species and other species that regularly utilize sagebrush habitat. The loss of these species from the wilderness would take degrade the natural quality of the wilderness. Action is needed to preserve the wilderness free from the effects of modern civilization. Treatment within wilderness would only occur where juniper canopy cover is <10% and only trees ≤8 inches diameter at breast height would be targeted. Treatment would include hand cutting or lopping juniper and scattering the branches.

SOLITUDE OR PRIMITIVE & UNCONFINED RECREATION

☐ YES ☒ NO

Explain:

OTHER FEATURES OF VALUE

☒ YES ☐ NO

Explain:

The restoration of the greater sage-grouse habitat within the wilderness is critical to the survival and perpetuation of this sensitive species. These wilderness areas are specifically recognized for sage-grouse and the habitat they provide for this key species. As stated in the Idaho Sage-Grouse Plan and the ARMPA, the goals of these plans and amendments are to conserve, enhance, and restore the Greater Sage-Grouse and its habitat, and to provide sufficient regulatory certainty such that the need for listing the species under the ESA could be avoided. The loss of sage-grouse from the wilderness would degrade a feature of value to the wilderness. Action is needed to preserve this feature of value.

Step 1 Decision
Is administrative action necessary in wilderness?

Decision Criteria

A.	Existing Rights or Special Provisions	☐ YES	☒ NO
B.	Requirements of Other Legislation	☒ YES	☐ NO
C.	Wilderness Character		
	Untrammeled	☐ YES	☒ NO
	Undeveloped	☐ YES	☒ NO
	Natural	☒ YES	☐ NO
	Outstanding Opportunities	☐ YES	☒ NO
	Other Features of Value	☒ YES	☐ NO

Is administrative action necessary in wilderness?

☒ YES	**EXPLAIN AND PROCEED TO STEP 2 OF THE MRDG**
☐ NO	**STOP – DO NOT TAKE ACTION IN WILDERNESS**

Explain:

The proposed project is an important management strategy for improving critical sage-grouse habitat, as well as for the survival and perpetuation of this sensitive species. The leks within wilderness identified for treatment would continue to be encroached upon by juniper and eventually would not provide suitable habitat. Millions of acres of sagebrush habitat have been lost to encroachment of western juniper and there is a great need to maintain habitat that is currently occupied by sage-grouse. The presence of this native species is an important and unique feature of the wilderness areas. These wilderness areas are

specifically recognized for sage-grouse and the habitat they provide for this key species. The loss of sage-grouse from the wilderness would degrade a feature of value to the wilderness. Additionally, loss of sagebrush habitat to juniper encroachment degrades habitat for many other sagebrush obligate species that regularly utilize sagebrush habitat such as mule deer. The loss of these species within the wilderness areas proposed for treatment would take away from the character of these wilderness areas. As stated above in the legislative requirements: The Convention on Nature Protection and Wildlife Preservation in the Western Hemisphere preamble states: "…The Governments of the American Republics, wishing to protect and reserve in their natural habitat representatives of all species and genera of their native flora and fauna, including migratory birds, in sufficient numbers and over areas extensive enough to assure them from becoming extinct through any agency within man's control".

MRDG Step 2

Determine the Minimum Activity

Other Direction
*Is there "special provisions" language in legislation (or other Congressional direction) that explicitly **allows** consideration of a use otherwise prohibited by Section 4(c)?*

AND/OR

Has the issue been addressed in agency policy, management plans, species recovery plans, or agreements with other agencies or partners?

☒ YES	**DESCRIBE OTHER DIRECTION BELOW**
☐ NO	**SKIP AHEAD TO TIME CONSTRAINTS BELOW**

Describe Other Direction:

Yes, the issue has been addressed in agency policy, management plans, as well as species recovery plans.

BLM Manual 8560 – Management of Designated Wilderness Areas Sec .34 A(3) states: "…The preservation of sensitive, rare, threatened, and endangered species dependent on wilderness conditions will be favored".

Sec .34 C(2) also states: "…Vegetative manipulation projects for fish and wildlife purposes may be approved by the State Director on a project by project basis if they do not degrade wilderness character, or if they correct conditions which are a result of human influence, or if the project will promote the perpetuation of a threatened or endangered species".

1999 Owyhee Resource Management Plan - Objective WNES 2 contains the following Management Action related to wilderness management: "…Manage designated wilderness in accordance with enabling legislation and other applicable federal legislation and policies".

Objective SPSS 1 states:
"…Manage special status species and habitats to increase or maintain populations at levels where their existence is no longer threatened and there is no need for listing under the Endangered Species Act of 1973, as amended".

"…Identify, protect, and enhance key sage-grouse habitat and populations".

Record of Decision and Approved Resource Management Plan Amendments (ARMPA) for the Great Basin Region, Including the Greater Sage-Grouse Sub-Regions of Idaho, Southwestern Montana, Nevada, Northeastern California, Oregon, and Utah – September 2015 –

One of the key components of the Greater Sage-Grouse conservation strategy (Sec. 1.6.2) is improving habitat condition and meeting habitat objectives by treating invasive annual grasses and removing encroaching conifers.

This document also states (Sec. 1.3) that conifer encroachment is one of three major threats to Greater Sage-Grouse in Great Basin Region.

Sec 1.4 states: The goal of these RMP amendments are to conserve, enhance, and restore the Greater Sage-Grouse and its habitat, and to provide sufficient regulatory certainty such that the need for listing the species under the ESA could be avoided.

BLM manual 6840 directs that…"The BLM shall carry out management activities consistent with the principals of multiple-use while conserving proposed, candidate, BLM sensitive and State species of special concern and their habitat".

Components of the Action
What are the discrete components or phases of the action?

Component X:	*Example: Transportation of personnel to the project site*
Component 1:	Transportation of personnel to the project site
Component 2:	Methods of juniper removal
Component 3:	Condition of sage brush communities after treatments
Component 4:	

Proceed to the alternatives.

Refer to the **MRDG Instructions** regarding alternatives and the effects to each of the comparison criteria.

MRDG Step 2: Alternatives

Alternative 1: Juniper treatment within wilderness (Non-motorized)

Description of the Alternative
What are the details of this alternative? When, where, and how will the action occur? What mitigation measures will be taken?

Project would remove western juniper in the early-stage encroachment from sage-grouse habitat in the BLM Bruneau and Owyhee Field offices. Removal efforts would focus on early

stage encroachment of juniper which would improve the long-term viability and persistence of sage-grouse and their habitat. For this project, juniper encroachment is considered to be in an early stage when canopy cover of juniper is less than 20%, and there are still adequate densities of shrubs and herbaceous vegetation needed to support sage-grouse.

Juniper removal within wilderness would focus on trees 8" DBH or less, would be flush cut with the ground, would be cut utilizing hand saws, and crews would be on foot. Motorized equipment would not be utilized within wilderness. No jackpot or pile burning would occur in wilderness areas

Component Activities
How will each of the components of the action be performed under this alternative?

Component of the Action		Activity for this Alternative
X	*Example: Transportation of personnel to the project site*	*Example: Personnel will travel by horseback*
1	Transportation of personnel to the project site	Juniper treatment crews working within wilderness areas will travel on foot
2	Methods of juniper removal	Juniper will be flush cut as close to ground as possible. Crews will utilize hand saws only for cutting operations. Only Stage 1 juniper stands will be targeted within wilderness. Additionally, only trees 8" DBH or smaller will be targeted within stands, due to the fact that trees are being cut by hand saws.
3	Condition of sage brush communities after treatments	Removal of juniper will increase shrub production, and increase the understory plant community helping restore ecosystem function and bringing it back to its more natural state.
4		
5		

Wilderness Character
What is the effect of each component activity on the qualities of wilderness character? What mitigation measures will be taken?

UNTRAMMELED

Component Activity for this Alternative		Positive	Negative	No Effect
X	*Example: Personnel will travel by horseback*	☐	☐	☒
1	Juniper treatment crews working within wilderness areas will travel on foot	☐	☐	☒
2	Juniper will be flush cut as close to ground as possible. Crews will utilize hand saws only for cutting operations. Only Stage 1 juniper stands will be targeted within wilderness. Additionally, only trees 8" DBH or smaller will be targeted, due to the fact that trees are being cut by hand saws.	☐	☒	☐
3	Removal of juniper will increase shrub production, and increase the understory plant community helping restore ecosystem function and bringing it back to its more natural state.	☐	☒	☐
4		☐	☐	☐
5		☐	☐	☐
Total Number of Effects				NE
Untrammeled Total Rating		**-2**		

Explain:

The cutting of juniper trees within portions of the wilderness areas would have a slight impact to the untrammeled characteristic by creating a "modern human control", through vegetation manipulation

UNDEVELOPED

Component Activity for this Alternative		Positive	Negative	No Effect
X	*Example: Personnel will travel by horseback*	☐	☐	☒
1	Juniper treatment crews working within wilderness areas will travel on foot	☐	☐	☒
2	Juniper will be flush cut as close to ground as possible. Crews will utilize hand saws only for cutting operations. Only Stage 1 juniper stands will be targeted within wilderness. Additionally, only trees 8" DBH or smaller will be targeted, due to the fact that trees are being cut by hand saws.	☐	☒	☐
3	Removal of juniper will increase shrub production,	☐	☒	☐

	and increase the understory plant community helping restore ecosystem function and bringing it back to its more natural state.			
4		☐	☐	☐
5		☐	☐	☐
Total Number of Effects				NE
Undeveloped Total Rating		**-2**		

Explain:

The hand cutting of juniper trees would indicate a form of modern human occupancy within wilderness, and would be noticeable for the foreseeable future to those visitors within the immediate area. Due to excellent vegetative (those areas containing stage 2 and 3 juniper stands) and topographic screening, project impacts would only be noticeable to visitors within the direct vicinity of the cutting area. Impacts would also be somewhat mitigated by the flush cutting of trees.

NATURAL

Component Activity for this Alternative		Positive	Negative	No Effect
X	*Example: Personnel will travel by horseback*	☐	☐	☒
1	Juniper treatment crews working within wilderness areas will travel on foot	☐	☐	☒
2	Juniper will be flush cut as close to ground as possible. Crews will utilize hand saws only for cutting operations. Only Stage 1 juniper stands will be targeted within wilderness. Additionally, only trees 8" DBH or smaller will be targeted, due to the fact that trees are being cut by hand saws.	☐	☒	☐
3	Removal of juniper will increase shrub production, and increase the understory plant community helping restore ecosystem function and bringing it back to its more natural state.	☒	☐	☐
4		☐	☐	☐
5		☐	☐	☐
Total Number of Effects				NE
Natural Total Rating		**0**		

Explain:

The project would also impact the immediate areas naturalness by leaving an imprint of human work within the wilderness area. However, the project is beneficial to the areas naturalness by aiding in the restoration of the sage brush component, which is a unique value for which the wilderness areas are identified as having.

SOLITUDE OR PRIMITIVE & UNCONFINED RECREATION

Component Activity for this Alternative		Positive	Negative	No Effect
X	*Example: Personnel will travel by horseback*	☐	☐	☒
1	Juniper treatment crews working within wilderness areas will travel on foot	☐	☐	☒
2	Juniper will be flush cut as close to ground as possible. Crews will utilize hand saws only for cutting operations. Only Stage 1 juniper stands will be targeted within wilderness. Additionally, only trees 8" DBH or smaller will be targeted, due to the fact that trees are being cut by hand saws.	☐	☐	☒
3	Removal of juniper will increase shrub production, and increase the understory plant community helping restore ecosystem function and bringing it back to its more natural state.	☐	☐	☒
4		☐	☐	☐
5		☐	☐	☐
Total Number of Effects				NE
Solitude or Primitive & Unconfined Rec. Total Rating		**NE**		

Explain:

Impacts to solitude are considered negligible. Removal of juniper would reduce vegetative screening within phase 1 stands. However, outstanding opportunities for solitude would still exist within phase 2 and 3 juniper stands as well as within river corridors.

OTHER FEATURES OF VALUE - Wildlife

Component Activity for this Alternative		Positive	Negative	No Effect
X	*Example: Personnel will travel by horseback*	☐	☐	☒
1	Juniper treatment crews working within wilderness areas will travel on foot	☐	☐	☒
2	Juniper will be flush cut as close to ground as possible. Crews will utilize hand saws only for cutting	☒	☐	☐

	operations. Only Stage 1 juniper stands will be targeted within wilderness. Additionally, only trees 8" DBH or smaller will be targeted, due to the fact that trees are being cut by hand saws.			
3	Removal of juniper will increase shrub production, and increase the understory plant community helping restore ecosystem function and bringing it back to its more natural state.	☒	☐	☐
4		☐	☐	☐
5		☐	☐	☐
Total Number of Effects		2		NE
Other Features of Value Total Rating		**+2**		

Explain:

The cutting of juniper would restore and maintain suitable sage-grouse and other sagebrush dependent species habitat within the wilderness areas of the Bruneau and Owyhee BLM management areas.

Traditional Skills
What is the effect of each component activity on traditional skills?

TRADITIONAL SKILLS

Component Activity for this Alternative		Positive	Negative	No Effect
X	*Example: Personnel will travel by horseback*	☐	☐	☒
1	Juniper treatment crews working within wilderness areas will travel on foot	☒	☐	☐
2	Juniper will be flush cut as close to ground as possible. Crews will utilize hand saws only for cutting operations. Only Stage 1 juniper stands will be targeted within wilderness. Additionally, only trees 8" DBH or smaller will be targeted, due to the fact that trees are being cut by hand saws.	☒	☐	☐
3	Removal of juniper will increase shrub production, and increase the understory plant community helping restore ecosystem function and bringing it back to its more natural state.	☐	☐	☒
4		☐	☐	☐

5	☐	☐	☐
Total Number of Effects			NE
Traditional Skills Total Rating	**+2**		

Explain:

Traditional skills would be maintained with crews hiking within wilderness, as well as by crews utilizing the minimum tool necessary (hand saws) for project work.

Safety of Visitors & Workers
What is the risk of this alternative to the safety of visitors and workers? What mitigation measures will be taken?

RISK ASSESSMENT	Probability of Accident				
Severity of Accident	Frequent	Likely	Common	Unlikely	Rare
Catastrophic: Death or permanent disability	1 ☐	1 ☐	2 ☐	2 ☐	3 ☒
Critical: Permanent partial disability or temporary total disability	1 ☐	2 ☐	2 ☐	3 ☐	4 ☒
Marginal: Compensable injury or illness, treatment, lost work	2 ☐	3 ☐	3 ☐	4 ☒	4 ☐
Negligible: Superficial injury or illness, first aid only, no lost work	3 ☐	4 ☐	4 ☒	4 ☐	4 ☐
Risk Assessment	**3.75**				

Risk Assessment Code

1 = Extremely High Risk	**2 = High Risk**	**3 = Moderate Risk**	**4 = Low Risk**

Explain:

Project should pose zero risk to visitor safety and only slight risk to operation crews due to the fact that crews will be on foot, utilizing hand saws, and only cutting trees less than 8” DBH.

Summary Ratings for Alternative 1

Wilderness Character	
Untrammeled	-2
Undeveloped	-2
Natural	0

Solitude or Primitive & Unconfined Recreation	NE
Other Features of Value	+2
Wilderness Character Summary Rating	**-2**

Traditional Skills	
Traditional Skills	+2

Safety	
Risk Assessment	3.75

MRDG Step 2: Alternatives

Alternative 2: Juniper treatment within wilderness (Motorized)

Description of the Alternative
What are the details of this alternative? When, where, and how will the action occur? What mitigation measures will be taken?

This Alternative would be similar to Alternative 1, with the difference being that crews would remove all of phase 1 juniper within wilderness, utilize chainsaws for cutting, and travel through wilderness on ATVs and other rubber tired vehicles.

Component Activities
How will each of the components of the action be performed under this alternative?

Component of the Action		Activity for this Alternative
X	*Example: Transportation of personnel to the project site*	*Example: Personnel will travel by horseback*
1	Transportation of personnel to the project site	Juniper removal crews working within wilderness would utilize motorized equipment to travel through wilderness
2	Methods of juniper removal	Juniper will be flush cut as close to ground as possible. Crews will utilize chainsaws for cutting operations.
3	Condition of sage brush communities after treatments	Removal of juniper will increase shrub production, and increase the understory plant community helping restore ecosystem function and bringing it back to its more natural state.
4		
5		

Wilderness Character
What is the effect of each component activity on the qualities of wilderness character? What mitigation measures will be taken?

UNTRAMMELED

Component Activity for this Alternative		Positive	Negative	No Effect
X	*Example: Personnel will travel by horseback*	☐	☐	☒
1	Juniper removal crews working within wilderness would utilize motorized equipment to travel through wilderness	☐	☒	☐
2	Juniper will be flush cut as close to ground as possible. Crews will utilize chainsaws for cutting operations.	☐	☒	☐
3	Removal of juniper will increase shrub production, and increase the understory plant community helping restore ecosystem function and bringing it back to its more natural state.	☐	☐	☒
4		☐	☐	☐
5		☐	☐	☐
Total Number of Effects			-2	NE
Untrammeled Total Rating		**-2**		

Explain:

The cutting of juniper trees within portions of the wilderness areas that contain stage 1 stands would have a slight impact to the untrammeled characteristic by creating a “modern human control”, through vegetation manipulation

UNDEVELOPED

Component Activity for this Alternative		Positive	Negative	No Effect
X	*Example: Personnel will travel by horseback*	☐	☐	☒
1	Juniper removal crews working within wilderness would utilize motorized equipment to travel through wilderness	☐	☒	☐
2	Juniper will be flush cut as close to ground as possible. Crews will utilize chainsaws for cutting operations.	☐	☒	☐
3	Removal of juniper will increase shrub production, and increase the understory plant community helping restore ecosystem function and bringing it back to its more natural state.	☐	☐	☒
4		☐	☐	☐

5		☐	☐	☐
Total Number of Effects			-2	NE
Undeveloped Total Rating		**-2**		

Explain:

The cutting of juniper trees and the use of motorized vehicles would indicate a form of modern human occupancy within wilderness, and would be noticeable for the foreseeable future to those visitors within the immediate area.

NATURAL

Component Activity for this Alternative		Positive	Negative	No Effect
X	*Example: Personnel will travel by horseback*	☐	☐	☒
1	Juniper removal crews working within wilderness would utilize motorized equipment to travel through wilderness	☐	☒	☐
2	Juniper will be flush cut as close to ground as possible. Crews will utilize chainsaws for cutting operations.	☒	☐	☐
3	Removal of juniper will increase shrub production, and increase the understory plant community helping restore ecosystem function and bringing it back to its more natural state.	☐	☒	☐
4		☐	☐	☐
5		☐	☐	☐
Total Number of Effects			-3	NE
Natural Total Rating		**-2**		

Explain:

The cutting of juniper trees and the evidence or motorized use would impact the immediate areas naturalness by leaving an imprint of human work within the wilderness area. Project work would be noticeable for the foreseeable future to those visitors within the immediate area.

SOLITUDE OR PRIMITIVE & UNCONFINED RECREATION

Component Activity for this Alternative		Positive	Negative	No Effect
X	*Example: Personnel will travel by horseback*	☐	☐	☒

1	Juniper removal crews working within wilderness would utilize motorized equipment to travel through wilderness	☐	☒	☐
2	Juniper will be flush cut as close to ground as possible. Crews will utilize chainsaws for cutting operations.	☐	☒	☐
3	Removal of juniper will increase shrub production, and increase the understory plant community helping restore ecosystem function and bringing it back to its more natural state.	☐	☐	☒
4		☐	☐	☐
5		☐	☐	☐
Total Number of Effects			-2	NE
Solitude or Primitive & Unconfined Rec. Total Rating		**-2**		

Explain:

Motor vehicle use and the use of chainsaws disrupt wilderness solitude. Juniper stands with ≥10% canopy cover would not be treated; therefore outstanding opportunities for solitude or primitive and unconfined recreation would still exist within wilderness.

OTHER FEATURES OF VALUE - Wildlife

Component Activity for this Alternative		Positive	Negative	No Effect
X	*Example: Personnel will travel by horseback*	☐	☐	☒
1	Juniper removal crews working within wilderness would utilize motorized equipment to travel through wilderness	☐	☒	☐
2	Juniper will be flush cut as close to ground as possible. Crews will utilize chainsaws for cutting operations.	☒	☐	☐
3	Removal of juniper will increase shrub production, and increase the understory plant community helping restore ecosystem function and bringing it back to its more natural state.	☒	☐	☐
4		☐	☐	☐
5		☐	☐	☐
Total Number of Effects		+2	-1	NE

Other Features of Value Total Rating	**+1**

Explain:

The cutting of juniper would restore, improve, and maintain suitable sage-grouse habitat within the Bruneau and Owyhee BLM management areas.

Traditional Skills
What is the effect of each component activity on traditional skills?

TRADITIONAL SKILLS

	Component Activity for this Alternative	Positive	Negative	No Effect
X	*Example: Personnel will travel by horseback*	☐	☐	☒
1	Juniper removal crews working within wilderness would utilize motorized equipment to travel through wilderness	☐	☒	☐
2	Juniper will be flush cut as close to ground as possible. Crews will utilize chainsaws for cutting operations.	☐	☒	☐
3	Removal of juniper will increase shrub production, and increase the understory plant community helping restore ecosystem function and bringing it back to its more natural state.	☐	☐	☒
4		☐	☐	☐
5		☐	☐	☐
Total Number of Effects			-2	NE
Traditional Skills Total Rating		**-2**		

Explain:

The use of motorized and mechanized equipment would not maintain traditional uses.

Safety of Visitors & Workers
What is the risk of this alternative to the safety of visitors and workers? What mitigation measures will be taken?

RISK ASSESSMENT	Probability of Accident				
Severity of Accident	Frequent	Likely	Common	Unlikely	Rare

Catastrophic: Death or permanent disability	1 ☐	1 ☐	2 ☐	2 ☐	3 ☒
Critical: Permanent partial disability or temporary total disability	1 ☐	2 ☐	2 ☐	3 ☒	4 ☐
Marginal: Compensable injury or illness, treatment, lost work	2 ☐	3 ☐	3 ☒	4 ☐	4 ☐
Negligible: Superficial injury or illness, first aid only, no lost work	3 ☐	4 ☒	4 ☐	4 ☐	4 ☐
Risk Assessment	**3.25**				

Risk Assessment Code

1 = Extremely High Risk	**2 = High Risk**	**3 = Moderate Risk**	**4 = Low Risk**

Explain:

Risk to visitor safety would be negligible. With experienced and trained personnel conducting operations, the risk utilizing motorized and mechanized equipment during transportation and cutting operations should be moderate.

Summary Ratings for Alternative 2

Wilderness Character	
Untrammeled	-2
Undeveloped	-2
Natural	-2
Solitude or Primitive & Unconfined Recreation	-2
Other Features of Value	+1
Wilderness Character Summary Rating	**-7**

Traditional Skills	
Traditional Skills	-2

Safety	
Risk Assessment	3.25

MRDG Step 2: Alternatives

Alternative 3: Juniper treatment within wilderness using prescribed fire

Description of the Alternative
What are the details of this alternative? When, where, and how will the action occur? What mitigation measures will be taken?

Under this alternative the BLM would use prescribed fire for the removal of juniper within wilderness. Stage one juniper stands would continue to be the main target under this alternative. Burning would typically occur in the fall (October) as conditions permit. Ignition methods could vary from hand crews utilizing drip torches to aerial tactics such as heli-torches. Crews would prep the wilderness areas with black lining and cutting to attempt to secure fire perimeters in advance of burning operations.

Component Activities
How will each of the components of the action be performed under this alternative?

Component of the Action		Activity for this Alternative
X	*Example: Transportation of personnel to the project site*	*Example: Personnel will travel by horseback*
1	Transportation of personnel to the project site	Crews would be required to walk within wilderness areas. If aerial tactics such as a heli-torch are utilized, aircraft would land and refuel outside of wilderness.
2	Methods of juniper removal	Fire would be used for juniper treatment. During preparations for the burn, crews may also need to remove juniper with saws to attempt to secure a fire line perimeter. Hand saws would be used as much as possible; however, for trees greater than 8”, chainsaws would be required. Fire may also escape the planned perimeter in which case would need to be stopped as soon as possible to eliminate further vegetation loss. This may require further cutting, hand lines, and aircraft.

3	Condition of sage brush communities after treatments	Removal of juniper itself would increase shrub production, and increase the understory plant community helping restore ecosystem function and bringing it back to its more natural state. However, the use of fire will not only eliminate juniper but the existing shrub and grass communities within the planned burned areas as well. Additionally, there's a chance that the prescribed fire escapes and burns into the stage 2 and 3 juniper stands as well as eliminates other vegetation within wilderness.
4		
5		

Wilderness Character
What is the effect of each component activity on the qualities of wilderness character? What mitigation measures will be taken?

UNTRAMMELED

Component Activity for this Alternative		Positive	Negative	No Effect
X	*Example: Personnel will travel by horseback*	☐	☐	☒
1	Crews would be required to walk within wilderness areas. If aerial tactics such as a heli-torch are utilized, aircraft would land and refuel outside of wilderness.	☐	☐	☒
2	Fire would be used for juniper treatment. During preparations for the burn, crews may also need to remove juniper with saws to attempt to secure a fire line perimeter. Hand saws would be used as much as possible; however, for trees great than 8", chainsaws would be required. Fire may also escape the planned perimeter in which case would need to be stopped as soon as possible to eliminate further vegetation loss. This may require further cutting, hand lines, and aircraft.	☐	☒	☐
3	Removal of juniper itself would increase shrub production, and increase the understory plant community helping restore ecosystem function and	☐	☒	☐

	bringing it back to its more natural state. However, the use of fire will not only eliminate juniper but the existing shrub and grass communities within the planned burned areas as well. Additionally, there's a chance that the prescribed fire escapes and burns into the stage 2 and 3 juniper stands as well as eliminates other vegetation within wilderness.			
4		☐	☐	☐
5		☐	☐	☐
Total Number of Effects			-2	NE
Untrammeled Total Rating		**-2**		

Explain:

While the use of fire would give a more natural appearance within the wilderness, the cutting of vegetation during preparations and even possibly during burning operations would have an impact to the untrammeled characteristic by creating a "modern human control", through vegetation manipulation. The creation of hand line trenches to attempt to stop fire from progressing, in the event that fire escapes the burn perimeter, would also impact the untrammeled character.

UNDEVELOPED

Component Activity for this Alternative		Positive	Negative	No Effect
X	*Example: Personnel will travel by horseback*	☐	☐	☒
1	Crews would be required to walk within wilderness areas. If aerial tactics such as a heli-torch are utilized, aircraft would land and refuel outside of wilderness.	☐	☐	☒
2	Fire would be used for juniper treatment. During preparations for the burn, crews may also need to remove juniper with saws to attempt to secure a fire line perimeter. Hand saws would be used as much as possible; however, for trees great than 8", chainsaws would be required. Fire may also escape the planned perimeter in which case would need to be stopped as soon as possible to eliminate further vegetation loss. This may require further cutting, hand lines, and aircraft.	☐	☒	☐
3	Removal of juniper itself would increase shrub	☐	☒	☐

	production, and increase the understory plant community helping restore ecosystem function and bringing it back to its more natural state. However, the use of fire will not only eliminate juniper but the existing shrub and grass communities within the planned burned areas as well. Additionally, there's a chance that the prescribed fire escapes and burns into the stage 2 and 3 juniper stands as well as eliminates other vegetation within wilderness.			
4		☐	☐	☐
5		☐	☐	☐
Total Number of Effects			-2	NE
Undeveloped Total Rating		**-2**		

Explain:

The hand cutting of juniper trees would indicate a form of modern human occupancy within wilderness, and would be noticeable for the foreseeable future to those visitors within the immediate area. In the event that fire escapes the burn perimeter, the creation of hand line trenches to attempt to stop fire from progressing, would also impact the undeveloped character. The use of aircraft to set fire is a form of modern human occupancy.

NATURAL

Component Activity for this Alternative		Positive	Negative	No Effect
X	*Example: Personnel will travel by horseback*	☐	☐	☒
1	Crews would be required to walk within wilderness areas. If aerial tactics such as a heli-torch are utilized, aircraft would land and refuel outside of wilderness.	☐	☐	☒
2	Fire would be used for juniper treatment. During preparations for the burn, crews may also need to remove juniper with saws to attempt to secure a fire line perimeter. Hand saws would be used as much as possible; however, for trees great than 8", chainsaws would be required. Fire may also escape the planned perimeter in which case would need to be stopped as soon as possible to eliminate further vegetation loss. This may require further cutting, hand lines, and aircraft.	☐	☒	☐
3	Removal of juniper itself would increase shrub	☐	☒	☐

	production, and increase the understory plant community helping restore ecosystem function and bringing it back to its more natural state. However, the use of fire will not only eliminate juniper but the existing shrub and grass communities within the planned burned areas as well. Additionally, there's a chance that the prescribed fire escapes and burns into the stage 2 and 3 juniper stands as well as eliminates other vegetation within wilderness.			
4		☐	☐	☐
5		☐	☐	☐
Total Number of Effects			-2	NE
Natural Total Rating		**-2**		

Explain:

While the use of fire would give a more natural appearance within the wilderness, the cutting of vegetation during preparations and even possibly during burning operations would have an impact on the areas naturalness by leaving an imprint of human work within the wilderness. Removal of juniper itself would increase shrub production, and increase the understory plant community helping restore ecosystem function and bringing it back to its more natural state. However, the use of fire will not only eliminate juniper but the existing shrub and grass communities within the planned burned areas as well. Additionally, there's a chance that the prescribed fire escapes and burns into the stage 2 and 3 juniper stands as well as eliminates other vegetation within wilderness. This would negatively impact the areas natural ecological system until the brush/sage component, which is a unique feature of the wilderness areas, can reestablish itself which could take up to 20 years.

SOLITUDE OR PRIMITIVE & UNCONFINED RECREATION

Component Activity for this Alternative		Positive	Negative	No Effect
X	*Example: Personnel will travel by horseback*	☐	☐	☒
1	Crews would be required to walk within wilderness areas. If aerial tactics such as a heli-torch are utilized, aircraft would land and refuel outside of wilderness.	☐	☒	☐
2	Fire would be used for juniper treatment. During preparations for the burn, crews may also need to remove juniper with saws to attempt to secure a fire line perimeter. Hand saws would be used as much as possible; however, for trees great than 8",	☐	☒	☐

	chainsaws would be required. Fire may also escape the planned perimeter in which case would need to be stopped as soon as possible to eliminate further vegetation loss. This may require further cutting, hand lines, and aircraft.			
3	Removal of juniper itself would increase shrub production, and increase the understory plant community helping restore ecosystem function and bringing it back to its more natural state. However, the use of fire will not only eliminate juniper but the existing shrub and grass communities within the planned burned areas as well. Additionally, there's a chance that the prescribed fire escapes and burns into the stage 2 and 3 juniper stands as well as eliminates other vegetation within wilderness.	☐	☒	☐
4		☐	☐	☐
5		☐	☐	☐
Total Number of Effects			-3	NE
Solitude or Primitive & Unconfined Rec. Total Rating			**-3**	

Explain:

Aerial operations such as low flying aircraft hovering above junipers and torching the trees, if utilized would negatively impact solitude within wilderness. Additionally, the use of chainsaws for preparation work or firefighting, if the burn were to escape the planned perimeter would also negatively impact visitor solitude. If fire does escape the planned perimeter and burns into Stage 2 and 3 juniper stands, the loss of this vegetation would further reduce the opportunities for solitude within the wilderness, as vegetative and topographic screening play a key role in providing for these outstanding opportunities. While burning operations are conducted, visitors would also be limited or restricted from these areas for extended periods of time, reducing the opportunities for unconfined recreation.

OTHER FEATURES OF VALUE - Wildlife

Component Activity for this Alternative		Positive	Negative	No Effect
X	*Example: Personnel will travel by horseback*	☐	☐	☒
1	Crews would be required to walk within wilderness areas. If aerial tactics such as a heli-torch are utilized, aircraft would land and refuel outside of wilderness.	☐	☐	☒
2	Fire would be used for juniper treatment. During	☐	☒	☐

	preparations for the burn, crews may also need to remove juniper with saws to attempt to secure a fire line perimeter. Hand saws would be used as much as possible; however, for trees great than 8", chainsaws would be required. Fire may also escape the planned perimeter in which case would need to be stopped as soon as possible to eliminate further vegetation loss. This may require further cutting, hand lines, and aircraft.			
3	Removal of juniper itself would increase shrub production, and increase the understory plant community helping restore ecosystem function and bringing it back to its more natural state. However, the use of fire will not only eliminate juniper but the existing shrub and grass communities within the planned burned areas as well. Additionally, there's a chance that the prescribed fire escapes and burns into the stage 2 and 3 juniper stands as well as eliminates other vegetation within wilderness.	☐	☒	☐
4		☐	☐	☐
5		☐	☐	☐
Total Number of Effects			-2	NE
Other Features of Value Total Rating		**-2**		

Explain:

While the use of fire would eliminate Stage 1 juniper within sage-grouse habitat, and potentially Stage 2 and 3 juniper stands as well, the use of fire would also eliminate the existing sagebrush-steppe ecosystem further degrading suitable sage-grouse habitat.

Traditional Skills
What is the effect of each component activity on traditional skills?

TRADITIONAL SKILLS

Component Activity for this Alternative		Positive	Negative	No Effect
X	*Example: Personnel will travel by horseback*	☐	☐	☒
1	Crews would be required to walk within wilderness areas. If aerial tactics such as a heli-torch are utilized, aircraft would land and refuel outside of	☒	☐	☐

	wilderness.			
2	Fire would be used for juniper treatment. During preparations for the burn, crews may also need to remove juniper with saws to attempt to secure a fire line perimeter. Hand saws would be used as much as possible; however, for trees great than 8", chainsaws would be required. Fire may also escape the planned perimeter in which case would need to be stopped as soon as possible to eliminate further vegetation loss. This may require further cutting, hand lines, and aircraft.	☐	☒	☐
3	Removal of juniper itself would increase shrub production, and increase the understory plant community helping restore ecosystem function and bringing it back to its more natural state. However, the use of fire will not only eliminate juniper but the existing shrub and grass communities within the planned burned areas as well. Additionally, there's a chance that the prescribed fire escapes and burns into the stage 2 and 3 juniper stands as well as eliminates other vegetation within wilderness.	☐	☐	☒
4		☐	☐	☐
5		☐	☐	☐
Total Number of Effects		+1	-1	NE
Traditional Skills Total Rating		**0**		

Explain:

A crew hiking within wilderness helps maintain traditional skills; however, the use of motorized and mechanized equipment would not maintain traditional uses.

Safety of Visitors & Workers
What is the risk of this alternative to the safety of visitors and workers? What mitigation measures will be taken?

RISK ASSESSMENT	Probability of Accident				
Severity of Accident	Frequent	Likely	Common	Unlikely	Rare
Catastrophic: Death or permanent disability	1 ☐	1 ☐	2 ☐	2 ☒	3 ☐

Critical: Permanent partial disability or temporary total disability	1 ☐	2 ☐	2 ☐	3 ☒	4 ☐
Marginal: Compensable injury or illness, treatment, lost work	2 ☐	3 ☒	3 ☐	4 ☐	4 ☐
Negligible: Superficial injury or illness, first aid only, no lost work	3 ☒	4 ☐	4 ☐	4 ☐	4 ☐
Risk Assessment	**2.75**				

Risk Assessment Code

1 = Extremely High Risk	**2 = High Risk**	**3 = Moderate Risk**	**4 = Low Risk**

Explain:

Risk level under this alternative would increase for both visitors and workers. The presence of fire even on a controlled burn has potential risks for workers, and in the event the fire escapes control and becomes a wildfire, the general public within the area becomes at risk as well. Workers are also exposed to higher levels of risk when dealing with motorized equipment such as chainsaws and aircraft.

Summary Ratings for Alternative 3

Wilderness Character	
Untrammeled	-2
Undeveloped	-2
Natural	-2
Solitude or Primitive & Unconfined Recreation	-3
Other Features of Value	-2
Wilderness Character Summary Rating	**-11**

Traditional Skills	
Traditional Skills	0

Safety	
Risk Assessment	2.75

MRDG Step 2: Alternative Comparison

Alternative 1:	**Juniper treatment within wilderness (Non-motorized)** Project would remove western juniper in the early-stage encroachment from sage-grouse habitat in the BLM Bruneau and Owyhee Field offices. Removal efforts would focus on early stage encroachment of juniper which would improve the long-term viability and persistence of sage-grouse. For this project, juniper encroachment is considered to be in an early stage when canopy cover of juniper is less than 20%, and there are still adequate densities of shrubs and herbaceous vegetation needed to support sage-grouse. Juniper removal within wilderness would focus on trees 8" DBH or less, would be flush cut with the ground, would be cut utilizing hand saws, and crews would be on foot. Motorized equipment would not be utilized within wilderness.
Alternative 2:	**Juniper treatment within wilderness (Motorized)** This Alternative would be similar to Alternative 1, with the difference being that crews would remove all of Stage 1 juniper within wilderness, utilize chainsaws for cutting, and travel through wilderness on ATVs and other rubber tired vehicles for efficiency.
Alternative 3:	**Juniper treatment within wilderness using prescribed fire** Under this alternative the BLM would use prescribed fire for the removal of juniper within wilderness. Stage 1 juniper stands would continue to be the main target under this alternative. Burning would typically occur in the fall (October) as conditions permit. Ignition methods could vary from hand crews utilizing drip torches to aerial tactics such as heli-torches. Crews would prep the wilderness areas with black lining and cutting to attempt to secure fire perimeters in advance of burning operations.

Wilderness Character	Alternative 1		Alternative 2		Alternative 3			
	+	-	+	-	+	-		

Untrammeled		-2		-2		-2		
Undeveloped		-2		-2		-2		
Natural		0		-2		-2		
Solitude/Primitive/Unconfined	NE	NE		-2		-3		
Other Features of Value	+2		+1			-2		
Total Number of Effects	+2	-6	+1	-8	NE	-11		
Wilderness Character Rating	**-2**		**-7**		**-11**			

Traditional Skills	Alternative 1		Alternative 2		Alternative 3			
	+	-	+	-	+	-		
Traditional Skills	+2			-2	+1	-1		
Traditional Skills Rating	**+2**		**-2**		**0**			

Safety of Visitors & Workers	Alternative 1	Alternative 2	Alternative 3	
Risk Assessment	3.75	3.25	2.75	

MRDG Step 2: Determination

Refer to the **MRDG Instructions** before identifying the selected alternative and explaining the rationale for the selection.

Selected Alternative - Juniper treatment within wilderness (Non-motorized)

☒	Alternative 1:	**Juniper treatment within wilderness (Non-motorized)** Project would remove western juniper in the early-stage encroachment from sage-grouse habitat in the BLM Bruneau and Owyhee Field offices. Removal efforts would focus on early stage encroachment of juniper which would improve the long-term viability and persistence of sage-grouse. For this project, juniper encroachment is considered to be in an early stage when canopy cover of juniper is less than 20%, and there are still adequate densities of shrubs and herbaceous vegetation needed to support sage-grouse. Juniper removal within wilderness would focus on trees 8" DBH or less, would be flush cut with the ground, would be cut utilizing hand saws, and crews would be on foot. Motorized equipment would not be utilized within wilderness.
☐	Alternative 2:	Juniper treatment within wilderness (Motorized)
☐	Alternative 3:	Juniper treatment within wilderness using prescribed fire
☐		

Explain Rationale for Selection:

The selection of Alternative 1, was based upon the perpetuation of a sensitive species that is a key feature within the wilderness areas. Sage-grouse and suitable sage-grouse habitat are some of the unique features that were identified in the designation of these wilderness areas, and continued degradation of this species and its habitat are unacceptable. The citation of Article VIII says the species "shall be protected as completely as possible", which is what this alternative was designed to accomplish with the least impacts to wilderness character. Alternative 1 would help restore greater sage-grouse habitat within the wilderness which is critical to the survival and perpetuation of this special status species.

This alternative is in compliance with BLM manuals 6840 and 8560, the Owyhee Resource Management Plan, Idaho Sage-grouse Management Plan, as well as the recently completed ARMPA.

Describe Monitoring & Reporting Requirements:

BLM personnel will monitor throughout the duration of the project, ensuring crews conduct work on foot within wilderness, that only trees less than 8” are removed from Stage 1 juniper stands, and that trees are removed with handsaws only.

Approvals

Which of the prohibited uses found in Section 4(c) of the Wilderness Act are approved in the selected alternative and for what quantity?

	Prohibited Use	Quantity
☒	Mechanical Transport:	NA
☒	Motorized Equipment:	NA
☒	Motor Vehicles:	NA
☒	Motorboats:	NA
☒	Landing of Aircraft:	NA
☒	Temporary Roads:	NA
☒	Structures:	NA
☒	Installations:	NA

Refer to agency policies for the following review and decision authorities:

☐	Name	Position

	Ryan Homan	ORP	
	Signature		Date

Recommended	Name	Position	
	Signature		Date

Recommended	Name	Position	
	Signature		Date

Approved	Name	Position	
	Signature		Date