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Environmental Assessment

Goose Creek Sage-Grouse Habitat Restoration Project

Minidoka Ranger District
Sawtooth National Forest
Cassia County, Idaho

Photo by Ralph Maughan

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Table of Contents

Table of Contents ..... **i**
Chapter 1– Purpose and Need **1-4**
1.1 Introduction 1-4
1.2 Background 1-4
1.3 Project Area Description 1-5
1.4 Purpose and Need for Action 1-7
Chapter 2– Objectives of the Goose Creek Sage-Grouse Habitat Restoration Project 2-8
2.1 Consistency with Laws, Regulations, and Policy 2-16
2.2 Management Framework 2-17
2.2.1 Endangered Species Act 2-17
2.2.2 Tribal Consultation 2-17
2.2.3 National Historic Preservation Act 2-17
2.2.4 Migratory Bird Treaty Act 2-17
2.2.5 Environmental Justice 2-18
2.2.6 Inventoried Roadless Areas 2-18
2.2.7 Research Natural Areas / Recommended Wilderness 2-18
2.3 Decision Framework 2-18
2.4 Public Involvement 2-19
2.5 Identification of Issues 2-20
2.5.1 Issues Analyzed in Detail 2-20
2.5.2 Issues Not Analyzed in Detail 2-20
Alternatives **2-22**
2.6 Alternative Considered in Detail 2-23
2.6.1 Alternative 1: No Action 2-23
2.6.2 Alternative 2: Proposed Action 2-23
2.6.3 Alternative 3: Hand Only Treatment Alternative 2-25
2.7 Features Common to All Action Alternatives 2-27
2.8 Implementation Strategy 2-27
2.9 Maintenance of Treatments 2-27
2.10 Adaptive Management 2-27
2.10.1 Project Design Features and Best Management Practices 2-28
2.11 Alternatives Considered but Dismissed from Detailed Analysis 2-33

2.11.1 Alternative 1: 2-33
2.11.2 Rationale for Dismissal 2-33
2.11.3 Alternative 2: 2-34
2.11.4 Rationale for Dismissal 2-34
2.11.5 Alternative 3: 2-34
2.11.6 Rationale for Dismissal 2-34
2.11.7 Alternative 4: 2-34
2.11.8 Rationale for Dismissal 2-34
2.12 Comparison of Alternatives 2-35
Chapter 3– Affected Environment 39
3.1 Introduction 39
3.2 Wildlife and Terrestrial Habitat 39
3.2.1 Affected Environment and Existing Conditions 39
3.3 Key Issue – Non Target Species 3-79
3.4 Fire and Fuels 3-84
3.4.1 Affected Environment and Existing Conditions 3-84
3.5 Native Plant Communities and TECWS Plants- Affected Environment and Existing Conditions 3-89
Native Vegetation Communities 3-89
3.6 SAGEBRUSH COMMUNITIES 3-92
3.7 ESA LISTED PLANT SPECIES 3-93
3.8 REGIONAL FORESTER'S SENSITIVE AND FOREST WATCH PLANT SPECIES 3-93
3.8.1 Forester's Sensitive Plant Species 3-94
NON-NATIVE INVASIVE NOXIOUS (WEED) PLANT SPECIES 3-96
3.9 Soils 3-98
3.9.1 Affected Environment and Existing Conditions 3-98
3.10 Key Issue #2 Soils 3-100
Chapter 4– Environmental Consequences and Cumulative Effects 4-104
4.1.1 Environmental Consequences 4-104
4.2 Key Issue #1-Non Target Species 4-107
4.2.1 Past, Present and Reasonably Foreseeable Actions within the Cumulative Assessment Area (CAA) 4-112
4.2.3 Cumulative Effects to Non Target Key Species 4-115
4.3.1.1 No Action Alternative 4-116

4.3.1.2 Proposed Action Alternative 4-116
Environmental Consequences- Native Plant Communities and TECSW Plants 4-120
4.3 NATIVE PLANT COMMUNITIES 4-122
4.4 REGIONAL FORESTER'S SENSITIVE AND FOREST WATCH PLANT SPECIES 4-123
4.4.2 Forest Watch Plant Species 4-124
4.5 (KEY ISSUE) NON-NATIVE INVASIVE NOXIOUS (WEED) PLANT SPECIES 4-126
4.6 Key Issue #2—Soils 4-130
Consultation and Coordination 4-136
Interdisciplinary Team 4-136
Federal, State, and Local Agencies: 4-136
Chapter 5– Appendix A – Monitoring 5-139

Chapter 1– Purpose and Need

1.1 Introduction

The greater sage-grouse (*Centrocercus urophasianus*) is a sage-steppe obligate wildlife species that is being adversely affected by a myriad of different stressors including the encroachment of juniper into sagebrush communities. Within the Cassia Division of the Minidoka Ranger District, juniper encroachment is a high risk factor threat to maintaining sage-grouse populations and their habitats due to behavioral avoidance of juniper and conversion of sagebrush communities to woodland communities.

In September 2015, the Bureau of Land Management (BLM) and United States Forest Service (USFS) released a Final Environmental Impact Statement (FEIS) and Record of Decision (ROD) titled the Greater Sage-Grouse Record of Decision that amended the land use plans across 11 states for both agencies for offices that managed Greater sage-grouse habitat. The land use plan amendments is an effort to implement proactive conservation measures to avoid a listing of sage-grouse under the Endangered Species Act (ESA). In October 2015, the United States Fish and Wildlife Service (USFWS) determined that listing of sage-grouse under the ESA was not warranted. One of the conservation strategies in the ROD directs the BLM and USFS to reduce juniper encroachment in sage-grouse habitats to maintain and enhance sagebrush communities for Greater sage-grouse. In 2017, the BLM and USFS issued a Notice of Intent to look whether or not to revise the Land Use Plans that were completed in 2015. That process is ongoing.

The Sawtooth National Forest completed a Fire and Invasive Species Assessment Tool (FIAT) Analysis in 2015 and completed a Third Order Sage Grouse Habitat Assessment Framework Seasonal Habitat Map; which both identified the Goose Creek area as a priority for sage-grouse habitat restoration. Goose Creek has a large amount of juniper encroachment and relatively large expanses of sage-grouse habitat in and adjacent to the project area. This project is a USFS proposal to meet conservation goals outlined in the ROD as they relate to sagebrush habitat enhancement and restoration in habitats that are encroached by juniper.

1.2 Background

Utah juniper (*Juniperus osteosperma*) is widely scattered throughout the Goose Creek area and the Intermountain West, where vegetation community composition is heavily influenced by historic patterns of wildfire. Historically, juniper existed in a continuum of densities throughout the landscape, characterized by two stand types: juniper woodlands and juniper savanna. Juniper woodlands typically existed in areas of rocky, shallow soils surrounded by limited fine fuels. In these areas, fire intervals were infrequent. Juniper woodland habitats can be found at elevations ranging from sea level to above 10,000 feet above mean sea level (MSL). They generally form transitional habitats, depending on elevation and precipitation. It is estimated that less than 10 percent of existing western juniper individuals established prior to the 1870's (USDI–BLM 1990, Miller et al. 1999a, Johnson 2005). Juniper savanna is typically open with high cover of perennial bunch grasses and forbs. Young trees colonize into sage steppe communities from the fire-safe

sites with densities inversely related to distance from the fire-safe sites as wildfire killed the invading juniper trees.

Within the project area juniper exists in stands of dense juniper which has spread across the landscape and into areas such as mountain big sagebrush communities and mountain shrub communities. These vegetation communities prior to European settlement burned on a more frequent fire return interval, which causes mortality to young encroaching juniper and maintained juniper primarily on sites that were relatively fire safe and had long fire return intervals, often exceeding 200 years.

Introduction of domestic livestock grazing over 140 years ago reduced the fine fuels needed to carry wildfires, and active fire suppression decreased the size of fires that did start (USFS 2008). As a result of decreased fire frequency and extent, juniper expansion has accelerated during the last century. Now many juniper communities display greater than 21 percent crown closure within areas that would have typically supported low-density juniper woodland. In these areas, understory shrubs and herbaceous species have declined, resulting in expanses of bare ground and a loss of key ecosystem components for function. Juniper has also expanded into areas that typically would not have a juniper plant community component due to a more frequent fire return interval. This is most commonly seen in the more productive mountain big sagebrush and mountain shrub vegetation communities.

As the density of juniper increases, large portions of the sage-steppe ecosystem are being altered. In areas with relatively high densities of juniper, vegetative communities have shifted from sagebrush dominated shrub-steppe to juniper woodlands. This shift in vegetative communities has resulted in a loss of biodiversity on the landscape, diminished habitat values (particularly for sage-steppe obligate species), and has contributed to degraded surface hydrologic conditions. Increased juniper density in sage-steppe habitats also results in decreased ground cover and increased exposure of bare soils, resulting in increased erosion potential and a loss of soil productivity. Changes and increases in fuel loading due to juniper encroachment can result in uncharacteristic high intensity wildfire, which coupled with degraded herbaceous and shrub understory composition often leads to sage-steppe communities converting juniper dominated sites which then can convert to annual grasslands following a high intensity wildfire. This is especially problematic in lower elevation precipitation zones, warm-dry soils and southerly aspects.

1.3 Project Area Description

This project is located in south-central Idaho in the Cassia Division (South Hills area), west of the town of Oakley, in Cassia County, Idaho, on the USFS Minidoka Ranger District. See Figure 1-1 and Figure 1-2 below. The project is contained in the Upper, Middle and Lower Goose Creek 5th level HUC watersheds, primarily contained within the Trapper Creek and Beaverdam Creek drainages.

Figure 1-1. Vicinity map

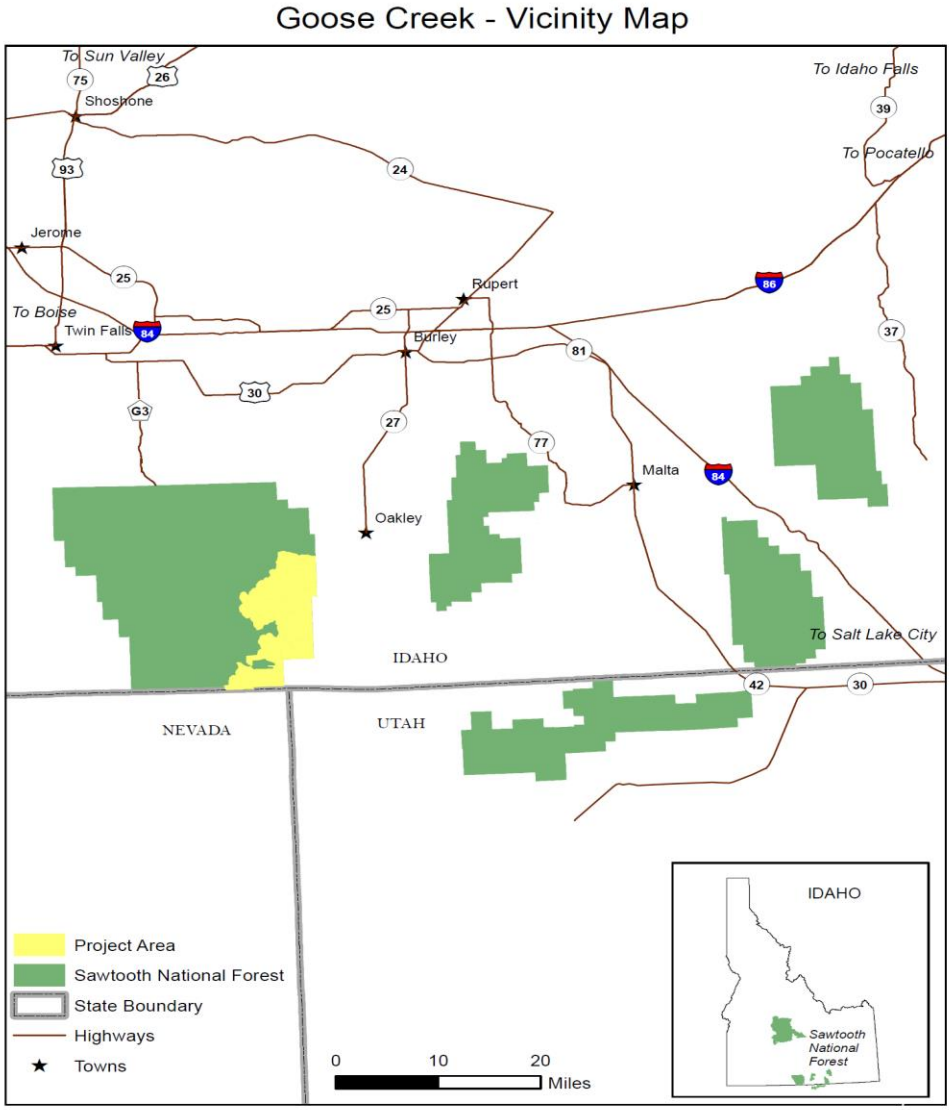
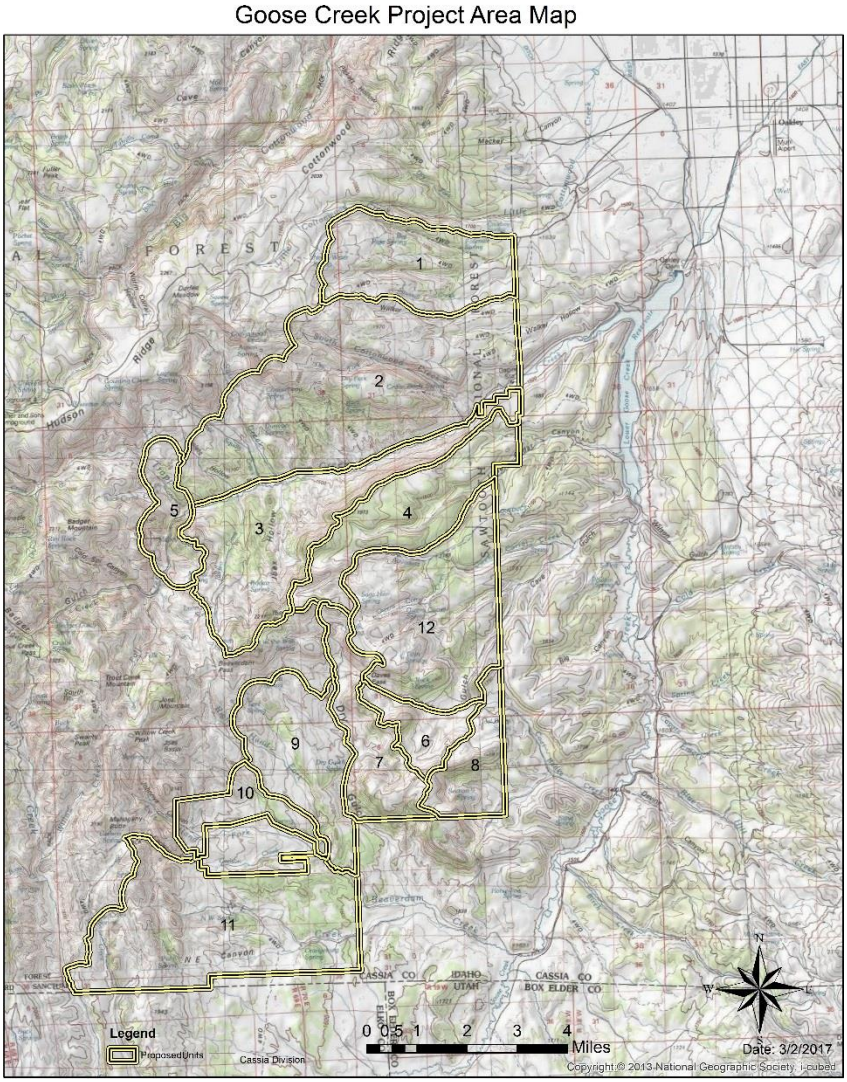


Figure 1-2. Project Area map



1.4 Purpose and Need for Action

The purpose of the action is to implement proactive habitat treatments to maintain healthy and resilient sage-steppe landscapes by: reducing juniper that has encroached into sage-grouse habitat, restoring vegetation conditions that resemble historic plant community mosaics, maintain large blocks of connected habitat, and reducing risks of uncharacteristic wildfire associated with high fuel loading from juniper encroachment that can result in a long term loss of productivity in sage-grouse habitat. The overarching goal of this project is to implement treatments that will improve sage-grouse nesting and brood rearing habitat in the Goose Creek area and adjacent to areas where known sage-grouse leks (breeding areas) are located or known sage-grouse use occurs. Treatments will enhance sage-steppe communities for other wildlife species such as mule deer, elk and other sagebrush steppe species that are negatively impacted by the loss of the herbaceous and shrub understory.

The need for the action is to address juniper encroachment within sage-grouse habitat where encroachment is threatening important sage grouse habitat and to ensure large blocks of habitat remain intact and connected and are not fragmented and disconnected by juniper encroachment. This need was identified as one of the conservation goals and direction in the Greater Sage-Grouse Record of Decision.

Chapter 2–Objectives of the Goose Creek Sage-Grouse Habitat Restoration Project

- Maintain sage-grouse habitat by implementing juniper reduction projects that will ensure adequate sagebrush cover and connectivity between seasonal habitats for sage-grouse.
- Improve connectivity of sage-grouse habitats and populations across ownership boundaries and across the landscape.
- Increase or maintain sagebrush cover greater than 15 percent on Wyoming and mountain big sagebrush sites within the project area.
- Maintain and improve sage-steppe habitat conditions for a myriad of species, including species such as mule deer and other sage-steppe obligate species.
- Improve the ecological health (i.e. resilience and resistance) of sites currently encroached by juniper to provide for improved sagebrush habitat and reduce the risk of transitioning to an annual grassland in the event of a wildfire.
- Maintain old growth or historic juniper woodlands on portions of the landscape where they occur to maintain their value to wildlife species for thermal cover and for species that use juniper for successful completion of their life cycle.
- Reduce fuel loading and fuel continuity in sage-grouse habitat to reduce the risk of uncharacteristic large wildfires in sage-grouse habitat and maintain large functional blocks of habitat.

Forest Plan and Greater Sage Grouse Plan Objectives and Direction

This action responds to the goals and objectives outlined in the 2012 Forest Plan and the 2015 Greater Sage-Grouse Plan, which amended the 2012 Forest Plan. This project helps move the project area towards desired conditions described in those plans. The need for this action includes:

- **GRSG-GRSGH-O-026-Objective** – Every 10 years for the next 50 years, improve greater sage-grouse habitat by removing invading conifers and other undesirable species based upon the number of acres shown in table 2. (Greater Sage Grouse Idaho & Southwest Montana Plan Amendment, 81**)**

Table 2-1. *Treatment Acres per Decade.*[1]

FOREST	MECHANICAL[2]	PRESCRIBED FIRE[3]	GRASS RESTORATION[4]
Boise	1000	2000	0
Caribou-Targhee-Curlew	3000	2000	3000
Salmon-Challis	5000	1000	0
Sawtooth	7000	1000	7000
Beaverhead-Deerlodge	0	0	0

[1]These are estimates of treatments required to achieve and/or maintain desired habitat conditions over a period of 10 years. There are many dynamic and highly variable disturbances that may happen over that period of time that could have a significant effect on the amount, type, and timing of treatment needed. Those disturbances are factored into the 10-year simulation using stochastic, not deterministic, techniques. Probabilities of events such as large wildfires are used in the model to make the simulation as realistic as possible, given empirical data about such events in the past, but the results of the simulation cannot be used to predict the future occurrence of such events, including their timing, size, or location, which are essentially random.

[2]Removal of conifers that have invaded sagebrush including phase-one juniper that is 10% or less and reducing sagebrush cover in areas over 30% canopy cover.

[3]Acres are those that are greater than 30% sagebrush canopy cover and/or invaded by 10% or greater conifer.

[4]Acres presently dominated by annual grasses that could be improved by herbicide application and seeding of perennial vegetation.

- **GRSG-GRSGH-ST-027-Standard** – Design habitat restoration projects to move towards desired conditions (table 1). (Greater Sage Grouse Idaho & Southwest Montana Plan Amendment, 81)

- **GRSG-GRSGH-GL-028-Guideline** – When removing conifers that are encroaching into greater sage-grouse habitat, avoid persistent woodlands (i.e., old growth relative to the site or more than 100 years old). (Greater Sage Grouse Idaho & Southwest Montana Plan Amendment, 81)

- **GRSG-GRSGH-GL-029-Guideline** – In priority, important, and general habitat management areas and sagebrush focal areas, actions and authorizations should include design features to limit the spread and effect of undesirable non-native plant species. (Greater Sage Grouse Idaho & Southwest Montana Plan Amendment, 81)

- **GRSG-GRSGH-GL-030-Guideline** – To facilitate safe and effective fire management actions, in priority, important, and general habitat management areas and sagebrush focal areas, fuel treatments in high-risk areas (i.e., areas likely to experience wildfire at an intensity level that might result in movement away from greater sage-grouse desired conditions in table 1) should be designed to reduce the spread and/or intensity of wildfire or the susceptibility of greater sage-grouse attributes to move away from desired conditions (table 1). (Greater Sage Grouse Idaho & Southwest Montana Plan Amendment, 81)

- **GRSG-FM-DC-041-Desired Condition** – In priority, important, and general habitat management areas and sagebrush focal areas, protect sagebrush habitat from loss due to unwanted wildfires or damages resulting from management-related activities while using agency risk management protocols to manage for firefighter and public safety and other high priority values. In all fire response, first priority is the management of risk to firefighters and the public. Greater sage-grouse habitat will be prioritized as a high value resource along with other high value resources and assets. **(**Greater Sage Grouse Idaho & Southwest Montana Plan Amendment, 83)

- **GRSG-FM-ST-042-Standard** – In priority, important, and general habitat management areas and sagebrush focal areas, do not use prescribed fire in 12-inch or less precipitation zones unless necessary to facilitate restoration of greater sage-grouse habitat consistent with desired conditions in table 1 or for pile burning. **(**Greater Sage Grouse Idaho & Southwest Montana Plan Amendment, 83)

- **GRSG-FM-ST-043-Standard** – In priority, important, and general management habitat management areas and sagebrush focal areas, if it is necessary to use prescribed fire for restoration of greater sage-grouse habitat consistent with desired conditions in table 1, the associated National Environmental Policy Act analysis must identify how the project would move towards greater sage-grouse desired conditions, why alternative techniques were not selected, and how potential threats to greater sage-grouse habitat would be minimized. **(**Greater Sage Grouse Idaho & Southwest Montana Plan Amendment, 83)

- **GRSG-FM-GL-046-Guideline** – In priority, important, and general habitat management areas and sagebrush focal areas, fuel treatments should be designed to maintain, restore, or enhance greater sage-grouse habitat. **(**Greater Sage Grouse Idaho & Southwest Montana Plan Amendment, 83)

Desired Conditions

Restoration focuses on establishing the composition, structure, pattern, and ecological processes necessary to make terrestrial and aquatic ecosystems sustainable, resilient, and healthy under current and future conditions. (Forest Service Manual 2020.5, page 12) Overall desired conditions of the project area include:

GRSG-GEN-DC-001-Desired Condition – The landscape for the greater sage-grouse encompasses large contiguous areas of native vegetation, approximately 6-to-62 square miles in area, to provide for multiple aspects of species life requirements. Within these landscapes, a variety of sagebrush-community compositions exist without invasive species, which have variations in subspecies composition, co-dominant vegetation, shrub cover, herbaceous cover, and stand structure to meet seasonal requirements for food, cover, and nesting for the greater sage-grouse. (Greater Sage Grouse Idaho & Southwest Montana Plan Amendment, 75)

GRSG-GEN-DC-002-Desired Condition – Anthropogenic disturbance is focused in non-habitat areas outside of priority, important, and general habitat management areas and sagebrush focal areas.[2] Disturbance in general habitat management areas is limited, and there is little to no disturbance in priority and important habitat management areas and sagebrush focal areas except for valid existing rights and existing authorized uses (Greater Sage Grouse Idaho & Southwest Montana Plan Amendment, 75).

Table 2-2: Desired Future Conditions for Sage-Grouse Seasonal Habitats

BREEDING AND NESTING[1,2,3] (Seasonal Use Period from March 1 to June 15) Apply 6.2 miles from active leks.[4]		
ATTRIBUTE	**INDICATORS**	**DESIRED CONDITION**
Lek Security	Proximity of trees[5]	Trees or other tall structures are absent to uncommon within 1.86 miles of leks.[6,7]
Lek Security	Proximity of sagebrush to leks[6]	Adjacent protective sagebrush cover within 328 feet of lek.[6]
Cover	Seasonal habitat extent[7] (Percent of seasonal habitat meeting desired conditions)	>80% of the breeding and nesting habitat.

Cover	Sagebrush canopy cover[6,7,8]	15 to 25%.
Cover	Sagebrush height[7] Arid sites[6,7,9] Mesic sites[6,7,10]	 12 to 32 inches. Arid 16 to 32 inches. Mesic
Cover	Predominant sagebrush shape[6]	>50% in spreading. [11]
Cover	Perennial grass canopy cover [6,7] Arid sites[7,9] Mesic sites[7,10]	>10%-Arid >15%-Mesic
Cover	Perennial grass height[6,7,8]	Provide overhead and lateral concealment from predators.[7,15]
Cover	Perennial forb canopy cover [6,7,8] Arid sites [9] Mesic sites [10]	>5%.[6,7-arid] >10%.[6,7-Mesic]
Cover	**Seasonal habitat extent [7] (Percent of seasonal habitat meeting desired conditions)**	**>40% of the brood-rearing/summer habitat.**
Cover	Sagebrush canopy cover [6,7,8]	10 to 25%.
Cover	Sagebrush height [7,8]	16 to 32 inches.
Cover	Perennial grass and forb canopy cover [7,8]	>15%.
Cover	Riparian areas/mesic meadows	Proper functioning condition.[12]
Cover	Upland and riparian perennial forb availability [6,7]	Preferred forbs are common with several preferred species present [13]
Cover	Sagebrush cover adjacent to riparian areas/mesic meadows [6]	Within 328 feet.
ATTRIBUTE	**INDICATORS**	**DESIRED CONDITION**

WINTER1 (Seasonal Use Period from November 1 to February 28)		
Cover and Food	Seasonal habitat extent[6,7,8] (Percent of seasonal habitat meeting desired conditions.)	>80% of the winter habitat.
Cover and Food	Sagebrush canopy cover above snow[6,7,8]	>10%.
Cover and Food	Sagebrush height above snow[6,7,8]	>10 inches.[14]

1Seasonal dates can be adjusted; that is, start and end dates may be shifted either earlier or later, but the local unit cannot lengthen or shorten the amount of days.
2 Doherty, K. 2008. Sage-grouse and Energy Development: Integrating Science with Conservation Planning to Reduce Impacts. University of Montana. Missoula, MT.
3 Holloran and Anderson. 2005. Spatial Distribution of Greater Sage-grouse nests in relatively contiguous sagebrush habitats. Condor 107:742-752.
4 Buffer distance may be changed only if 3 out of 5 years if peer-reviewed and published telemetry studies indicate the 6.2 miles is not appropriate.
5 Baruch-Mordo, S., J.S. Evans, J.P Severson, D.E. Naugle, J. D. Maestas, J.M. Kiesecker, M.J. Falkowski. C.A. Hagen, and K.P. Reese. 2013. Saving sage-grouse from trees: A proactive solution to reducing a key threat to a candidate species. Biological Conservation 167: 233-241.
6 Stiver, S.J., E.T. Rinkes, D.E. Naugle, P.D. Makela, D.A. Nance, and J.W. Karl, eds., 2015. Sage-Grouse Habitat Assessment Framework: A Multiscale Assessment Tool. Technical Reference 6710-1. BLM and Western Association of Fish and Wildlife Agencies, Denver, Colorado.
7 Connelly, J., M. A. Schroweder, A.R. Sands, and C.E. Braun. 2000. Guidelines to manage sage-grouse populations and its habitat. Wildlife Society Bulletin 28 (4): 967-985.
8 Connelly, J., K. Reese, and M. Schroder. 2003. Monitoring of Greater sage-grouse habitats and populations. Station Bulletin 80, Contribution 979. University of Idaho, College of Natural Resources Experiment Station. Moscow, ID.
9 10–12 inch precipitation zone; Artemisia tridentata wyomingensis is a common big sagebrush sub-species for this type site (Stiver et al. 2015).
10 >12 inch precipitation zone; Artemisia tridentata vaseyana is a common big sagebrush sub-species for this type site (Stiver et al. 2015).
11 Sagebrush plants with a spreading shape provide more protective cover than sagebrush plants that are more tree- or columnar shaped (Stiver et al. 2015).
12 Existing LMP desired conditions for riparian areas/wet meadows (spring seeps) may be used in place of properly functioning conditions, if appropriate for meeting greater sage-grouse habitat requirements.
13 Preferred forbs are listed in Table III-2 (Stiver et al. 2015). Overall total forb cover may be greater than that of preferred forb cover since not all forb species are listed as preferred in Table III-2.
14 The height of sagebrush remaining above the snow depends upon snow depth in a particular year. Intent is to manage for tall, healthy sagebrush stands.

Description of Juniper Phases and Treatment Prescriptions

Phase I Juniper Hand Treatment within Project Area

Phase I describes sites where juniper encroachment is just beginning to occur; shrub and herbaceous understory are still intact and are driving ecological processes. Phase I and early Phase II juniper sites have low densities of juniper cover and would be treated to remove young juniper invading intact sage-steppe communities. Mechanical treatments would not be conducted in early juniper encroachment sites due to the small stature of trees and the absence of large groups of trees across the landscape. Hand treatments would involve crew's hand cutting juniper trees with chainsaws and then lopping and

scattering limbs to a height of less than 2 feet. No ground disturbing activities are proposed for this treatment. Appendix A contains a map of the juniper phases in the project area. There are approximately 15,200 acres of Phase I juniper in the project area proposed for treatment.

Figure 2-1 Photograph of Typical Phase I Juniper Encroached Site

Photo by Scott Soletti, 2015.

Phase II Sites- Hand and Limited Mechanical Juniper Treatments within Project Area

Phase II juniper sites have medium canopy densities of juniper cover. Phase II sites are sites where juniper encroachment has occurred to the point at which both the juniper canopy and the shrub and herbaceous understory are influencing ecological processes. Shrub and herbaceous understory are still present but are declining in vigor. If left untreated, juniper cover will continue to increase until the site transitions to a Phase III site where most of the shrub and herbaceous understory has died or has very poor vigor and the juniper canopy dominates ecological processes. In most Phase II areas of the project area hand cutting is proposed, as the understory components are still present in sufficient quantities to recover to desired conditions following treatments. In areas nearing Phase III or are adjacent to Phase III, mechanical treatments are proposed to ensure slash buildup post treatment would not occur. There are approximately 2,300 acres of Phase II juniper in the project area proposed for treatment.

Figure 2-2 Photograph of Typical Phase II Juniper Encroached Site

Photograph courtesy of Hugh Barrett, CSR Natural Resource Consulting, Inc.

Phase III Mechanical Juniper Treatment Areas

Phase III sites are areas where the juniper canopy is dominating ecological processes. The shrub and herbaceous understory has low vigor and dead and dying plants are observed in the understory. Phase III juniper sites within the Project Area have high densities of juniper making hand treatment as a stand-alone treatment ineffective due to the potential for a large buildup of juniper slash. Phase III juniper will be treated mechanically using a masticator to mulch the slash across the soil surface or by cutting and piling juniper followed by prescribed burning of the piles to reduce the slash build up. Other treatments such as chipping of slash may be considered as an alternative treatment to reduce slash and would occur on a unit by unit basis.

Equipment access to a site often determines what type of equipment is used. The equipment used for treatments could be either rubber tired or track mounted. Mechanical treatments would be limited to areas with low to moderate slope (less than 30% slope). Overland travel and non-system roads may be used to facilitate mechanical treatments. All overland travel and non-system routes that would be used would conform to project design features and would be decommissioned or signed after use. No constructed temporary roads or permanent roads or changes to the Motor Vehicle Use Map are proposed for this project. Seed may be broadcasted as spot treatments within Phase III mechanical treatment areas prior to mechanical treatment if monitoring indicates that insufficient shrub and herbaceous understory is present to ensure natural vegetation recovery post treatment or if monitoring indicates a significant threat of invasion by undesired non-native species. A native seed mix that is comprised of species adapted for the site would be broadcasted as needed; mechanical treatment would help to work seeds into the soil. In Phase III treatments with slope greater than 30%, where it is not feasible to get equipment to the site, or where the small size of treatment area makes mechanical

treatment unfeasible, cutting and piling followed by prescribed burning of the piles would be implemented as the treatment method. There are approximately 6,500 acres of Phase III juniper in the project area proposed for treatment.

Figure 2-3 Photograph of Typical Late Phase III Juniper Encroached Site

Photograph courtesy of Oregon State University

2.1 Consistency with Laws, Regulations, and Policy

This EA has been prepared pursuant to the requirements of NEPA (42 U.S.C. 4321 et seq., 40 CFR 1500–1508), other relevant federal and state laws and regulations, and the Forest Plan (USDA Forest Service 2012).

This EA is tiered to the Final Environmental Impact Statement (FEIS) and planning record supporting the Forest Plan as amended in 2012 (USDA Forest Service 2012), including the documentation related to the Continuous Assessment and Planning (CAP) process described in Chapters III and IV of the Forest Plan. This documentation includes monitoring reports, implementation guides, and errata/corrections to the FEIS and Forest Plan. Documented analyses in the Forest Plan FEIS have been referenced rather than repeated in some instances. Analyses pertaining to the 2003 FEIS supporting decisions concerning the revised Forest Plan (USDA Forest Service 2003) and to the 2012 Environmental Assessment supporting amendments to the 2012 revised Forest Plan (USDA Forest Service 2012) are contained in the Forest planning record located at the Minidoka Ranger District Office in Burley, Idaho.

2.2 Management Framework

2.2.1 Endangered Species Act

The Endangered Species Act (ESA) provides for the protection and conservation of threatened and endangered plant, aquatic, and terrestrial wildlife species. A biological assessment/evaluation consistent with the requirements of this Act was prepared based on the Action Alternatives (See Project Record). A 'no effect' determination was made for Threatened and Endangered wildlife and botanical species. With a 'no effect' determination consultation with United States Fish and Wildlife Service (USFWS) is not required. Likewise, there are no listed fish species, thus consultation with National Oceanic and Atmospheric Administration (NOAA) is not required. Federally listed species will not be discussed further.

2.2.2 Tribal Consultation

Tribal governments have a special and unique legal and political relationship with the United States government as reflected in the United States Constitution, treaties, statutes, court decisions, executive orders, and memoranda. The relationship imparts a duty on all federal agencies to consult, coordinate, and communicate with American Indian Tribes on a government-to-government basis. Because Indian Tribes can be affected by the policies and actions of the Forest Service in managing the lands and resources under its jurisdiction, the Forest Service has a duty to consult with them on matters affecting their interests. Because of this government-to-government relationship, efforts were made to involve local tribal governments and to solicit their input regarding the proposed action.

Consultation on this project is ongoing with the Shoshone-Bannock Tribes of Fort Hall and the Shoshone Paiute Tribes of Duck Valley.

2.2.3 National Historic Preservation Act

This Act provides for the protection of prehistoric and historic resources. An archeological investigation was conducted for the project and a decision document will only be signed after concurrence with Idaho State Historic Preservation Officer (SHPO) has been received.

2.2.4 Migratory Bird Treaty Act

This Act and subsequent Executive Order and Memorandum of Understanding (MOU) between the USFWS and Forest Service provide for the protection of migratory birds. Based on the analysis and the wildlife project design features that avoid and minimize impacts to migratory birds and provide long term benefits to migratory birds , all action alternatives are consistent with this Act (See Wildlife Specialist Report for a complete analysis of the impact on Migratory birds).

2.2.5 Environmental Justice

In accordance with Executive Order 12898, all action alternatives were assessed to determine whether they would have disproportionately high and adverse human health or environmental effects, including social and economic effects, on minority or low-income human populations. This assessment considered such programs, policies, and activities. No effects were identified during scoping or the formal 30-day Notice of Proposed Action comment period.

2.2.6 Inventoried Roadless Areas

The Idaho Roadless Rule was promulgated on October 16, 2008 (73 FR 61456) and supersedes the 2001 Roadless Rule for National Forests in Idaho. The 2008 Idaho Roadless Rule establishes management direction for designated roadless areas in the State of Idaho and provides prohibitions with exceptions or conditioned permissions governing road construction, timber cutting and discretionary mineral development.

The project area does include two Inventoried Roadless Area (IRA), Mahogany Butte and Lone Cedar. These are both General Forest Areas and the Proposed Action and alternatives to the Proposed Action are consistent with the management direction for General Forest IRA units under the Roadless Rule and the Forest Plan (See Roadless Report in Project Record).

2.2.7 Research Natural Areas / Recommended Wilderness

There are no Research Natural Areas or Recommended Wilderness areas within the project area. The Trapper Creek RNA was excluded from treatment.

2.3 Decision Framework

We have prepared this document to describe the purpose and need for the action and to discuss and disclose the details of the proposed action, including the potential effects. Given the purpose and need, the deciding official will review this assessment, and the project record, in order to make the following decisions:

- Whether the proposed activities would accomplish the objectives of the Sawtooth National Forest Land and Resource Management Plan (Forest Plan), as amended (USDA Forest Service 2012), and meet the purpose and need for the project.
- Whether to approve implementation of the proposed action, or an alternative to the proposed action.
- What operating standards, design features, and monitoring activities should take place before, during, and after the activities, if any implementation is approved.

The Responsible Official will also decide if further analysis in an Environmental Impact Statement is warranted. The Responsible Official is the Minidoka District Ranger.

2.4 Public Involvement

The proposal was first listed in the Schedule of Proposed Actions on June 9, 2016 and has been listed continuously since that time. Since the project is focused on habitat restoration, the Ranger District worked with Idaho Department of Fish and Game on the proposal for treatments internally before scoping with the public. The Forest Service then mailed 34 scoping letters on June 8, 2016 to identified interested publics including grazing permittees, several interest groups, interested and affected individuals, and other state and federal agencies for comment on the project as part of the public involvement process. The Forest Service also emailed the letter to two individuals that requested all correspondence from the Forest Service electronically. The purpose of the letter is to notify interested and affected individuals of the proposed action and decisions to be made, and to invite any comments or concerns regarding the proposed action. Five responses were received from that mailing. The Minidoka Ranger District then held a field tour of the project on August 29, 2016 with the Idaho Roadless Commission. Five people attended the tour and discussed the project with Interdisciplinary team(IDT) members and the Minidoka District Ranger. The Minidoka Ranger District then held a public field tour of the project on September 26, 2016. Eight people attended the meeting and discussed the project with IDT members and the Minidoka District Ranger. One person submitted comments following the public field tour and oral comments were given during the field tour to Forest Service IDT members to consider and were captured in the notes from the field tour. Comments received outside of the designated scoping period were still reviewed and distributed to ID team members and the District Ranger to aid in development and refinement of alternatives and for analysis purposes.

Using the comments from Idaho Conservation League, Idaho Department of Fish and Game, Merriam Austin, Jim Prunty, Wildlands Defense, and Western Watersheds the interdisciplinary team developed a list of key issues to address (see Issues Section). In addition, the IDT developed Alternative 3 (Hand Thinning only alternative) in response to scoping comments and concerns.

The Forest Service IDT reviewed all comments to focus analysis and to identify issues. A ‘Response to Comments’ document will be developed and completed as part of the planning process after comments from the Draft EA are received.

2.5 Identification of Issues

2.5.1 Issues Analyzed in Detail

Through review of the internal and external feedback regarding the proposed action, key issues considered central to the analysis were identified.

Issue #1- Non Target Wildlife Species: There is a concern that there will be non-target impacts to wildlife species that use juniper during the completion of their life cycle, specifically migratory birds and that negative effects to nesting may occur as a result of the action alternatives.

Indicator: Acres of juniper treated compared to acres of juniper habitat available in the project area.

Issue #2 – Soils and Invasive Species: The volcanic ash derived soils are fragile, they are erosive and have a weak soil structure, and soil fertility is minimal. Because of these soil properties, the area will be more prone to invasion by cheatgrass and noxious weeds post mechanical treatment. Mechanical treatments may also impact physical and biological soil crusts and recovery is a concern in mechanically treated Phase III areas.

Indicator: Estimated total acres at risk of introduction and/or spread of noxious and invasive plant species.

Indicator: Estimated total acres of soils that will experience detrimental disturbance (DD).

2.5.2 Issues Not Analyzed in Detail

CONCERN 1: Livestock Grazing – There was a concern that livestock grazing is contributing to poor sage grouse habitat and that an alternative that restricts or eliminates livestock grazing should be considered. Per policy and law National Forests are managed under a multiple use philosophy and direction. Permitted grazing of livestock is one of these multiple use activities. Decisions on the areas of suitability for livestock grazing, stocking levels, and season of use for livestock that modify grazing permits or Allotment Management Plans (AMP'S) are outside the scope of this proposal. Decisions on short term management of treated areas are within the scope of this decision. Since short term management of treated areas will occur based on the previously analyzed Sawtooth National Forest Land and Resource Management Plan standards and guidelines, this concern was not analyzed in detail.

CONCERN 2: Impacts to private lands and decreased property values –There was a concern that proposed activities on National Forest Lands would affect private property land values. This is not an issue that was analyzed in detail because most of the land adjacent to NFS lands is managed by the BLM. In the case of limited areas that have private property adjacent, no information or data exists that that indicated that cutting juniper to restore functional sage-steppe habitat, an activity done throughout the intermountain west, has resulted in documented declines in private land values. Thousands of acres of juniper has been treated on local BLM lands in southern Idaho; no

information has been provided or located by FS staff that indicated it has had any negative impact on private land values, therefore this concern was not analyzed in detail.

Concern 3: Impacts of reducing juniper on hydrological resources- There was a concern that cutting juniper would lower the water table or reduce hydrological resources. Juniper reduction teatments has been shown to affect the water cycle primarily through changes in ground cover and evapotranspiration. When juniper is treated, herbaceous and total ground cover increase, which results in increased rainfall infiltration and decreased hillslope runoff. Removal also results in decreased evapotranspiration, reducing the amount of soil storage/groundwater returned to the atmosphere. Both of these processes result in a net increase to groundwater storage and available hydrologic resources, the opposite of the effect expressed in this concern, therefore this concern was not analyzed in detail.

Concern 4: Fire Behavior- There was a concern that juniper treatments would increase fire behavior, fire intensity and fire frequency. There would be a temporary, (two to three years) increase in potential fire behavior (in the case of an ignition) until juniper scales and needles fall off of cut trees. The proposed project would most likely reduce intensity and severity while returning sites to a more natural pre-European vegetation composition and fire return interval in the long term. In general that is expected to result in more frequent but less severe fires that ultimately can recover to a native perennial bunchgrass early seral successional vegetation community and not convert to a cheatgrass monoculture that is possible when Phase II and Phase III juniper encroached areas burn in a wildfire. Over time there will be a reduction in resistance to control as intensity will be reduced. This is supported in the scientific literature and locally observed on the Ranger District, therefore this concern was not analyzed in detail.

Concern 5: Expansion of Juniper- There was a concern that juniper expansion is a misnomer, is part of natural processes, and thus should not be treated. This is not supported in the literature and it is widely agreed upon by land management professionals and the scientific community. Juniper has expanded its range primarily as a result of fire suppression and lack of lower severity more frequent fires. Since fire cannot play its natural role, this project is intended to simulate fires role on the landscape and therefore this concern was not analyzed in detail.

Concern 6: Impact of treatments on Pinyon pine and old growth juniper- There was a concern expressed that the treatment was going to negatively affect old growth juniper and pinyon pine. Old growth juniper is not proposed to be targeted for removal and design features instruct Forest Service personnel and/or contractors to avoid cutting old growth. Pinyon pine has not been found or documented within the project area; if any is encountered the design features instruct Forest Service personnel and/or contractors to avoid cutting pinyon pine, therefore there is no issue with old growth retention or pinyon pine and this concern was not analyzed in detail.

Concern 7: Raven predation of sage-grouse after treatment - There was a concern that treating juniper would lead to increased raven predation on sage grouse. There is no scientific literature that correlates reducing juniper encroachment to increased raven predation of sage-grouse nests. In fact, the best available information indicates that sage-grouse use areas that have been treated for nesting quickly after treatment occurs.

Furthermore, management of raven populations falls to the Idaho Department of Fish and Game and the US Fish and Wildlife Service under the Migratory Bird Treaty Act. There is no scientific information that suggests that increasing the overall amount of nesting habitat for sage grouse, which would occur if juniper encroached areas were restored, would result in declines in nest success for a population. Nest site selection is complex and can vary based on the individual female, age and other factors. Females would still be selecting for habitat attributes based on many factors and reducing juniper in areas likely not being used for nesting now would have little to no detectable effect on areas where juniper doesn't exist now and are being used for nesting currently, therefore this concern was not analyzed in detail.

Concern 8: Loss of macronutrients and drying out of sites when juniper is removed- There was a concern that cutting juniper would result in fewer nutrients for plant communities and sites becoming drier. Scientific literature suggests the opposite actually occurs following juniper removal. Numerous studies have demonstrated increases in water tables, and increases in vegetation composition, abundance and vigor (See Project Record). In sites where juniper historically occurred i.e. old growth sites, no treatment is proposed, therefore this concern was not analyzed in detail.

Concern 9: Collision of sage-grouse with fences- There was concern that removal of juniper would lead to an increase in collisions with fences. There is no scientific literature that correlates reducing juniper encroachment to increased fence strikes for sage-grouse. Fence marking is completed based on the best scientific information and requirements outlined in the 2015 Sage-Grouse ROD. Additionally, the Forest will mark fences if data, state wildlife agency data, or input or professional judgment indicates there is an elevated risk of fence strikes in areas that haven't been previously identified. Marking fences has been shown to be effective in reducing fence strikes and if a juniper reduction treatment was completed in an area and as a result, fence strikes became a concern, the fence would be marked with collision markers, therefore this concern was not analyzed in detail.

Concern 10: Cultural Resources - There are cultural resources present within the project area and there was a concern that proposed treatments may affect sites. The Forest Service will survey for cultural resources as needed and agreed to by the Line Officer and SHPO. Appropriate design features and mitigation would be put in place prior to implementation to avoid any adverse effects to National Register eligible cultural resource sites. No adverse effects would be allowed under any of the alternatives, therefore this concern was not analyzed in detail.

Alternatives

This chapter describes and compares the alternatives considered for the Goose Creek Sage-Grouse Habitat Restoration Project. It includes a description and map of the alternatives considered. This section also presents the alternatives in comparative form, sharply defining the differences between each alternative and providing a clear basis for

choice among options by the decision maker and the public. Some of the information used to compare the alternatives is based upon the design of the alternative and some of the information is based upon the environmental, social, and economic effects of implementing each alternative.

2.6 Alternative Considered in Detail

2.6.1 Alternative 1: No Action

The No Action Alternative is the current management situation. Under the No Action Alternative, the proposed Goose Creek Habitat Restoration treatments will not be implemented. Sage-grouse habitat within the project area would continue to decline in quality and quantity, with expected long term declines in sage-grouse populations with conversion of sagebrush habitat to juniper woodland habitats. Fuel conditions will continue to increase beyond levels representative of the natural (historic) fire regime. Habitat values would continue to decline as perennial, herbaceous and shrub understory would further be reduced in the long term. Since no action would occur within the project area, there are no design features for this alternative.

2.6.2 Alternative 2: Proposed Action

The proposed action would treat juniper across 19,608 acres by hand thinning using drop, lop and scatter techniques and 3,884 acres by mastication using heavy equipment. Mastication is a stand-alone treatment (no pile burning is proposed if an area is going to be masticated). No broadcast burning is proposed in this alternative. See Figure 2-4 for proposed treatments locations within the project area.

Proposed treatments are based on levels of juniper encroachment with Phase I and early Phase II proposed for drop, lop and scatter treatments and later Phase II and Phase III juniper proposed for mechanical treatment or cutting and piling and burning as slash buildup becomes a concern as juniper gets thicker. Pile burning may be used in small portions of mechanical units if mastication is too difficult to implement due to logistics, terrain, access, rock, etc. This would be limited to no more than 50 acres per treatment unit where mastication is proposed. Seeding areas may be needed where juniper has reduced the understory; this would be primarily associated with mechanical treatments. A native seed mix developed for the site would be flown on prior to treatment to allow machinery to work the seed into the soil. Seeding needs would be determined on a site by site basis to ensure plant community succession based on existing vegetation composition and pretreatment monitoring data.

Project design features for Action Alternatives (Alternative 2 and 3) would apply to all areas under those alternatives, where applicable.

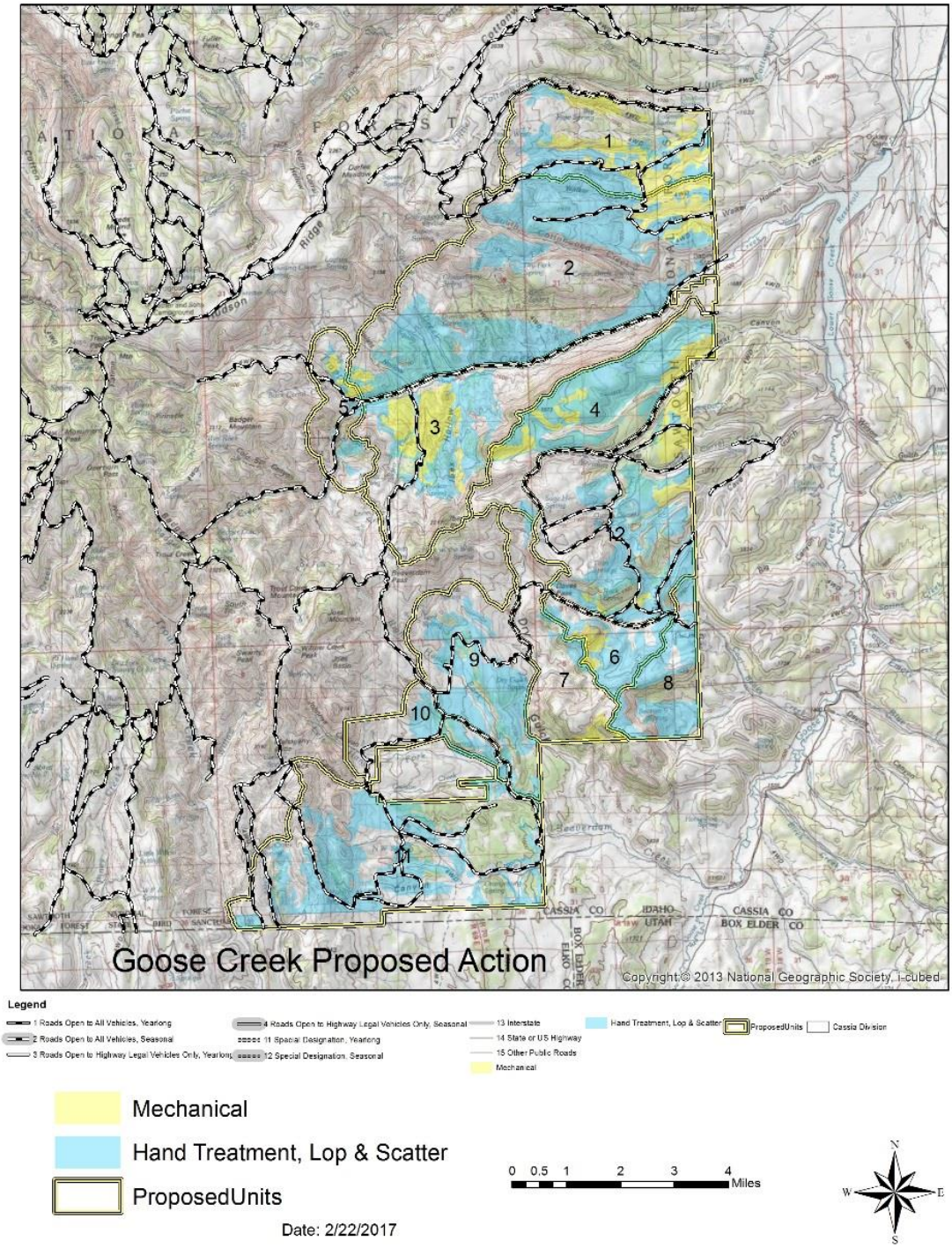


Figure 2-4- Map of Proposed Treatments for Alternative 2

2.6.3 Alternative 3: Hand Only Treatment Alternative

Under this alternative there would be no mechanical treatment of juniper and instead juniper encroached areas would be treated by hand cutting. There are approximately 20,050 acres of hand treatment in 12 units identified under this alternative. See Figure 2-5 for proposed treatments under this alternative. The majority of Phase III juniper encroached areas were removed from treatment under this alternative due to issues associated with dealing with slash build up and need for machinery to work seed into the soil. Phase I and Phase II juniper surrounded by Phase III were also removed from this alternative so that areas are not proposed for treatment that do not connect into sage-steppe habitat (i.e. avoid cutting a hole into a stand of juniper that does not connect into habitat void of juniper). Pile burning or single tree burning could be used as a treatment option to reduce slash and fuel loading in small site specific areas where a slash build up concern exists after unit layout. This would not exceed 100 acres of pile burning per treatment unit or a 15% detrimental disturbance to soils (DD), whichever comes first. The need for pile burning will be determined by the district fuels specialist in conjunction with the district wildlife biologist.

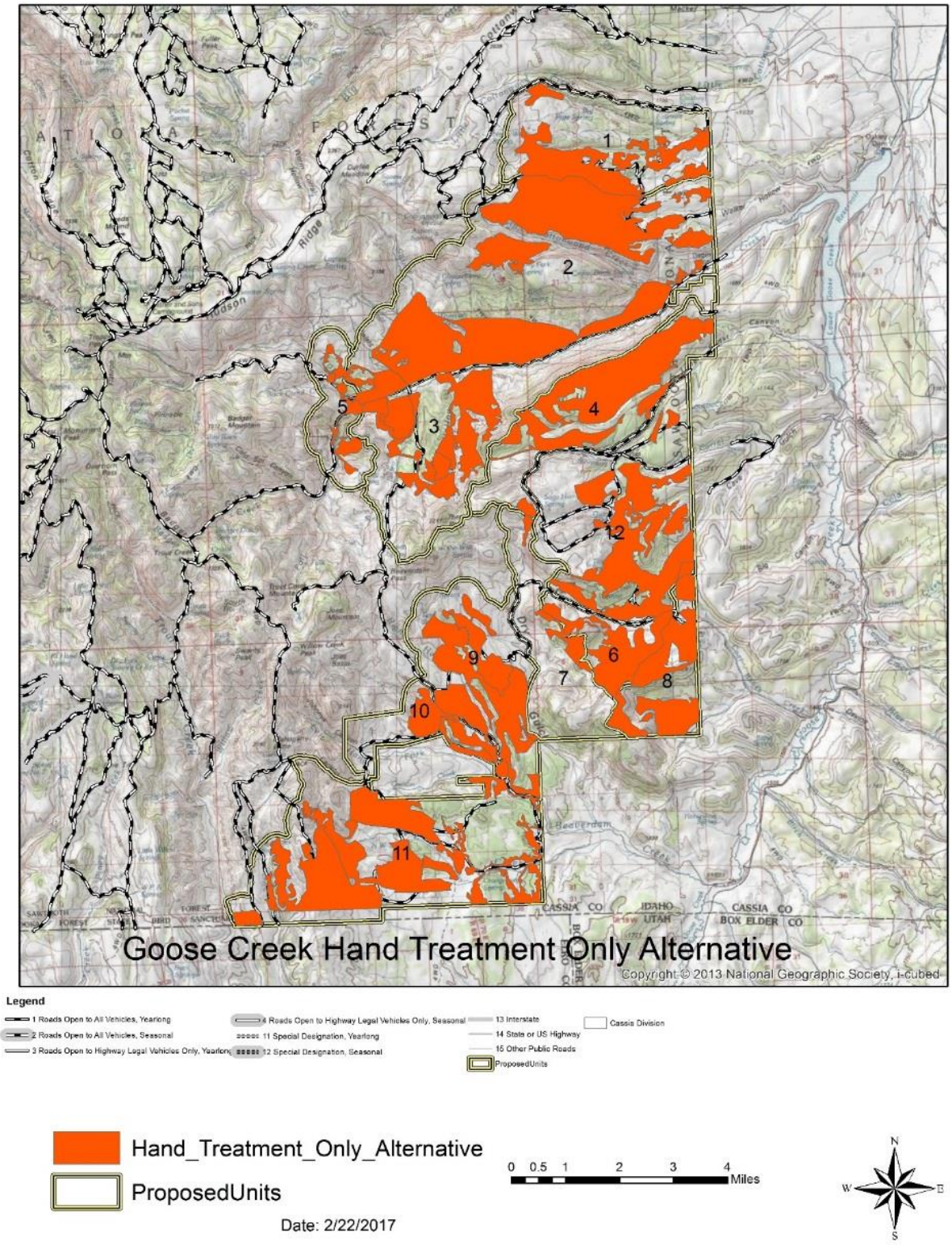


Figure 2-5- Map of Proposed Treatments for Alternative 3

2.7 Features Common to All Action Alternatives

2.8 Implementation Strategy

During implementation, treatment units may be broken into more manageable, smaller areas based on treatment method, fiscal year funding, district priorities, livestock pasture rotations, and forest staffing to inspect contractors as work is implemented. Units would vary from a few hundred acres to a few thousand acres for hand and mechanical treatments. Overall implementation strategy will use a lek centric approach; with implementation focusing near sage-grouse leks and working outward. In general, this would result in an immediate focus on implementation of hand treatments around leks where an immediate benefit to sage-grouse populations and habitat would be immediately realized with the removal of juniper.

During unit layout, IDT members would provide input as needed to ensure applicable project design features are being implemented as intended. This could result in modifications to treatment and unit boundaries due to factors such as a large amount of old growth, slash build up concerns, steepness of slope, cultural resource sites, etc. that need to have design features applied to ensure Forest Plan Standards are being met. The Project manager and Line Officer would be responsible for ensuring this occurs.

2.9 Maintenance of Treatments

As treatments are implemented, it is expected that in approximately 7-15 years following treatment, a follow up maintenance cut would be done to clean up any limbs, whips or small trees that were missed and/or germinated after the initial treatment. Typically, maintenance would be completed by hand crew using loppers or chainsaws. In the event that a wildfire burns a portion of an area proposed for treatment that is not yet implemented, a treatment to knock down the juniper skeletons may need to be completed to reduce raptor perches and encourage sage-grouse use of the burned area in the future.

2.10 Adaptive Management

As treatments are implemented, monitoring of pre and post treatments and observations would be completed by District and Forest staff. As information and data is collected, organized and analyzed, the district would employ an adaptive management approach to project implementation as needed. If goals and objective are not being met or progressing towards being met or new information comes available that would suggest a different approach to implementation, the district may use adaptive management principles to achieve the best results on the ground. For this type of project, it is expected that typical adaptive management approaches would be converting a treatment from mechanical to hand or vice versus, seeding an area or not seeding an area, or not treating an area due to resource concerns that occurred during prior implementation of the project (lessons learned). While the district would employ adaptive management principles as they implement the project, any project design features that were brought forward into the Decision Notice would still have to be adhered to and impacts that may occur as a result of

employing adaptive management to project implementation would still have to be within the scope of impacts that were analyzed in the EA. All applicable statutes, laws and policies would still be followed and project implementation would be consistent with statutes, laws, policies and the Forest Plan.

2.10.1 Project Design Features and Best Management Practices

The Goose Creek Sage-Grouse Habitat Restoration Project require certain precautions during project implementation. Defined Project Design Features would ensure that identified resources within the project boundary would be protected and/or preserved. All project activities would be coordinated with the appropriate resource specialist and/or the Interdisciplinary Team. Areas identified within the project boundaries as having important cultural, biological, botanical, hydrological, and recreational values have been excluded from treatment. Where applicable to the Action Alternatives, standards for management activities have been identified based on site-specific conditions. Where applicable, the following proposed project design features would be implemented to avoid and/or minimize effects to resources within the Project Area.

Heritage

For all those cultural properties recommended eligible or are unevaluated to the National Register:

- Mechanical treatment will not be used in areas of identified eligible or unevaluated cultural properties.
- Heritage Resource Staff will brief crew personnel on mastication avoidance areas before project implementation occurs. (See inadvertent discovery procedures).
- Additional mitigation design features will be put in place if needed to avoid adverse impacts to cultural resources. Design features will be based on field survey results and will be approved by Line Officer before implementation occurs. These design features will be generated and approved by the Forest Archaeologist and will be documented in the project file.
- An archaeological or tribal monitor may be required in high sensitivity areas for archaeological or culturally significant areas during treatment. This will be determined after consultation with Idaho State Historic Preservation Office and affected tribes.

Cultural Resources- Inadvertent Discovery

In the event of inadvertent discovery of undocumented cultural resources during implementation the following procedure shall be undertaken: work will cease in the immediate vicinity of the find and the Forest Archaeologist will be notified immediately in order to assess the discovery.

Wildlife; Migratory Birds; Special-Status Species (Federally-Listed, Proposed or Candidate, Threatened and Endangered Species); State Protected Species; USFS Sensitive Species

- If any active nests or dens of MIS or sensitive species are found during project implementation, a USFS wildlife biologist will be consulted prior to any treatments being conducted or continued. The USFS wildlife biologist in consultation with the Line Officer will develop an avoidance area and appropriate Best Management Practices (BMP's) as needed.

- To minimize and reduce the effect of treatments on nesting migratory birds, only up to 1,000 acres of Phase I juniper would be treated on an annual basis from March 1- June 15. Treatment would not occur in Phase II and Phase III juniper during this time period.

- Any active bird nests discovered during implementation would be avoided and the nest trees and trees adjacent to the nest tree would not be cut until the birds in the nest have fledged.

- If any unknown active raptor nests are discovered during implementation, Limited Operation Periods (LOPs) and/or buffer zones would be implemented as necessary to reduce disturbances to until birds are fledged. Buffer distances would be based on the site specific habitat, topography and species life history requirements.

- Project implementation would not occur within 2 miles of an active sage-grouse lek from the hours of 6:00 pm to 9:00 am.

- Project implementation would not occur in Phase I juniper on the fringes of existing intact sagebrush habitat from May 1 to June 15 to reduce the possibility of disturbance to nesting sage-grouse.

- If juniper is treated along a fence line and the possibility of fence strikes would be increased due to the proximity to a lek and/or topographical considerations, the fence line would be marked with fence markers. The USFS wildlife biologist would determine if the need for fence marking exists.

- One pile per acre may be left as wildlife piles for small mammals and birds. Piles would preferably not be mulched and larger limbs and boles would be used to construct the piles (large air gaps). Piles up to 20’x20’x8’ are acceptable. Wildlife piles would be coordinated with the USFS wildlife biologist, project implementation staff and Contracting Officer’s Representative (COR). If built, piles would be located adjacent to existing untreated juniper stands.

Hydrology

- Riparian Conservation Area's (RCA) widths for the project area, under category IV in Appendix B of Forest Plan, will be defined by "the extent of flood prone width" for perennial or intermittent streams. It will not apply to ephemeral channels.

- Only hand treatments would be allowed in RCAs; no mechanical treatments.

- Where mechanized equipment would require crossing intermittent or perennial stream channels or RCA's to access treatment areas, crossings sites would be identified by COR in consultation with a USFS hydrologist. Stream channel crossings would be at right angles and at the most durable site available. Use and number of stream crossings would be monitored by the project COR.

- Equipment staging, including fuel storage, and refueling would occur outside RCAs. All equipment will be free of leaks.

- No use of mechanized equipment or any vehicles off established roads would occur when soils are saturated as determined by COR in consultation with a USFS hydrologist.

Soils

- To mitigate ground disturbance during mastication, track equipment operators should avoid making abundant sharp right angle turns. Instead, a gentle curved pattern with the least amount of sharp angles should be used during implementation to reduce ground disturbance. Different routes would be used to avoid creating the appearance of trails.

- Mastication treatments in units with land types rated at a 4 or higher for erosion potential will be monitored and detrimental disturbance (DD) will be calculated. If it is found that DD exceeds the Forest Plan standard of 15%, all further mastication on these high erosion potential lands will not occur. Hand treatments may still occur in these units.

- Treatments within the project area may require vehicles to travel off designated motorized travel routes if specifically authorized by the COR or Line Officer. Following completion of treatments, any skid trails or locations used by vehicles off of established roads or other concentrated activity sites would be blocked and reclaimed to discourage unauthorized use.

Livestock Grazing

- Treatment units would be deferred from livestock grazing for two growing seasons (until July 15). Decisions to resume previous grazing practices will be objective based. Deferment will not be required in Phase I treatment areas because the shrub and herbaceous understory are still dominating ecological processes.
- For Phase II and Phase III treated areas, objectives for resuming grazing will be:
    1) A minimum of 4 perennial grass plant per square meter measured at the randomly generated pretreatment monitoring sites for the treatment unit.
    2) 75% of grasses firmly rooted in the soil, as tested by hand pulls.
    3) Vigorous grass plants as evident from seed production with full seed heads.

Vegetation

- Pinyon pine has not been identified in the project area; however, if pinyon pine is encountered, it will be left untreated.

- Reseed or revegetate areas as needed to prevent erosion, minimize the risk of invasion or expansion of noxious weeds, and/or facilitate the recovery of un-vegetated areas. Reseed or revegetate areas where the soil has been exposed by ground-disturbing activity using native plant materials or a Forest Service approved native seed mix. All seed will be certified to be free of seeds from noxious weeds listed on the current All States Noxious Weeds List.

Old Growth Juniper

Historic woodlands within the project areas would be preserved and mature/old growth stands of juniper would be identified and protected.

Individual old growth trees in restoration areas would be identified using morphological characteristics (Miller *et al*. 2005) and preserved for their many social and ecological values. These characteristics would include:

- Rounded or unsymmetrical tops that may be sparse and contain dead limbs.

- Deeply furrowed, fibrous bark on the trunk that is reddish in color.

- Branches near the base of the tree that may be very large and covered with fruticose lichens.

- Limited terminal leader growth on branches in the upper 25 percent of the canopy.

Inventoried Roadless Areas and Recreation

- To the extent practicable, activities would be scheduled to avoid high use recreation periods within the project area; this is primarily the opening weekend of mule deer archery and rifle seasons.

- If dispersed campsites are encountered during implementation, trees within the dispersed campsite would be left uncut to the extent practical, however trees would be removed if they were going to create a habitat concern for sage-grouse (i.e. trees directly adjacent to a lek).

Noxious Weed Species

- A Clean Equipment provision would be included in all service contracts. Equipment washing stations would be established in designated areas or arrangements for equipment washing prior to equipment entering the Sawtooth National Forest would be made prior to project implementation. Soil, seeds, and plant material would be removed from equipment and vehicles that travel off designated roads during implementation.

- No staging of personnel or equipment would occur in known noxious weed sites. Staging areas, when required, will be located in previously disturbed areas that are noxious weed free. Rehabilitation will occur following completion where/as necessary.

- All concentrations of noxious and invasive weeds within and/or adjacent to treatments would be avoided or treated, per current agency policies and procedures, prior to implementation to the extent feasible. Areas identified as having concentrations of noxious and invasive plant populations, within the proposed treatment blocks, would be monitored post treatment. Monitoring would be completed by district weed crews and other forest personnel as available.

Visual Resources

- All Juniper trees must be completely severed from the stump and cut below the lowest live limb, except when prevented by natural obstacles. All live limbs below the cutting point must be removed from the bole.
- Stump height should not exceed six (6) inches above ground level measured on the uphill side or four (4) inches above natural obstacles.
- Trunks/branches over six (6) inches in diameter should be cut into lengths of three (3) feet or less on average.
- Slash must be scattered so that there is no slash sticking up more than two (2) feet above the ground on average.
- Lop and scatter treatments will not occur on days that snow accumulations reach 6 inches or more to assure little trees are not missed.

Fuels Management/Fire

- All prescribed burning will take place under the guidelines set forth in a prescribed fire burn plan developed specifically for this project area.
- Prescribed burning (piles) would be accomplished using hand-firing methods only. This measure will help reduce soil impacts.
- Piles will be placed in a non-linear pattern in each unit to maintain a mosaic burn pattern.
- Maximize the distance between piles when feasible, maintaining a 15 foot average spacing between piles in each unit to minimize the potential for piles to ignite one another.
- Hand piles would be a maximum size of 6'x 6' x 6' and include material no greater than ten inches in diameter and no longer than five feet in length. This measure will help reduce soil impacts.

- Piles should be burned with snow on the ground or enough precipitation where the piles won't spread more than 15 feet laterally. Creep is a concern if fire is consuming shrubs, creep that only burns perennial grasses is not a concern.

2.11 Alternatives Considered but Dismissed from Detailed Analysis

NEPA regulations require that agencies should "vigorously explore and objectively evaluate all reasonable alternatives" to the proposed action. Alternatives that would not be reasonable, either because they do not meet the purpose and need or because of other considerations, may be eliminated from detailed study. A brief discussion of these alternatives follows, and the reasons for their dismissal are provided.

2.11.1 Alternative 1:

Prescribed burning wherever possible to thin or remove Utah juniper which has established on sagebrush sites.

2.11.2 Rationale for Dismissal

This alternative was eliminated from detailed analysis because of the difficulty in keeping fire within the targeted vegetation types and difficulty to prevent the burning of the existing shrub and grass understory. Cheatgrass invasion would also be a significant risk following prescribed burning in certain vegetation types. The objective of the project is to maintain the existing shrub and grass component when possible and remove enough trees to allow the shrub and grass component to reach ecological site potential; this alternative was considered unlikely to achieve this objective. The IDT considered areas for

prescribed fire treatments within the initial proposed action and determined that broadcast burning would not be the most effective method to meet the desired conditions. The area of consideration was limited based on a guideline from the 2015 Greater Sage-Grouse ROD restricting broadcast burning to zones with greater than 12" of annual precipitation. This general guideline was set forth to limit burning in areas where a higher likelihood exists that cheatgrass would invade the site post treatment. Some areas have existing grasses and sagebrush that would provide better habitat if retained versus being burned. Others lacked feasible control features. For these reasons, broadcast burning was not proposed and was removed from the proposed action.

2.11.3 Alternative 2:

Reduced Grazing Alternative.

2.11.4 Rationale for Dismissal

This alternative was proposed by one of the commenters but was eliminated from detailed analysis because reducing grazing levels and/or changes in permitted livestock use would not address or meet the purpose and need for action, which is to treat sage-grouse habitats that are already encroached and declining in vigor as a result of juniper expansion. Reducing or eliminating livestock would do nothing to address the areas where juniper has expanded into previously functional sage-grouse habitats.

2.11.5 Alternative 3:

Riparian Restoration/Reducing Grazing Restoration Alternative.

2.11.6 Rationale for Dismissal

This alternative would not implement any juniper control treatments but would instead reduce livestock numbers, remove livestock developments and implement restoration activities in riparian areas and mesic meadows in sage-grouse brood rearing and summer habitat. This alternative was proposed by some of the commenters but was eliminated from detailed analysis because it would not address the purpose and need for action, which is to treat sage-grouse habitats that are already encroached and declining in vigor as a result of juniper expansion. Reducing livestock numbers and implementing riparian projects would do nothing to address the areas where juniper has expanded into previously functional upland sage-grouse habitats.

2.11.7 Alternative 4:

Mechanical over Snow Alternative.

2.11.8 Rationale for Dismissal

An alternative was proposed internally by the IDT that would implement mechanical treatments only when sufficient snow was present to reduce any impacts to soils and/or heritage resources, if present. After further study looking at current year and past years snow conditions, precipitation zone maps, talking with experts in over snow timber operations and local knowledge, this alternative was dismissed from detailed analysis because in most years it is unlikely that enough snow exists to be effective, snow drifting

and closing roads to service trucks for machinery is an issue, the project area is prone to freeze /thaw that can lead to muddy conditions when trying to implement and logistical concerns exist that make it possible that a project would ultimately not get implemented because costs and/or contractor willingness would be prohibitive in this area. Over snow operations may still occur as part of the proposed mechanical treatments in the proposed action, but they would be opportunistic in nature.

2.12 Comparison of Alternatives effects of the alternatives impacting the issue indicators.

Table 0- compares the effects of the alternatives on meeting elements of the Purpose and Need. Chapter 3 contains a detailed description and discussion comparing the alternatives, as well as additional contrasts of the potential effects to other resources and uses. Table 2-4 compares the effects of the alternatives impacting the issue indicators.

Table 0-3. Alternative Comparison Meeting Elements of Purpose and Need

Purpose and Need (elements)	Alternative 1	Alternative 2	Alternative 3
Improve the ecological health (i.e. resilience and resistance) of sites currently encroached by juniper.	**Does not meet purpose and need**	**Fully Meets**	**Partially meets,** Fully Meets in Phase I and Phase II encroached areas. Does not meet on approximately 3,900 acres of PA in Phase III.
Maintain large blocks of connected habitat.	**Does not meet purpose and need**	**Fully Meets**	**Fully Meets,** hand thinning only would maintain the large blocks of habitat that exist within the PA.
Maintain old growth or historic juniper woodlands on portions of the	**Partially meets,** Meet in short term but due to fuel buildup, old growth stands could burn in	**Fully meets**	**Partially meets,** some Phase III areas are adjacent to old growth juniper and by not

landscape where they occur.	uncharacteristic wildfire in the long term.		treating the Phase III juniper, there is a possibility that a wildfire could carry through the Phase III into old growth stands.
Increase or maintain sagebrush cover greater than 15 percent on Wyoming and mountain big sagebrush sites within the project area.	**Does not meet purpose and need**	**Moving towards Fully meets**	**Partially meets**; Fully meets on approximately 20,000 acres but In Phase III areas that would not be treated under this alterative, sagebrush cover would remain under 15%.
Improve sage-grouse nesting and brood rearing habitat in the Goose Creek area.	**Does not meet purpose and need**	**Fully meets**	**Fully meets** due to hand treatment improving areas of sage-grouse nesting and brood rearing habitat in the Goose Creek area that are currently providing habitat (Phase I and early Phase II).
Reduce fuel loading and fuel continuity in sage-grouse habitat.	**Does not meet purpose and need**	**Fully Meets**	**Partially meets;** on approximately 3,900 acres of Phase III areas where the potential for high severity impacts from wildfire and where

			juniper densities are greatest, treatments would not occur.
Reduce the risk of transitioning to an annual grassland in the event of a large uncharacteristic wildfire.	**Does not meet purpose and need**	**Fully Meets**	**Partially Meets,** in Phase III areas, where the risk of transitioning to annual grasslands is greatest, little treatment is proposed and therefore these areas would still be at a risk of transitioning to an annual grassland.

Table 0-4. Alternative Comparison by Issue Indicators

Issue Indicator	Alternative 1	Alternative 2	Alternative 3
Soils and Invasive Species			
Estimated total acres at risk of introduction and/or spread of noxious and invasive plant species.	0 acres in the short term, unknown risk from large wildfires in the long term	7,610 acres	3,726 acres
Estimated total acres of soils that will experience detrimental disturbance (DD).	0 acres in the short term	1,362 acres	947 acres
Non Target Wildlife Species			
Acres of juniper treated compared to acres of juniper habitat available.	0 acres /35,000 acres	23,500 acres/35,000 acres	20,050 acres/35,000 acres

Chapter 3–Affected Environment

3.1 Introduction

This section summarizes the physical, biological, social and economic environments of the affected project area and the potential changes to those environments due to implementation of the alternatives. It also presents the scientific and analytical basis for comparison of alternatives.

The discussions of resources and potential effects take advantage of existing information included in the Sawtooth National Forest Land & Resource Management Plan Final Environmental Impact Statement (FEIS), project-specific resource reports and related information, and other sources as indicated. Where applicable, such information is briefly summarized and referenced to minimize duplication. The planning record for the Goose Creek Sage-Grouse Habitat Restoration Project includes all project-specific information, including resource reports, biological assessments, and evaluations. The record also contains information resulting from public involvement efforts. Unless specifically stated otherwise, additional supporting information, as well as analysis assumptions and methodologies, are contained in the project planning record located at the Minidoka Ranger District office.

The following is a list of specialist reports prepared for this project. Reports analyze the direct, indirect, and cumulative effects of the alternatives on the respective resources. Applicable portions of these reports that are related to the analysis of the effects on Key Issues identified are contained in the EA.

- Biological Evaluation/Wildlife/Threatened and Endangered/Migratory Bird/Fisheries Specialist Report
- Botanical, Noxious Weeds, and Soil Resources Specialist Report
- Hydrology Specialist Report
- Cultural and Heritage Resources Specialist Report
- Rangeland Resources Specialist Report
- Recreation Resources Memo
- Visual Resources Specialist Report
- Fire/Fuels/Air Quality Specialist Report

3.2 Wildlife and Terrestrial Habitat

3.2.1 Affected Environment and Existing Conditions

The project area terrestrial wildlife conditions are analyzed to display how the proposed action accomplishes the purpose and objectives stated for this project. The affected environment description describes how the current situation affects wildlife species and their habitat.

Greater Sage-grouse – MIS

On September 22, 2015, the Land Use Plan Amendment and Final Environmental Impact Statement (FEIS) for Greater sage-grouse was completed and a Record of Decision (ROD) was signed. Nearly all of the Goose Creek Project area was mapped as an Important Habitat Management Area (IHMA) in the 2015 Sage-Grouse ROD except for one small portion of the project area that was mapped as a General Habitat Management Area (USFS GIS data, 2017, Figure 5). It is worth noting that mapping of habitat management areas for the FEIS was conducted at a landscape scale. Third order habitat mapping that the Forest completed followed the Habitat Assessment Framework Protocol (BLM, 2015) and refined habitat maps by identifying seasonal habitat types and removing areas where forested vegetation occurred and dominated the site or areas of slope greater than 30% in nesting/breeding habitat and 50% slope in brood/summer habitat and identifying seasonal habitats. Across the district, this removes some areas that were mapped in the FEIS as IHMA but do not meet the characteristics of sage-grouse habitat. Third order habitat maps were used to identify the specific sage-grouse seasonal habitat types within the project area (Figure 6). These maps were developed using the best available data, but may change as new information becomes available.

Priority Habitat Management Areas (PHMAs) focus 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. PHMAs include adequate area to accommodate continuation of existing land uses and landowner activities.

Important Habitat Management Areas (IHMAs) contain additional habitat and populations that provide a management buffer for the PHMA and to connect patches of PHMA. IHMAs are typically adjacent to PHMAs but generally reflect somewhat lower sage-grouse population status and/or reduced habitat value due to disturbance, habitat fragmentation or other factors.

General Habitat Management Areas (GHMAs) encompass habitat that is outside of PHMAs or IHMAs. GHMAs contain approximately 10 percent of the occupied leks that are also of relatively low male attendance compared to leks in PHMA or IHMA. GHMAs are generally characterized by lower quality disturbed or patchy habitat of low lek connectivity. GHMAs comprise areas of occupied seasonal or year round habitat outside of priority habitat.

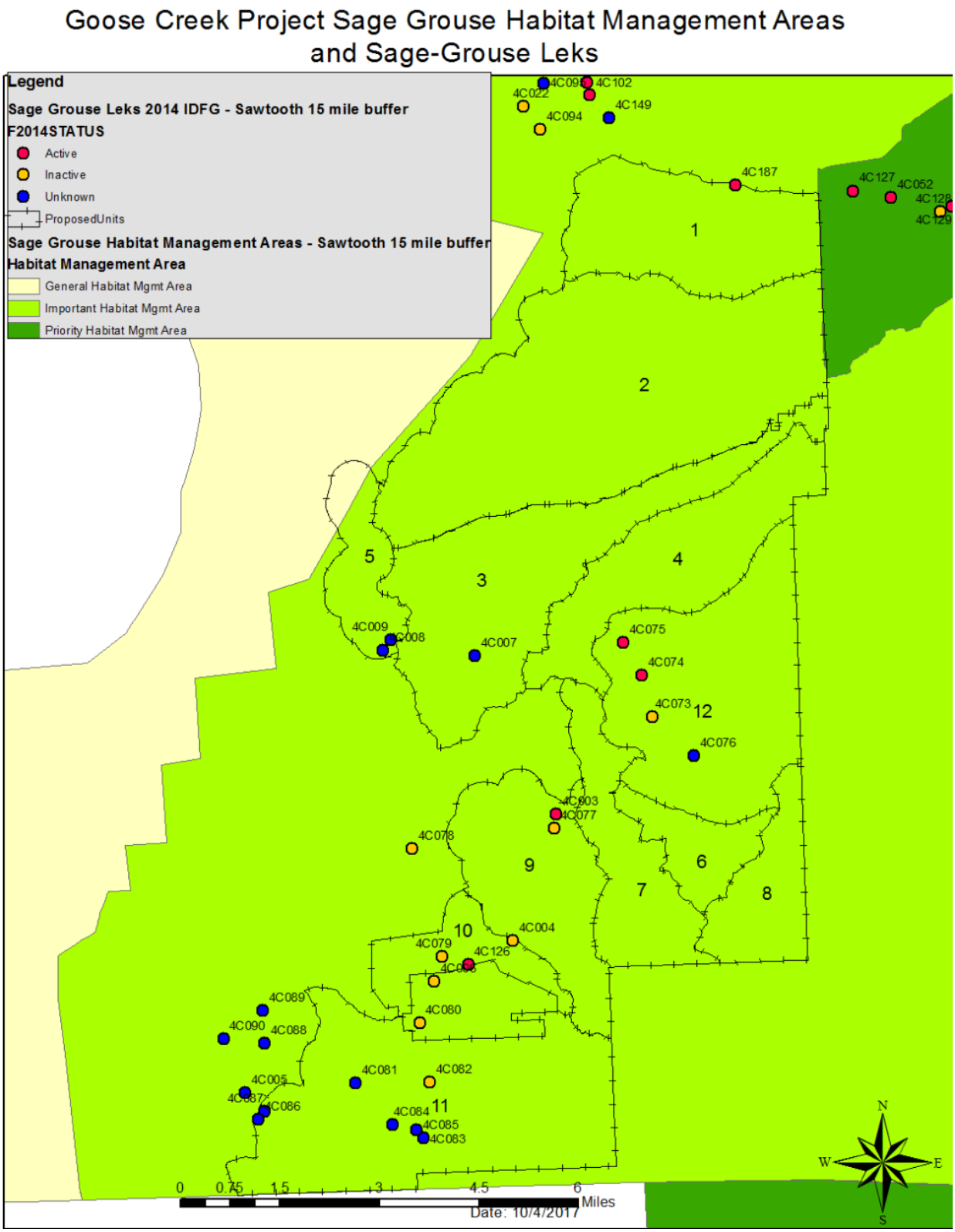


Figure 3-1. Map of Sage-Grouse Habitat Management Areas

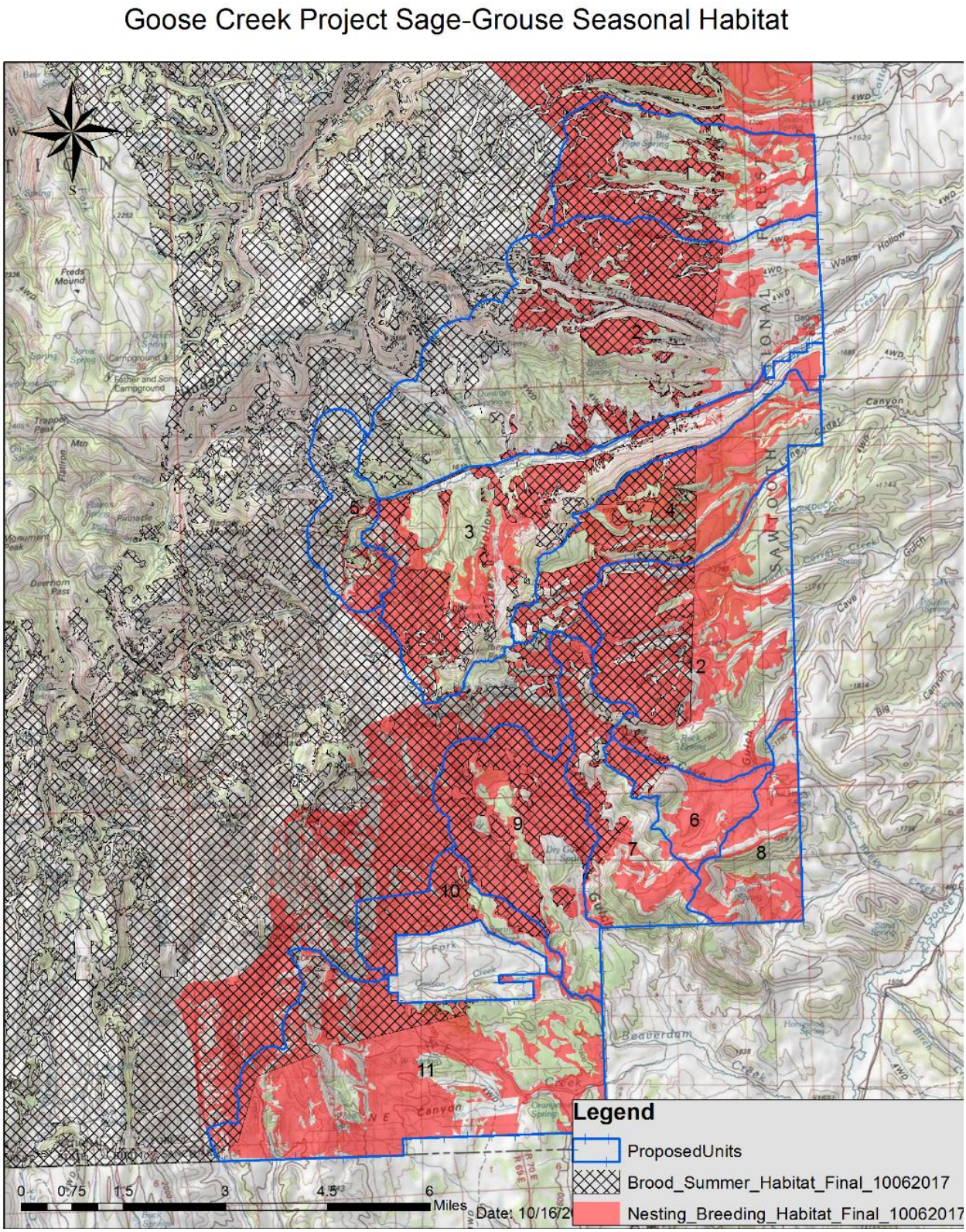


Figure 3-2. Goose Creek Project Sage-Grouse Third Order Seasonal Habitat

Breeding and Nesting Habitat

Lek sites, where males display during the breeding season, are characterized by low, sparse vegetation or bare ground. Sage-grouse males appear to form leks opportunistically at sites within or adjacent to potential nesting habitat. Lekking has been observed within the project primarily on low sagebrush or sparsely vegetated sites, such as upland meadows, that are suitable sites for males to display. Lek site habitat is not considered a limiting habitat type on the landscape.

The importance of sagebrush (*Artemisia* spp.) for nesting habitat is well documented (Connelly et al. 2000). Most sage-grouse nests are located under sagebrush plants that provide overhead cover. Although the exact percentage is debated within the scientific community and may vary by ecoregion, in general, 15 to 25 percent canopy cover of sagebrush with a herbaceous understory of native grasses and forbs is thought to be preferred (Connelly et al. 2000). Within the project area, the majority of sites have the ecological potential to meet these habitat guidelines but may have reduced shrub, grass, or forb composition, primarily as a result of juniper encroachment but also to a lesser extent to non-native crested wheatgrass seedings. The desired conditions for Mountain Big Sagebrush and Dwarf Sagebrush from the Forest Plan are displayed in table 3-2.

Within the Goose Creek project area, sage-grouse have been documented breeding, nesting, brooding, and occasionally using the project area during the fall/winter seasonal use periods. There are 4 active leks (breeding/strutting grounds), 10 leks of unknown status and 7 inactive leks within the project area. There are 5 leks adjacent to the project area where sage-grouse use is expected to occur within the project area. Breeding and nesting is expected to occur adjacent to lek site.

Table 3-1: Sage-Grouse Leks within and adjacent to Project Area Boundary

Project Unit	Lek ID	Lek Name	Management Status	FY2014 Status	Last Count	2016 Survey results (high counts only)	Comments
10	4C126	Not Named	Occupied	Active	2014	29 males, 1 female	Phase I juniper encroaching on site
9	4C003	Not Named	Occupied	Active	2014	0	No sign
12	4C074	OWENS CORRAL	Occupied	Active	2014	7 males, 1 female	2 coyotes near lek site

Project Unit	Lek ID	Lek Name	Management Status	FY2014 Status	Last Count	2016 Survey results (high counts only)	Comments
12	4C075	LONE CEDAR	Occupied	Active	2014	0	SAGR scat at lek coordinates
11	4C082	NW SPRING	Undetermined	Inactive	2014	0	No Sign
10	4C079	PETRIFIED	Undetermined	Inactive	2014	0	Winter sign at point
10	4C004	Not Named	Undetermined	Inactive	2014	0	No Sign
9	4C077	DRY GULCH	Undetermined	Inactive	2014	13 males, 1 female	Occupied
12	4C073	MAGPIE #1	Undetermined	Inactive	2014	1 male, 1 female	Male not strutting when found
11	4C083	SMALL MEADOW	Undetermined	Unknown	2008	0	No Sign
11	4C085	FENCE CORNER	Undetermined	Unknown	2007	0	No Sign
11	4C084	POINT SPRING	Undetermined	Unknown	2008	0	No Sign
11	4C086	JAY 1	Undetermined	Unknown	2011	0	No sign
11	4C087	JAY 2	Undetermined	Unknown	2008	0	No sign
Adjacent to Unit 11	4C089	Jay Pond	Occupied	Active	2011	6 males, 0 females	Occupied
Adjacent to Unit 11	4C005	Not Named	Undetermined	Unknown	2011	0	No Sign
Adjacent to Unit 11	4C090	Trout 1	Undetermined	Unknown	2011	0	No Sign
Adjacent to Unit 11	4C088	Jay 3	Undetermined	Unknown	2011	0	Old Sign

Project Unit	Lek ID	Lek Name	Management Status	FY2014 Status	Last Count	2016 Survey results (high counts only)	Comments
Adjacent to Unit 11	4C078	Right Hand Meadow	Undetermined	Inactive	2014	0	No Sign
10	4C006	Left Hand Fork	Undetermined	Inactive	2014	0	No Sign
10	4C080	Critchfield Meadow	Undetermined	Inactive	2014	0	No Sign
11	4C081	SMALL POINT	Undetermined	Unknown	2008	0	No Sign
12	4C076	MAGPIE #2	Undetermined	Unknown	2011	0	No Sign
3	4C007	Not Named	Undetermined	Unknown	2011	0	No Sign
5	4C008	Not Named	Undetermined	Unknown	2011	0	No sign
5	4C009	Not Named	Undetermined	Unknown	2011	0	No sign but flushed 5 males .28 miles from lek

Despite management and research efforts that date to the 1930s, breeding populations of sage-grouse have declined 17-47% throughout much of its range (Connelly and Braun 1997). The Conservation Objectives Report lists known threats to populations in the Northern Great Basin as fire, conifer encroachment, invasive plant species, infrastructure, grazing, recreation, and urbanization. (USFWS 2013).

While sage-grouse population increases between the late 1990's to 2006 were noted across the Snake River Plain Management Zone (Western Association of Fish and Wildlife Agencies Sage-Grouse and Columbian Sharp-tailed Grouse Technical Committee 2008) and the South Magic Valley (SMV), a sudden drop in population numbers was noted in the SMV region in 2007-08 (Figure 3-3). This is thought to be from a local outbreak in West Nile Virus in late summer or fall of 2006. West Nile virus was never confirmed in sage-grouse within the Magic Valley, but highly suspected as many species suffered from the virus that year. Sage-grouse population numbers increased slightly in 2009-2011. Known cases of West Nile virus in most species have reduced considerably since 2006. In 2012, sage-grouse population numbers markedly declined again, likely as a result of the very low sage-grouse productivity measured in 2011. It was also

possibly related to ongoing drought conditions (Idaho Sage-grouse Advisory Committee 2012, 2013).

Figure 3-3. Sage-grouse lek counts - based on total number of males counted on lek routes counted each year from 2004-2014, in the South Magic Valley Sage-grouse Planning Area, Idaho (Sage-grouse Advisory Committee, Statewide Annual Reports 2009 & 2014).

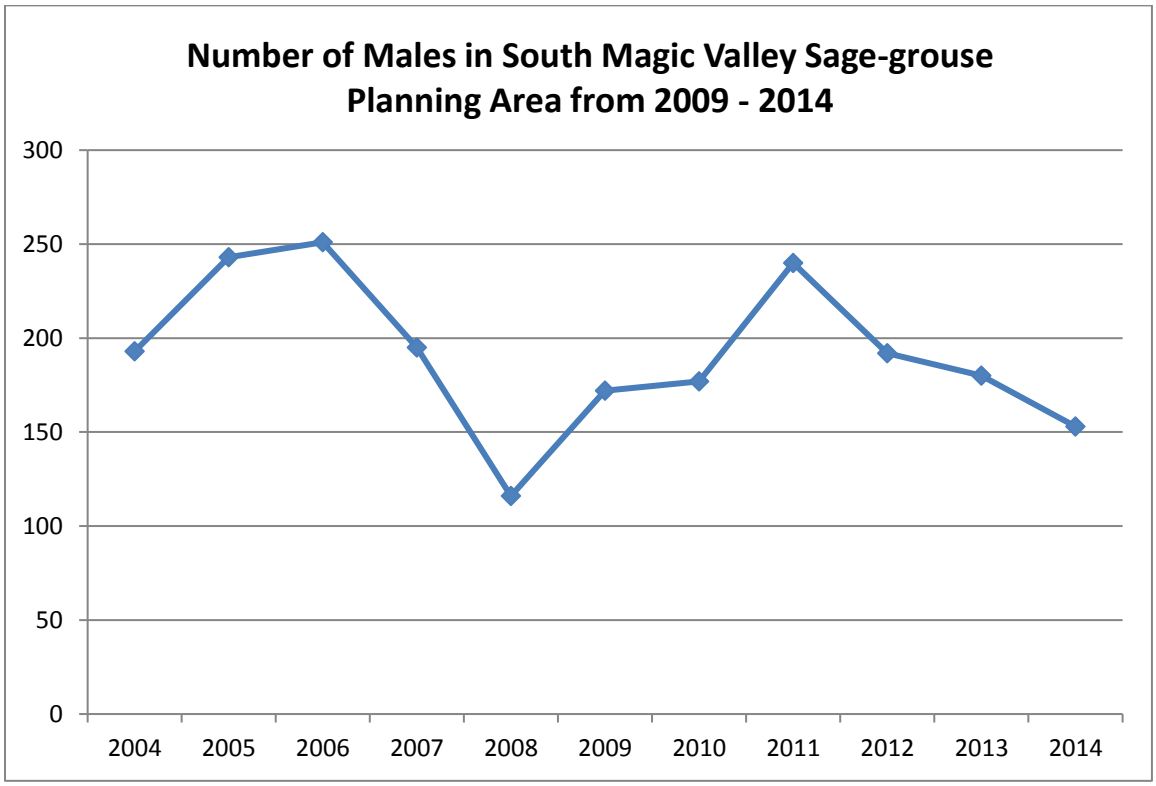


Table 3-2 Desired Condition Ranges for Mountain Big Sagebrush and Dwarf Sagebrush from Forest Plan, Appendix A

Canopy Cover Classes	Desired Percent of Area for Mountain Big Sagebrush	Mountain Big Sagebrush canopy cover categories and percent of sampled sites	Desired Percent of Area for Dwarf Sagebrush	Dwarf Sagebrush canopy cover categories and percent of sampled sites
Grass/Forb = <10% canopy cover	13–33%	13 sites (36%)	13–33%	5 sites (29%)
Low = 10–25% canopy cover	27–47%	15 sites (42%)	27–47%	9 sites (53 %)

Moderate = 26–35% canopy cover	12–32%	5 sites (14%)	12–32%	1 site (6%)
High = ≥36% canopy cover	8–28%	3 sites (8%)	8–28%	2 sites (12%)

Pre-Treatment Monitoring

Within the project area, randomly located pre-treatment Sage-grouse Habitat Assessment Framework plots were collected in 53 locations during the 2016 field season. Plot locations were generated using a stratified random sampling strategy to reduce biases associated with plot site selection and get a better overall representation of conditions across the landscape. Data collected included vegetation and shrub canopy composition, preferred forb abundance, presence of noxious weeds, sagebrush shape and grass droop height. Overall, pre-treatment sagebrush canopy cover across the entire project area (not just the treatment areas) are at or near desired percentages for mountain and low sagebrush sites but based on the data collected appear to be trending towards the lower canopy cover classes at this point in time. Plots were located both in areas proposed for treatment and in adjacent areas that are not being treated but are within the project area.

Plots were also assessed for sage-grouse habitat suitability that looks at a myriad of factors including sagebrush cover, sagebrush height and shape, grass cover, preferred forbs, grass height, disturbances, presence of invasive and noxious plant species, and on site and adjacent management activities. Of the 53 plots assessed, 2 plots were suitable, 19 sites were marginally suitable and 31 sites were not unsuitable. Table 3-3 below has data on vegetation composition, preferred forbs and habitat suitability. Figure 3-4 shows the location of the plots. Juniper was a contributing factor to marginally suitable and unsuitable ratings in many cases.

Table 3-3. Shrub Canopy Cover within pretreatment sampled sites

Plot ID	Proposed Treatment	Dominant Land Cover Type	Crested Wheatgrass present	Total shrub cover percent	Total grass cover percent	Total number of Preferred Forbs	Sage-Grouse Habitat Suitability	Reason for Rating
GC-DG-1B	Not in treatment area but within project area	Low sagebrush/Mountain big sagebrush/Sandberg bluegrass - Idaho fescue mix	No	6	3	2	Marginal	Sparse juniper
GC-DG-2B	Hand treatment	Mountain big sagebrush/Idaho fescue	No	25	35	6	Marginal	Sparse juniper
GC-DG-3B	Hand treatment	Mountain big sagebrush/Idaho fescue/Sandberg bluegrass	No	29	29	4	Unsuitable	Abundant juniper
GC-DG-4B	Hand treatment	Mountain big sagebrush/Sandberg bluegrass	Yes	6	22	8	Unsuitable	Abundant juniper

Plot ID	Proposed Treatment	Dominant Land Cover Type	Crested Wheatgrass present	Total shrub cover percent	Total grass cover percent	Total number of Preferred Forbs	Sage-Grouse Habitat Suitability	Reason for Rating
GC-DG-5B	Hand treatment	Mountain big sagebrush/crested wheatgrass	Yes	20	49	3	Marginal	Low forb diversity, dominant crested wheatgrass
GC-JC-3B	Hand treatment	Mountain big sagebrush/crested wheatgrass	Yes	24	38	8	Marginal	Low forb cover, dominant non-native grasses
GC-JC-4B	Hand treatment	Mountain big sagebrush/crested wheatgrass	Yes	8	49	6	Marginal	Low forb cover, dominant non-native grasses
GC-JP-12	Hand Treatment	Low sagebrush/Mountain big sagebrush/bitterbrush /Sandberg bluegrass/Juniper mix	No	12	22	7	Unsuitable	Abundant juniper
GC-JP-15	Hand Treatment	Mountain big sagebrush/bitterbrush	No	34	31	7	Marginal	Sparse juniper

Plot ID	Proposed Treatment	Dominant Land Cover Type	Crested Wheatgrass present	Total shrub cover percent	Total grass cover percent	Total number of Preferred Forbs	Sage-Grouse Habitat Suitability	Reason for Rating
		/intermediate wheatgrass						
GC-JP-24	Hand treatment	Mountain big sagebrush/intermediate wheatgrass/Sandberg bluegrass	No	47	7	4	Marginal	Sparse juniper
GC-JP-29	Hand treatment	Low sagebrush/Idaho fescue/ Sandberg's bluegrass	No	15	50	2	Unsuitable	Dominant juniper
GC-JP-3S	Hand treatment	Mountain big sagebrush/Crested wheatgrass seeding	Yes	2	45	3	Unsuitable	Dominant juniper and crested wheatgrass
GC-JP-31S	Right on edge of mechanical and hand boundary	Low sagebrush/bluebunch wheatgrass	No	3	17	5	Unsuitable	Abundant juniper, low sagebrush cover

Plot ID	Proposed Treatment	Dominant Land Cover Type	Crested Wheatgrass present	Total shrub cover percent	Total grass cover percent	Total number of Preferred Forbs	Sage-Grouse Habitat Suitability	Reason for Rating
GC-JP-4B	Hand treatment (on edge of mastication)	Low sagebrush/cheatgrass	No	21	10	8	Unsuitable	Abundant juniper and cheatgrass
GC-JP-5B (JP-4)	Hand treatment	Low sagebrush/Sandberg bluegrass/bluebunch wheatgrass/crested wheatgrass	No	22	12	7	Unsuitable	Dominant juniper and non-native grasses
GC-JP-9B	Hand treatment	Low sagebrush/Sandberg bluegrass/Juniper mix	No	37	13	11	Marginal	Sparse juniper
GC-LC-1B	Not in treatment area but within project area	Mountain big sagebrush/low sagebrush/Idaho fescue/Sandberg bluegrass	No	16	19	13	Marginal	Low sagebrush composition, high % bare ground
GC-LC-2B	Hand treatment	Mountain big sagebrush/Sandberg	No	9	36	7	Unsuitable	Abundant juniper nearby, cheatgrass

Plot ID	Proposed Treatment	Dominant Land Cover Type	Crested Wheatgrass present	Total shrub cover percent	Total grass cover percent	Total number of Preferred Forbs	Sage-Grouse Habitat Suitability	Reason for Rating
		bluegrass/smooth brome						and high bare ground
GC-LC-3B	Hand treatment	Mountain big sagebrush/Idaho fescue-and mix of other native grasses	No	23	7	6	Unsuitable	Abundant juniper, high % bare ground, aspen
GC-LC-4B	Hand treatment	Mountain big sagebrush/Sandberg bluegrass/bluebunch wheatgrass	No	33	24	6	Suitable	Good sagebrush and forb cover
GC-LC-5B	Hand treatment	Low sagebrush/Sandbergs bluegrass	No	10	14	8	Unsuitable	Abundant juniper
GC-OB-1B	Hand treatment	Mountain big sagebrush/crested wheatgrass	Yes	0	36	10	Unsuitable	Abundant juniper and crested wheatgrass, very low sagebrush cover

Plot ID	Proposed Treatment	Dominant Land Cover Type	Crested Wheatgrass present	Total shrub cover percent	Total grass cover percent	Total number of Preferred Forbs	Sage-Grouse Habitat Suitability	Reason for Rating
GC-OB-2B	Hand treatment	Mountain big sagebrush/crested wheatgrass and mixed with other perennial grasses/juniper	Yes	2	8	4	Unsuitable	Abundant juniper and non-native grasses
GC-OB-3B	Hand treatment	Mountain big sagebrush/crested wheatgrass	Yes	11	44	5	Marginal	Sparse juniper, abundant crested wheatgrass
GC-OB-4B	Hand treatment	Mountain big sagebrush/rabbitbrush /crested wheatgrass	Yes	2	59	6	Unsuitable	Abundant juniper and crested wheatgrass
GC-OB-5B	Hand treatment	Bitterbrush/crested wheatgrass/juniper	Yes	10	32	6	Unsuitable	Abundant juniper and crested wheatgrass
GC-TC-2B	Not in treatment area but within project area	Low sagebrush/ rabbitbrush/	No	4	38	8	Unsuitable	Little sagebrush cover, high % bare ground

Plot ID	Proposed Treatment	Dominant Land Cover Type	Crested Wheatgrass present	Total shrub cover percent	Total grass cover percent	Total number of Preferred Forbs	Sage-Grouse Habitat Suitability	Reason for Rating
		bluebunch wheatgrass						
GC-UB-1B	Hand treatment	Low sagebrush/little deep rooted perennial grass at site/bulbous bluegrass dominant	No	38	25	3	Unsuitable	Abundant juniper and non-native grasses
GC-UB-4B	Not in treatment area but within project area	Mountain big sagebrush/cheatgrass/ mixed with bitterbrush and currant.	No	7	77	5	Marginal	Low sagebrush cover, non-native grasses
GC-UB-5B	Hand treatment	Mountain big sagebrush/western needlegrass/bulbous bluegrass	No	16	26	6	Unsuitable	Abundant juniper and non-native grasses
OV-BC-1S	Not in treatment area but within project area	Mountain big sagebrush/crested wheatgrass	Yes	19	39	4	Marginal	Dominant crested wheatgrass, low forb cover

Plot ID	Proposed Treatment	Dominant Land Cover Type	Crested Wheatgrass present	Total shrub cover percent	Total grass cover percent	Total number of Preferred Forbs	Sage-Grouse Habitat Suitability	Reason for Rating
OV-BC-3S	Not in treatment area but within project area	Mountain big sagebrush/crested wheatgrass	Yes	25	37	7	Marginal	Dominant crested wheatgrass, low forb cover
OV-BC-6S	Not in treatment area but within project area	Juniper/Idaho fescue	No	0	0	5	Unsuitable	Abundant juniper, low vegetation cover
OV-FM-1B	Hand Treatment	Low sagebrush/Juniper/Sandberg bluegrass	No	24	13	8	Unsuitable	Juniper scattered across site but composition is good, would become suitable if treated.
OV-FM-2B	Hand Treatment	Mountain big sagebrush/snowberry/mountain shrub/Idaho fescue	No	32	9	4	Unsuitable	Juniper scattered across site but composition is good, would become suitable if treated.

Plot ID	Proposed Treatment	Dominant Land Cover Type	Crested Wheatgrass present	Total shrub cover percent	Total grass cover percent	Total number of Preferred Forbs	Sage-Grouse Habitat Suitability	Reason for Rating
OV-FM-3B	Not in treatment area but within project area	Low sagebrush/Crested wheatgrass	Yes	27	17	9	Marginal	Shrub cover good but dominant crested wheatgrass, high bare ground
OV-FM-5B	Hand Treatment	Low sagebrush/Crested wheatgrass	Yes	18	20	4	Marginal	Dominant crested wheatgrass, low forb cover
OV-LB-1S	Not in treatment area but within project area	Low sagebrush/Mountain big sagebrush/bluebunch wheatgrass	No	24	34	5	Marginal	Sparse juniper
OV-LB-2S	Hand treatment	Mountain big sagebrush/ Juniper mix/bluebunch wheatgrass	No	30	34	7	Unsuitable	Abundant juniper
OV-LB-3S	Not in treatment area	Mountain big sagebrush/bluebunch	No	2	2	8	Unsuitable	Abundant juniper, dry rocky site

Plot ID	Proposed Treatment	Dominant Land Cover Type	Crested Wheatgrass present	Total shrub cover percent	Total grass cover percent	Total number of Preferred Forbs	Sage-Grouse Habitat Suitability	Reason for Rating
	but within project area	wheatgrass/Juniper mix						
OV-LB-4S	Not in treatment area but within project area	Mountain big sagebrush/Idaho fescue	No	47	11	3	Marginal	Low forb diversity/cover
OV-LB-6S	Hand treatment	Low sagebrush/Sandberg bluegrass	No	27	8	8	Marginal	Sparse juniper
OV-RC-1B	Hand Treatment	Mountain big sagebrush/bottlebrush squirreltail	No	18	23	11	Unsuitable	Abundant juniper
OV-RC-2B	Not in treatment area but within project area	Mountain big sagebrush/Sandberg bluegrass and Kentucky bluegrass	No	58	35	6	Marginal	Aspen nearby

Plot ID	Proposed Treatment	Dominant Land Cover Type	Crested Wheatgrass present	Total shrub cover percent	Total grass cover percent	Total number of Preferred Forbs	Sage-Grouse Habitat Suitability	Reason for Rating
OV-RC-4B	Mastication	Low sagebrush/Sandberg bluegrass/ mixture of native grasses	No	2	15	12	Unsuitable	Abundant juniper, low sagebrush cover
OV-RC-5B	Mastication	Low sagebrush/Sandberg bluegrass/ mixture of native grasses	No	5	21	12	Unsuitable	Abundant juniper
OV-RC-6B	Not in treatment area but within project area	low sagebrush/Sandberg bluegrass/ mixture of native grasses	No	21	12	9	Suitable	Good sagebrush and forb cover
OV-TC-1B	Hand Treatment	Rabbitbrush/crested wheatgrass/juniper	Yes	7	47	1	Unsuitable	Abundant juniper, low forb diversity, low shrub cover
OV-TC-2B	Not in treatment area but within project area	Low sagebrush/cheatgrass/ juniper	No	14	2	3	Unsuitable	Abundant juniper

Plot ID	Proposed Treatment	Dominant Land Cover Type	Crested Wheatgrass present	Total shrub cover percent	Total grass cover percent	Total number of Preferred Forbs	Sage-Grouse Habitat Suitability	Reason for Rating
OV-TC-3B	Hand Treatment	Mountain big sagebrush/ Sandbergs bluegrass/juniper	No	5	15	8	Unsuitable	Abundant juniper, low shrub cover
OV-TC-4B	Hand Treatment	Mountain big sagebrush/juniper/cheatgrass	No	24	34	5	Unsuitable	Abundant juniper
OV-TC-5B	Hand Treatment	Low sagebrush/juniper/Sandbergs bluegrass	No	1	10	8	Unsuitable	Abundant juniper, low shrub cover

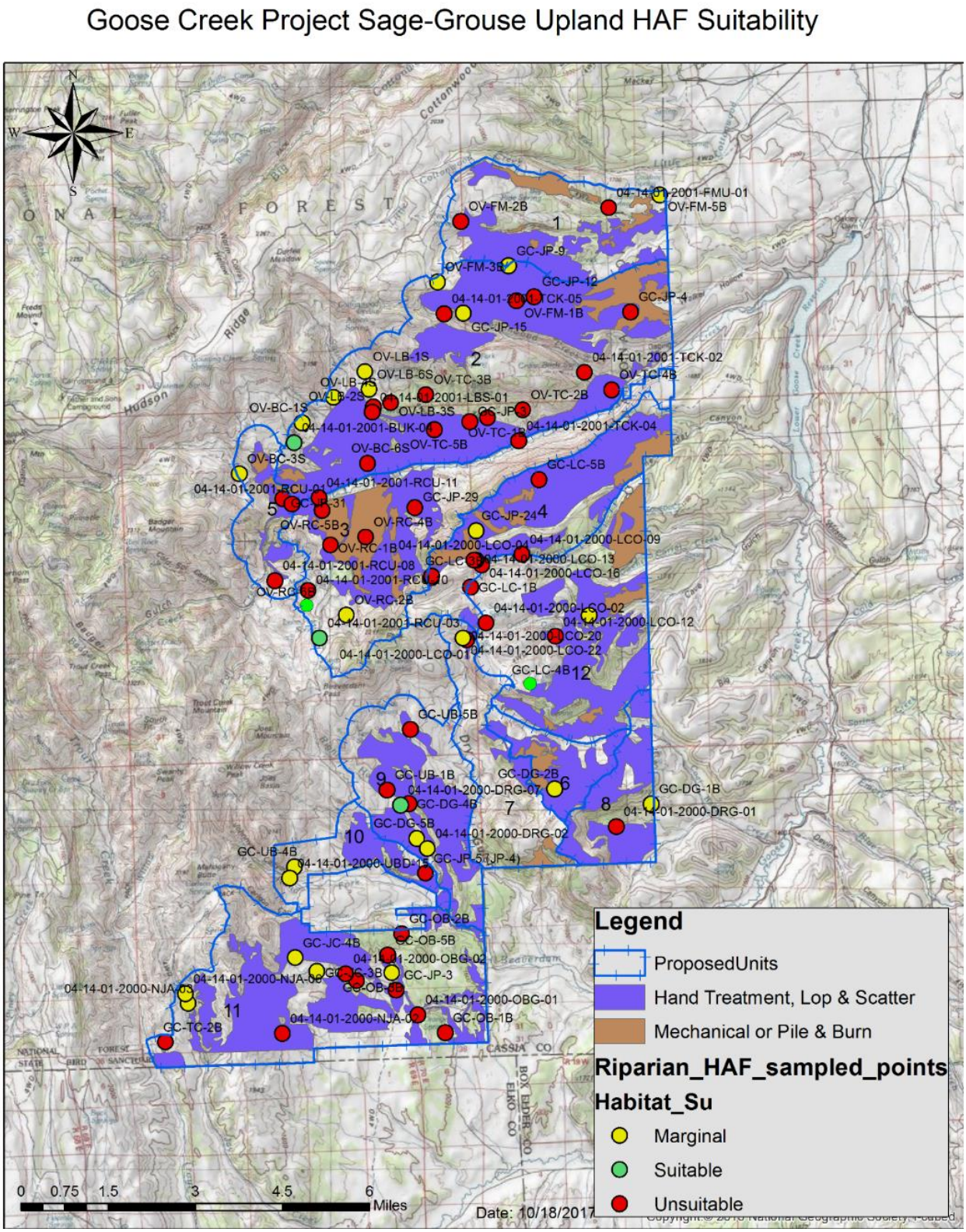


Figure 3-4. Pretreatment HAF Sampling Points

Brood Rearing/ Summer Habitat

Sage-grouse rely on wet meadows and riparian habitats in relatively close proximity to sagebrush habitat, where native forbs provide summer food for hens and their broods. Late brood rearing habitats usually have less dense sagebrush canopy than nesting habitats and generally have a higher proportion of grasses and forbs in the understory. Riparian meadows, springs, and seeps are important for sage-grouse as they produce forbs and insects necessary for juvenile birds (Connelly et al. 2000). During summer, sage-grouse primarily eat insects and forbs, but they rarely stray from the edge of sagebrush, which provides cover year round.

Sage-grouse locally migrate up and down in elevation; hens that are rearing broods and foraging in the Goose Creek watershed often ascend in elevation (onto Forest Service lands) in search of greener forbs and insects as the summer season progresses. Limited telemetry data has documented these movements in and adjacent to the project area. Most of the riparian areas in the project area are capable of providing habitat to sage-grouse; use has been observed in many of the riparian sites within the project area (S. Soletti, personal observation, 2016). Nearly all of the riparian sites within the project area are currently being impacted by livestock grazing to some degree and at a few sites livestock water developments lie within riparian conservation areas. In 2017, sage-grouse brood/summer Habitat Assessment Framework plots were completed in riparian areas across the district, including riparian sites within the project area. Plots evaluate a number of factors that influence a sites suitability to sage-grouse including physical functioning of processes (soil, hydrology, vegetation) on the site, abundance of preferred forbs, level of disturbance, a qualitative condition rating, vegetation structure and composition and management activities that have the potential to affect site suitability. Twenty one of the 29 sites monitored in 2017 within the project area are impacted by juniper encroachment to the edge of the riparian zone or are close enough to likely influence behavioral avoidance of these sites. Table 3-4 below details the findings and the site suitability for sage-grouse. Three sites were considered suitable, five sites were rated as marginally suitable and 21 sites were considered unsuitable. Site suitability is not static and can change with management actions such as when trees are removed, grazing practices are improved, etc. (USFS Sage-grouse riparian habitat survey, 2017. S. Soletti, personal observation, 2017).

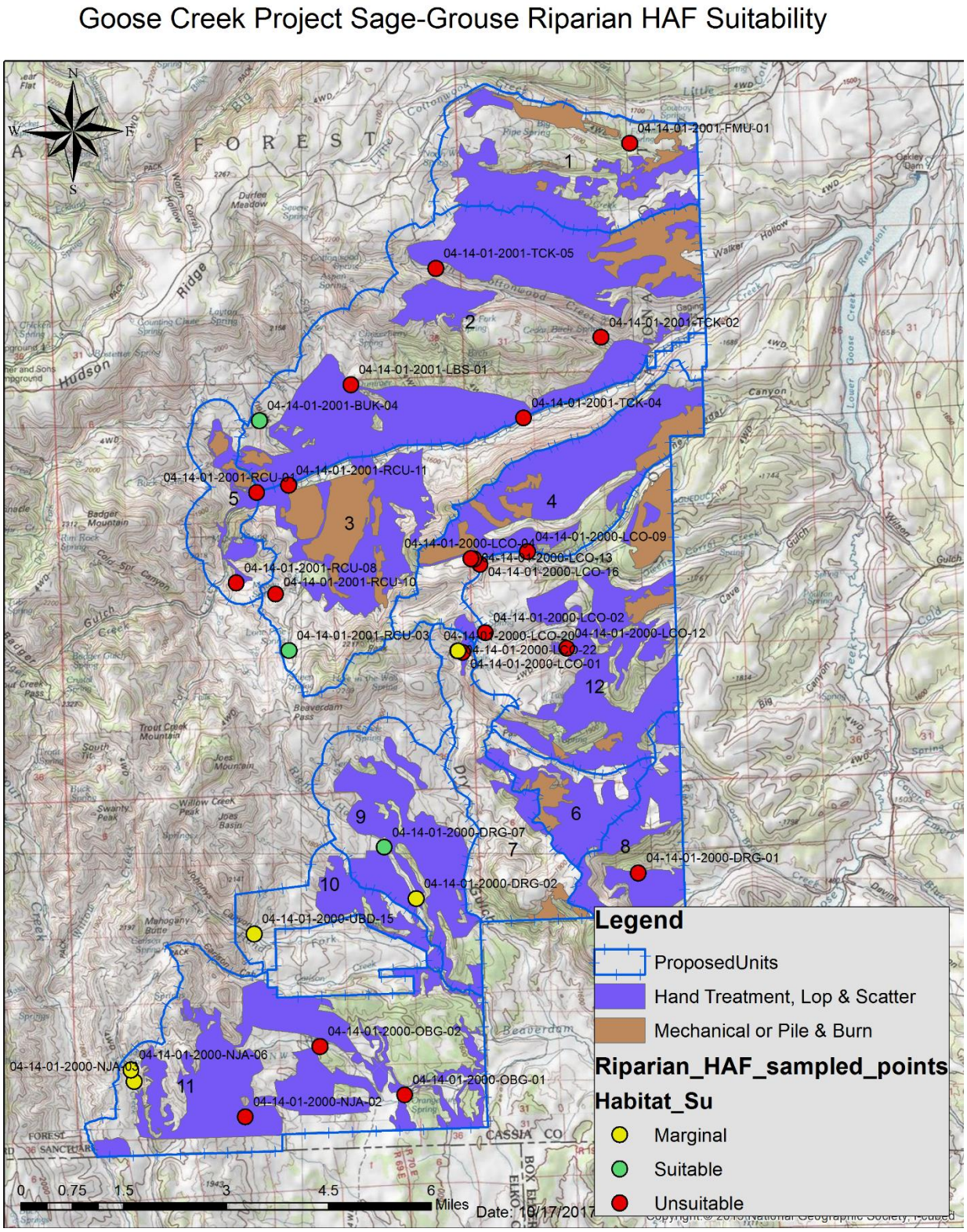


Figure 3-5: Map of Sage-Grouse HAF Riparian Plots in Project Area

Table 3-4: Sage-Grouse Riparian Habitat Assessment Plots

Site Number	Unit	Allotment	Pasture	Range Developme nt on site	Noxious Weeds at Site	Condition Rating	Overall Disturbance	Sage-Grouse Habitat Suitability	Number of preferred forbs	Juniper adjacent to Site
04-14-01-2000-NJA-03	Unit 11	Goose Creek	North Jay Creek	No	Yes	Fair	Moderate	Marginal	4	No
04-14-01-2000-NJA-06	Unit 11	Goose Creek	North Jay Creek	No	Yes	Fair	Moderate	Marginal	1	No
04-14-01-2000-OBG-02	Unit 11	Goose Creek	Orangeburg	No	Yes	Fair	Moderate	Unsuitable	4	Yes
04-14-01-2000-UBD-15	Unit 10	Goose Creek	Upper Beaverdam	No	Yes	Fair	Moderate	Marginal	5	No
04-14-01-2000-DRG-02	Unit 9	Goose Creek	Dry Gulch	No	Yes	Fair	Moderate	Marginal	8	Yes
04-14-01-2000-DRG-07	Unit 9	Goose Creek	Dry Gulch	No	Yes	Fair	Moderate	Suitable	6	Yes, low density
04-14-01-2000-LCO-01	Unit 7	Goose Creek	Lone Cedar/Owen's Corral	Yes	Yes	Fair	Moderate	Unsuitable	7	Yes

Site Number	Unit	Allotment	Pasture	Range Developme nt on site	Noxious Weeds at Site	Condition Rating	Overall Disturbance	Sage-Grouse Habitat Suitability	Number of preferred forbs	Juniper adjacent to Site
04-14-01-2000-LCO-20	Unit 7	Goose Creek	Lone Cedar/Owen's Corral	No	Yes	Poor	Moderate	Marginal	4	No
04-14-01-2000-LCO-12	Unit12	Goose Creek	Lone Cedar/Owen's Corral	Yes	Yes	Fair	Moderate	Unsuitable	6	Yes
04-14-01-2000-LCO-02	Unit12	Goose Creek	Lone Cedar/Owen's Corral	No	Yes	Fair	Moderate	Unsuitable	3	Yes
04-14-01-2001-RCU-10	Unit 3	Oakley Valley	Rodeo Creek	No	No	Fair	Moderate	Unsuitable	1	No
04-14-01-2000-LCO-04	Unit 4	Goose Creek	Lone Cedar/Owen's Corral	No	Yes	Fair	Moderate	Unsuitable	4	Yes
04-14-01-2000-LCO-09	Unit 12	Goose Creek	Lone Cedar/Owen's Corral	No	Yes	Fair	Moderate	Unsuitable	6	Yes
04-14-01-2001-FMU-01	Unit 1	Oakley Valley	Four Mile Unit	Yes	Yes	Fair	Slight	Unsuitable	3	Yes
04-14-01-2000-OBG-1	Unit 11	Goose Creek	Orangeburg	No	Yes	Good	Slight	Unsuitable	5	Yes

Site Number	Unit	Allotment	Pasture	Range Developme nt on site	Noxious Weeds at Site	Condition Rating	Overall Disturbance	Sage-Grouse Habitat Suitability	Number of preferred forbs	Juniper adjacent to Site
04-14-01-2001-RCU-03	Unit 3	Oakley Valley	Rodeo Creek	No	Yes	Good	Slight	Suitable	4	No
04-14-01-2001-RCU-08	Unit 5	Oakley Valley	Rodeo Creek	No	Yes	Good	Moderate	Unsuitable	4	Yes
04-14-01-2000-LCO-16	Unit 4	Goose Creek	Lone Cedar/Owen's Corral	No	Yes	Good	Slight	Unsuitable	3	Yes
04-14-01-2000-LCO-13	Unit 4	Goose Creek	Lone Cedar/Owen's Corral	No	Yes	Good	Slight	Unsuitable	5	Yes
04-14-01-2001-RCU-01	Unit 5	Oakley Valley	Rodeo Creek	No	Yes	Good	Slight	Unsuitable	2	Yes
04-14-01-2001-RCU-11	Unit 3	Oakley Valley	Rodeo Creek	No	Yes	Good	Slight	Unsuitable	5	Yes
04-14-01-2001-BUK-04	Unit 2	Oakley Valley	Buck Corral	No	Yes	Good	Slight	Suitable	7	No
04-14-01-2001-TCK-04	Unit 3	Oakley Valley	Trapper Creek	No	Yes	Good	Slight	Unsuitable	8	Yes

Site Number	Unit	Allotment	Pasture	Range Developme nt on site	Noxious Weeds at Site	Condition Rating	Overall Disturbance	Sage-Grouse Habitat Suitability	Number of preferred forbs	Juniper adjacent to Site
04-14-01-2001-LBS-01	Unit 2	Oakley Valley	Lower Bostetter	Yes	Yes	Good	Slight	Unsuitable	3	Yes
04-14-01-2001-TCK-02	Unit 2	Oakley Valley	Trapper Creek	No	Yes	Good	Slight	Unsuitable	5	Yes
04-14-01-2001-TCK-05	Unit 2	Oakley Valley	Trapper Creek	No	Yes	Good	Slight	Unsuitable	9	Yes
04-14-01-2000-NJA-02	Unit 11	Goose Creek	North Jay Creek	Yes	Yes	Poor	Moderate	Unsuitable	2	Yes
04-14-01-2000-DRG-01	Unit 7	Goose Creek	Dry Gulch	No	Yes	Poor	High	Unsuitable	7	Yes
04-14-01-2000-LCO-22	Unit 7	Goose Creek	Lone Cedar/Owen's Corral	Yes	Yes	Poor	Moderate	Unsuitable	3	No

Fall and Winter Habitat

In the fall, sage-grouse shift their diet entirely to sagebrush, depending on the shrub for both food and cover. Unlike many species of wildlife, sage-grouse typically have higher survival rates during the fall/winter period than other seasonal use periods and often put on weight. Winter habitat generally consists of denser sagebrush communities where sage-grouse can forage on sagebrush that is above the snow or on windswept ridges where sagebrush is exposed. Sage-grouse select winter use sites based on snow depth and topography to access sagebrush. Sagebrush heights of 25-35 cm (10-14 in) above the snow and canopy cover of 10-30 percent, are important for winter use by sage-grouse (Connelly et al. 2000). Nesting hens that brood at higher elevations on Forest Service lands typically descend back down to sagebrush habitat at lower elevations as winter approaches. Telemetry data and biologist observations indicates that a small portion of the project area is actively used by sage-grouse during the fall/winter (USFS GIS Data, 2017, S. Soletti, personal observations).

Local Threats to Sage-Grouse Populations

The Goose Creek project area lies within the Sage-Grouse Northern Great Basin Management Zone. This is a large area of primarily public land ownership covering three states: Oregon, Idaho and Nevada. Population analysis estimates that sage-grouse carrying capacity will decline from an estimated 6,770 males in 2007 to 1787 males in 2037 within the management zone if current trends continue (Garton *et al.* 2011). The largest overall threat to sage-grouse populations in this management zone is wildfire and the associated risk of conversion of sagebrush habitats to cheatgrass (COT Report, 2013).

A Resistance and Resilience assessment was completed for the project using Sage-Grouse Habitat Assessment data plots that were randomly generated within the project area following the USDA Forest Service General Technical Report Protocol (RMRS-GTR-326. 2014). The protocol scores the overall resistance and resilience of a site based on abiotic and biotic factors such as sagebrush cover, soil temperature regimes, soil moisture regimes, invasive species, etc. The score is then multiplied by 0.8 for a low intensity/disturbance or treatment, such as hand cutting. For a high severity wildfire event the score is multiplied by 0.1 and was used to illustrate the No Action Alternative, where no treatment would be done and the resistance of that site to annual grass invasion pre-fire and then the resilience of that site to recover post-fire. The treatments are used to illustrate the low intensity disturbance, where treatment would be done. Mastication could be either low intensity or moderate intensity depending on a multitude of factors during implementation but for analysis purposes was scored as a low intensity event. This analysis was completed to compare the No Action and Action Alternatives using resistance/resilience and state and transition model concepts (Figure 3-6 below).

Results from assessments are detailed below in Table 3.5, in general, resistance and resilience in the project area is moderate to low. Assessments support the findings of the ID Team Members that many sites in the project areas are susceptible to increases in annual grasses or a conversion to an annual grassland community in the event of a high severity wildfire or other disturbances, including treatments.

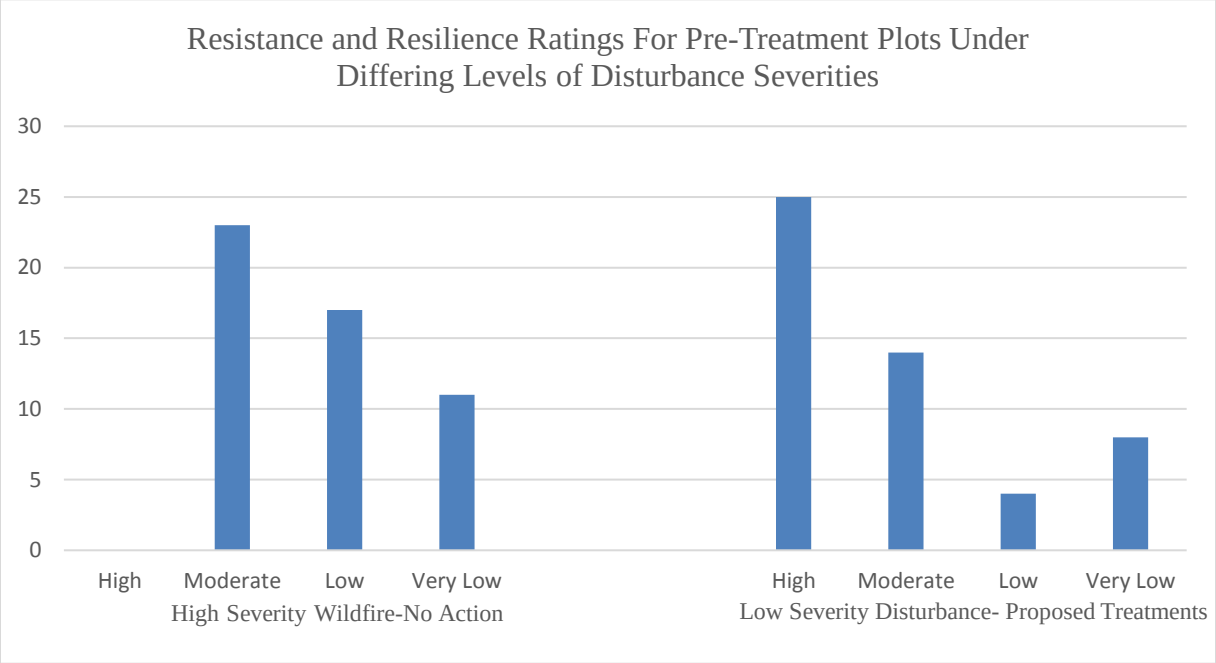


Figure 3-6. Summary Graph of R&R Ratings in Project Area under Differing Disturbance Severities

Table 3.5: Sage-Grouse Habitat Assessment Framework Plots and Resistance and Resilience Ratings with Project Area

Plot ID	Proposed Treatment	Resilience and Resistance Score (R&R) for Low Severity Disturbance	R&R Score Under High Severity Wildfire Scenario	Comments About Site
GC-DG-1B	Outside of treatment	Very Low R&R-7.9	Very Low R&R-6.4	Is a very dry site, vegetation composition is poor, juniper dominates site. It is likely this site would transition to an annual grassland following disturbance.
GC-DG-2B	Hand treatment	High R&R-23.5	Moderate R&R-16.8	In good ecological condition and has a vigorous and robust shrub and herbaceous understory.

Plot ID	Proposed Treatment	Resilience and Resistance Score (R&R) for Low Severity Disturbance	R&R Score Under High Severity Wildfire Scenario	Comments About Site
GC-DG-3B	Hand treatment	High R&R-24.5	Moderate R&R-17.8	Very productive site with good understory composition.
GC-DG-4B	Hand treatment	High R&R-22.5	Moderate R&R-15.8	Has a robust understory and diverse plant community and is in good ecological condition. Juniper is encroaching and expanding at site.
GC-DG-5B	Hand treatment	High R&R-21.5	Moderate R&R-14.8	Dominated by a crested wheatgrass understory. There is a good overstory of sagebrush but low plant diversity. This site is not prone to cheatgrass invasion due to the high composition of crested wheatgrass.
GC-JC-3B	Hand treatment	High R&R-24.5	Moderate R&R-17.8	Site is dominated by mountain big sagebrush and crested wheatgrass. It also has a good diversity of other native grasses and forbs. It is a productive site.
GC-JC-4B	Hand treatment	High R&R-22.5	Moderate R&R-15.8	Site is dominated by crested wheatgrass. Mountain big sagebrush foliar cover is 6%. Low plant diversity but high R&R due to the robust stand of crested wheatgrass.
GC-JP-12	Hand Treatment	Moderate R&R-16.7	Low R&R-12.2	Some grazing related impacts, cheatgrass is present and could become dominant in the event of a wildfire. Rest of treatment will be important to ensure released nutrients are taken by deep rooted perennial bunchgrasses and not invasive annual grasses.

Plot ID	Proposed Treatment	Resilience and Resistance Score (R&R) for Low Severity Disturbance	R&R Score Under High Severity Wildfire Scenario	Comments About Site
GC-JP-15	Hand Treatment	High R&R-25.5	Moderate R&R-18.8	Very productive site with good understory.
GC-JP-24	Hand treatment	Low R&R-13.9	Low R&R-12.4	This site has a fair amount of bare ground and poor deep rooted perennial grass component. Grazing use was noted as a potential stressor of this site.
GC-JP-29	Hand treatment	High R&R-20.5	Low R&R-13.8	Site is in decent ecological condition and should be resistant to cheatgrass invasion. Juniper is not dominating ecological processes.
GC-JP-3	Hand treatment	High R&R-21.5	Low R&R-14.8	This is an old crested wheatgrass seeding. Crested wheatgrass still dominates and natives have not established at levels that have much influence on the plant community.
GC-JP-31	Right on edge of mechanical and hand boundary	Very Low R&R-9.8	Very Low R&R-9.2	Site has late Phase II juniper encroachment and cheatrass is co-dominant. In the event of a disturbance such as fire, it is likely this site would transition to an annual grassland.
GC-JP-4	Hand treatment (on edge of mastication)	Very low R&R-5.8	Very low R&R-5.6	Dense juniper, poor understory, cheatgrass present.
GC-JP-5 (JP-4)	Hand treatment	Low R&R-13.7	Very Low R&R-9.2	Site has perennial grasses present but cheatgrass is present. Site appears to be a livestock concentration area. Hand treatment of juniper would not likely convert to an annual grassland but a

Plot ID	Proposed Treatment	Resilience and Resistance Score (R&R) for Low Severity Disturbance	R&R Score Under High Severity Wildfire Scenario	Comments About Site
				wildfire could result in trending towards a site conversion.
GC-JP-9	Hand treatment	Moderate R&R-16.6	Low R&R-11.4	Sparse juniper, low sagebrush cover.
GC-LC-1B	Outside of treatment	High R&R-23.5	Moderate R&R-15.8	Site is in good condition, good forb cover.
GC-LC-2B	Hand treatment	High R&R-21.6	Moderate R&R-15.6	Site has good composition but invasives are present in small amounts.
GC-LC-3B	Hand treatment	High R&R-23.5	Moderate R&R-16.8	Site is in good condition. Scattered juniper present. High plant diversity.
GC-LC-4B	Hand treatment	High R&R-25.6	Moderate R&R-19.6	In good ecological condition; there are moderate levels of livestock grazing at site. Juniper density is low.
GC-LC-5B	Hand Treatment	Moderate R&R-17.6	Low R&R-11.6	Site burned in past and has recovered well. Cheatgrass is present but not a big factor in the plant community.
GC-OB-1B	Hand treatment	Moderate R&R-19.5	Low R&R-12.8	Soils on this site are sandy with low nutrient availability. The understory is dominated by crested wheatgrass.
GC-OB-2B	Hand treatment	Moderate R&R-14.4	Low R&R-13.4	Site has heavy juniper encroachment. Sparse sagebrush is left. Any treatment that is completed would either need to minimize loss of existing vegetation or reseed. A slash treatment may be needed.

Plot ID	Proposed Treatment	Resilience and Resistance Score (R&R) for Low Severity Disturbance	R&R Score Under High Severity Wildfire Scenario	Comments About Site
GC-OB-3B	Hand treatment	High R&R-20.5	Low R&R-13.8	This site has previously burned and was seeded to crested wheatgrass. Crested wheatgrass dominates the site but some rabbitbrush and sagebrush has slightly reinvaded site.
GC-OB-4B	Hand treatment	High R&R-22.5	Moderate R&R-15.8	Site has previously burned and recovered well. Sagebrush is still recovering. Crested wheatgrass is on the site but there is still a diversity of other grasses.
GC-OB-5B	Hand treatment	Moderate R&R-19.6	Low R&R-13.6	The dominant grass on this site is crested wheatgrass. Juniper is a major component of the site and is dominating ecological processes. Sagebrush is lacking but bitterbrush is an important component of this site.
GC-TC-2B	Outside of treatment	High R&R-20	Low R&R-12.8	Site appears to have burned in the past and few shrubs are present. This site is dominated by bluebunch wheatgrass. Overall low plant diversity. Bluebunch appears to be outcompeting all other plants. Little livestock grazing.
GC-UB-1B	Hand treatment	Very low R&R-7	Very low R&R-7	Site is near fence in an ecological inclusion with a different soil type than the surrounding area. Soil is very poor and basically has no deep rooted perennial bunchgrasses or bluegrass. That may be due to

Plot ID	Proposed Treatment	Resilience and Resistance Score (R&R) for Low Severity Disturbance	R&R Score Under High Severity Wildfire Scenario	Comments About Site
				livestock use near fenceline. Very unproductive.
GC-UB-4B	Outside of treatment	Moderate R&R-16.7	Low R&R-14.4	Site has a potential to transition to an annual grassland if it burns in high severity event.
GC-UB-5B	Hand treatment	High R&R-22.5	Moderate R&R-19.8	This site scores well but is on the edge of being a poor site. It is in decent condition however cheatgrass is present and will likely increase with disturbance.
OV-BC-1S	Outside of treatment area	High R&R-22.5	Moderate R&R-19.8	If it burns, would remain a crested wheatgrass stand. Low forb cover.
OV-BC-3S	Outside of treatment area	High R&R-25	Moderate R&R-17.8	This site is dominated by crested wheatgrass. Its R&R is high but forb diversity is low.
OV-BC-6S	Outside of treatment area	Low R&R-10	Low R&R-10	Phase III juniper site with nearly no understory.
OV-FM-1B	Hand Treatment	Moderate R&R-16.6	Low R&R-11.4	Sparse juniper, low forb cover.
OV-FM-2B	Hand Treatment	High R&R-26.5	Moderate R&R-19.8	Very productive site
OV-FM-3B	Outside of treatment area	High R&R-21.5	Moderate R&R-14.8	Productive site, crested wheatgrass present.
OV-FM-5B	Hand Treatment	Moderate R&R-15.6	Very low R&R-9.6	Crested wheatgrass is dominant herbaceous plant
OV-LB-1S	Outside of treatment area	Moderate R&R-15.1	Moderate R&R-14.9	Potential for cheatgrass increase in the event of a high severity fire as understory is reduced, sparse juniper

Plot ID	Proposed Treatment	Resilience and Resistance Score (R&R) for Low Severity Disturbance	R&R Score Under High Severity Wildfire Scenario	Comments About Site
OV-LB-2S	Outside of treatment area	High R&R-21.6	Moderate R&R-16.4	Cheatgrass is present in plant community and could increase under improper management, especially post fire.
OV-LB-3S	Outside of treatment area	Very Low R&R-8	Very Low R&R-8	Phase III juniper site. Low resilience to disturbance. Understory is very depleted. Likely to convert to annual grassland if it burns in wildfire.
OV-LB-4S	Outside of treatment	Moderate R&R-19.7	Moderate R&R-15.2	Lack of robust understory makes this site susceptible to cheatgrass invasion; especially in the event of a fire. Cheatgrass is present in enough of the plant community, there is likely a robust seed bank.
OV-LB-6S	Hand treatment	Very Low R&R-9.9	Very Low R&R-8.4	Little understory and relatively unproductive site, may need to seed or replant if treated.
OV-RC-1B	Hand Treatment	Moderate R&R-19.7	Moderate R&R-16	This site has cheatgrass as the co-dominant grass. It has moderate resiliency but could become invaded/dominated by cheatgrass in the event of a high severity fire.
OV-RC-2B	Outside of treatment	High R&R-27	Moderate R&R-19.8	This site is in good ecological condition and is very productive. Little bare ground and high R&R.
OV-RC-4B	Mastication	Low R&R-10.6	Very Low R&R-9.4	This site has a lot of bare ground. Cheatgrass is not a component of the site. This site should be seeded if it is

Plot ID	Proposed Treatment	Resilience and Resistance Score (R&R) for Low Severity Disturbance	R&R Score Under High Severity Wildfire Scenario	Comments About Site
				masticated to ensure vegetation recovery.
OV-RC-5B	Mastication	Moderate R&R-14.8	Low R&R-11.2	Dominated by juniper and has a lot of bare ground. If the site is masticated, it would likely need to be seeded first. Cheatgrass is not an issue on this site when data was collected.
OV-RC-6B	Not in treatment area	Moderate R&R-19.5	Low R&R-12.8	Fairly productive with a high level of plant diversity. Cheatgrass is not an issue right now.
OV-TC-1B	Hand Treatment	High R&R-20.7	Low R&R-10.7	Cheatgrass is present on this site at levels that could result in dominance if it burned in a high severity wildfire.
OV-TC-2B	Not in treatment area	Very Low R&R-7	Very Low R&R-7	Phase III old growth juniper site with no grass or shrub understory.
OV-TC-3B	Hand Treatment	High R&R 20.5	Moderate R&R-17.1	Dense juniper, good forb diversity.
OV-TC-4B	Hand Treatment	Very Low R&R-8	Very Low R&R-8	Cheatgrass is dominant in understory and would increase with disturbance, especially fire.
OV-TC-5B	Hand Treatment	High R&R-22.1	Moderate R&R-16.9	Close to Phase III juniper site. Understory still intact and cheatgrass is not present. Juniper is expanding and affecting site composition.

Local Threats to Sage-Grouse Populations-Continued

Sage-grouse are negatively impacted by the expansion of coniferous woodlands in their habitats, even if the underlying sagebrush habitat remains (Freese et al. 2009). GRSG avoid these areas (Casazza et al. 2010), and as coniferous woodlands increase in abundance and size, the underlying habitat quality for sage-grouse diminishes. The extent of juniper woodlands have increased by 150% since European settlement across the Great Basin (Miller et al., 2008). Junipers have expanded following changes in land-use practices (Romme et al., 2009), climate (Miller and Wigand, 1994; Romme et al., 2009), and disturbance regimes (Miller and Rose, 1999). Sage-grouse require large continuous areas of sagebrush-dominated ecosystems for population persistence (Knick et al., 2013). Encroachment of pinyon-juniper has been identified as a primary threat to sage-grouse populations (CFR, 2015a) by contributing to fragmentation of continuous expanses of sagebrush and accelerating a positive feedback loop between wildfire and invasive annual grass (the other primary threat in the Great Basin) that often eliminates and replaces sagebrush (Brooks et al., 2004; Balch et al., 2013; Chambers et al., 2014a). Several studies have documented strong avoidance of juniper by sage-grouse (Doherty et al., 2008; Atamian et al., 2010; Casazza et al., 2011; Knick et al., 2013) even at relatively low density (e.g., < 4% canopy cover; Baruch-Mordo et al., 2013). Importantly, avoidance of pinyon-juniper by sage-grouse can have population-level consequences to brood survival (Casazza et al., 2011) and lek persistence (Baruch-Mordo et al., 2013). Tall vertical structures (such as trees) that provide perching and nesting habitat in an otherwise flat landscape can increase risk of avian predation (Coates et al., 2014a; Howe et al., 2014), which sage-grouse may perceive as a threat that changes with the density of trees on the landscape. Within the project area, of the 21 historically identified leks, only four remain active at this time. Nearly all of the inactive or unknown status leks are either surrounded by or directly adjacent to juniper. The active leks have juniper expanding towards the sites but are not currently being impacted by juniper and are directly adjacent to intact sagebrush habitat. There are five leks adjacent to the project area, with only one site being active; three being classified into unknown management status and one being in inactive management status.

For management purposes, continuous encroachment of juniper is often categorized into three transitional phases (i.e., Phase I, II, and III) indicating the dominant vegetation influencing ecological processes (Miller et al., 2005; Miller et al., 2013).

Mapping of conifer encroachment from the FIAT analysis shows a total of 85,045 acres of active encroachment on the Minidoka Ranger District, a map is included in Appendix M of the FIAT assessment. Table 3-6, below shows the breakdown of encroachment acres by phase within the Minidoka District. (Sawtooth FIAT Assessment, 2015).

Table 3-6: Acres of Conifer Encroachment by Phase

Ranger Districts	Phase I	Phase II	Phase III	Total Acres
Minidoka RD	57,500	6,654	20,891	85,045

In the project area, there is approximately 12,842 acres of Phase I, 2,195 acres of Phase II, and 6,043 acres of Phase III juniper identified for treatment. This actual acres of Phase I juniper is under represented as small juniper less than two meters wide are usually not

detected when mapping trees using a two meter pixel delineation for differentiating shrubs from trees. Generally, the leading edge of juniper expansion is not accurately detected using mapping resources alone. For purpose of this analysis it is assumed that sage-grouse behavioral avoidance extends 0.5 mile farther than the area where actual juniper occur. When the proposed treatments are buffered out by 0.5 miles, this covers a 60,212 acre area.

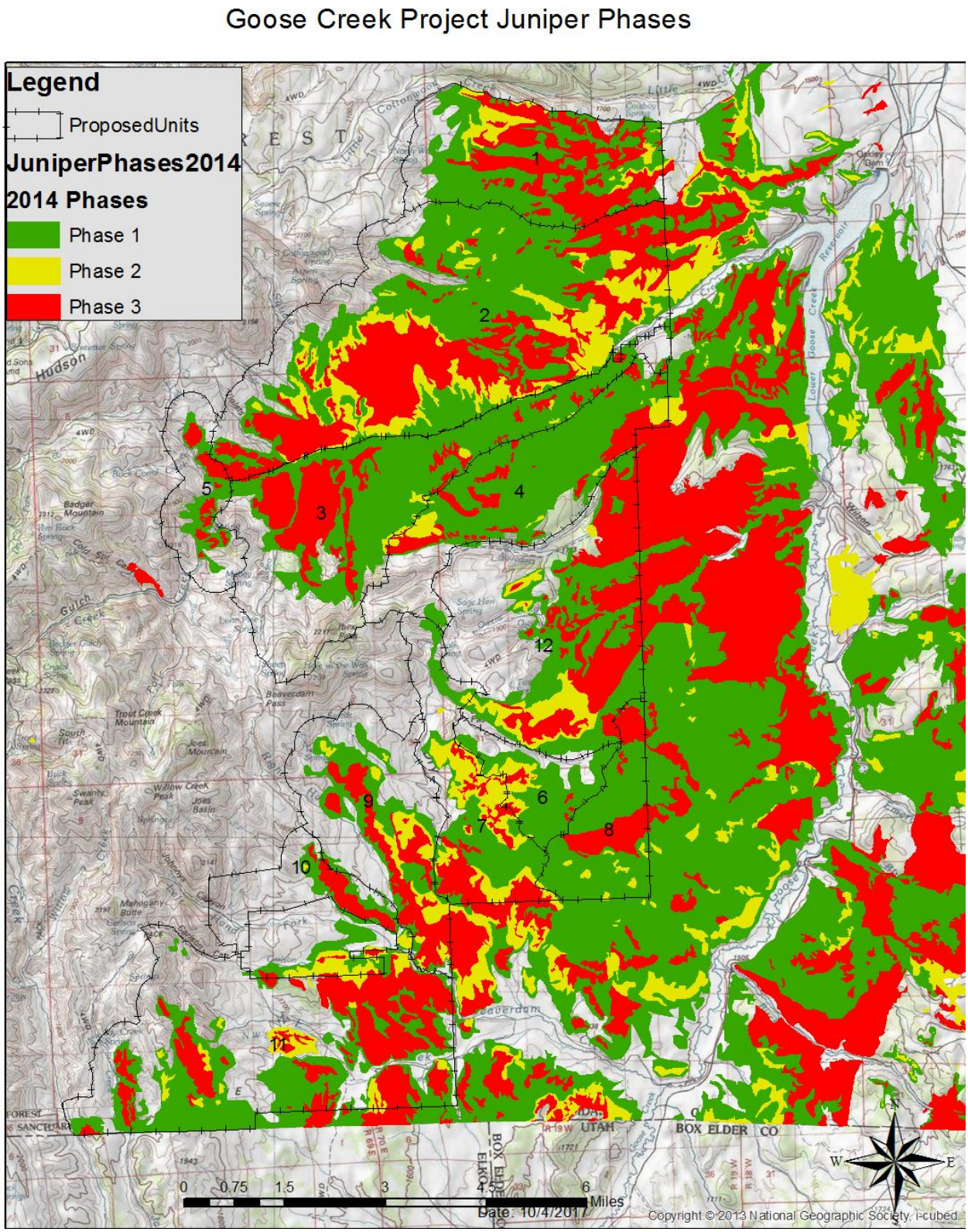


Figure 3-7. Map of Juniper Phases in Goose Creek Project Area

Habitat Summary

Overall, sage-grouse depend on large, primarily unbroken sage-steppe landscapes that can provide hiding cover, lek habitat, a native herbaceous understory, access to succulent forbs, nesting cover, and winter forage.

The majority of sagebrush communities within the project area are comprised of Wyoming big sagebrush**,** mountain big sagebrush, dwarf sagebrush as well as sagebrush communities intermixed with juniper, both historic and encroaching, throughout the project area as well as small pockets of mountain shrub communities. Most habitat components are immediately available for sage-grouse life cycle completion within and adjacent to the project area but not in the amount or distribution that is likely needed. This is evident by the many sage-grouse leks in the project area having declining attendance or becoming inactive.

3.3 Key Issue – Non Target Species

Sagebrush habitats support a unique biodiversity. Several bird and mammal species are almost entirely dependent on sagebrush for survival: Sage-grouse, sage sparrow, Brewer's sparrow, sage thrasher, pygmy rabbit, and sagebrush vole. An additional 100 species of birds, 90 mammals, and 60 herptiles have a facultative association with sagebrush. At least one bird, 18 small mammals and three native ungulates consume sagebrush in their diets. Over 240 insects, 70 spiders, and other arachnid species are associated with sagebrush (Welch 2005). At least 133 plant and 24 species of lichens are associated with sagebrush (Welch 2005), varying with geographic location, topography, soil, elevation, and climate.

Juniper habitat also provides a niche to species within the sage-steppe ecosystem and are used for foraging on juniper berries and nesting habitat for migratory birds. At a landscape scale, juniper habitat is not considered declining or a limiting habitat factor across the intermountain west for many species that use juniper due to the increase in spatial extent in the last century. In the literature, pinyon and juniper often co-exist and are commonly referred to as pinyon-juniper communities. While there is no known pinyon in the Goose Creek project area, pinyon-juniper is referred to in this analysis as it is used in the literature. Pinyon-juniper has expanded downward in elevation into areas with deeper soils, and historically, more fine fuels and higher fire frequency. This expansion was facilitated by the removal of fine fuels through heavy grazing and by the active suppression of wildfires (Roundy and Vernon 1999). In contrast, a study in a portion of the Colorado Plateau (Mesa Verde National Park) suggested that pinyon-juniper densities at higher elevations with naturally lower fire frequency have probably not increased greatly over the last 100 years and that the increases observed are probably the result of climatic changes rather than fire suppression (Romme et al. 2003).

Woodland plants may provide structure for nest sites of Red-tailed and Ferruginous Hawks and may attract bird species such as Western Scrub-Jay, Black-billed Magpie, and Virginia's Warbler. Species closely tied to pinyon-juniper include species such as the Black-chinned Hummingbird, Ash-throated Flycatcher, Cassin's Kingbird, Gray Flycatcher, Western Scrub-Jay, Pinyon Jay, Juniper Titmouse, Bushtit, Bewick's Wren,

Northern Mockingbird, Blue-gray Gnatcatcher, Gray Vireo, Black-throated Gray Warbler, Lark Sparrow, and Black-chinned Sparrow (Balda and Masters 1980). Pinyon and juniper rely heavily on animals for seed distribution, a dependence that makes the pinyon juniper woodland unique. Other forest types may require animals to disperse some seeds of some plant species, but in pinyon-juniper, animals are critical to the dispersal of the seeds of the dominant tree species. Birds, in particular, are responsible for this important role in the maintenance of pinyon-juniper woodlands.

Both pinyon and juniper provide food for wildlife species. Mammalian consumers of pinyon seeds include species such as deer mouse, pinyon mouse, Abert's squirrel, rock squirrel, cliff chipmunk, Hopi chipmunk, Uinta chipmunk, Colorado chipmunk, desert woodrat, Stephen's woodrat, white-throated woodrat, Mexican woodrat and bushy-tailed woodrat. Avian consumers include species such as Clark's Nutcracker, Pinyon Jay, Mexican Jay, Western Scrub-Jay, Steller's Jay, and Juniper Titmouse. A portion of these species are known to occur in and adjacent to the project area.

Juniper berries, which consist of a hard-coated seed enclosed in a fleshy outer covering, are eaten by mammals such as rabbits, gray fox, black bear, coyote, striped skunk, and a variety of rodents, and by birds such as Western Bluebird, Mountain Bluebird, Townsend's Solitaire, American Robin, Bohemian Waxwing, and Cedar Waxwing (Lanner 1981; Chambers et al. 1999; White et al. 1999). A portion of these species are known to occur in and adjacent to the project area. These animals serve an important role in the future of local juniper populations by dispersing the seeds. When eaten, the hard-coated juniper seed often passes through the digestive system intact and is excreted, falling to the ground where it may germinate and become established. Removing the outer flesh increases the probability that a juniper seed will germinate by a factor of 10. Junipers themselves facilitate this process by producing berries that are conspicuously colored blue or red, and making them readily accessible on the outer layers of foliage. Birds are the primary seed-dispersal mechanism for some juniper species (Chambers et al. 1999). Birds are effective because they deposit seeds under woody vegetation (a suitable site for germination and seedling growth). Bird-facilitated dispersal is particularly important for re-establishing junipers within woodlands that have been burned or killed by insects or drought, provided some dead trees remain standing. Also, since seeds are usually deposited singly or in small clusters, the chances of density-dependent seed depredation are reduced. However, juniper seeds must be covered by soil to germinate, something not accomplished by the birds. Bird-dispersed seeds must be buried by some other means such as trampling, frost heaving, soil deposition, or rodent caching. Mammals distribute juniper too, sometimes traveling a mile or more before depositing their seed-ladened scats.

The numbers of individual birds and bird species generally increase with the age of pinyon-juniper stands (Golden Eagle Audubon Society 1997), partly as a result of the increasing structural diversity found in those stands, which provides more opportunities for nesting and foraging by species that fill different niches, and because only large trees can provide the cavities needed by cavity-nesting birds. Most of the pinyon-juniper obligates and species of conservation concern are tied to stands of mature trees. Phase I and early Phase II stands provide less habitat value and forage.

Unlike some other forest types, like ponderosa pine, low-intensity ground fires were probably never very common in pinyon-juniper woodlands due to the lack of understory vegetation to carry fires (Baker and Shinneman 2004). Instead, high-severity crown fires were more likely, although they probably occurred in a given area only once every few hundred years (Baker and Shinneman 2004). Such fires will probably continue as part of natural cycles and play an important role in the health of this ecosystem. However, many (perhaps most) pinyon-juniper woodlands have passed a threshold of change (Tausch 1999b): overly dense woodlands and invasive weeds in these areas have compromised the ability of the woodlands to return to a natural woodland after a fire. Instead, these areas may become trapped in a cycle of frequent fires fueled by annual weeds, with no return to woodland or even shrubland possible without extensive (and expensive) management. It is important to differentiate true juniper woodlands (sites that are relatively fire safe) from stands of juniper that are encroaching into sagebrush and have a readily available understory fuel load.

Common Juniper Habitat Bird Species:

For analysis purposes, the following species were selected for analysis of the "Key Issue: Impacts to Non-Target Species" due to their life history traits, sufficient information about ecology and population trends and the likelihood that the species uses the project area to some degree.

Black Chinned Hummingbird:

This species typically breeds in riparian zones of arid regions, but also nests extensively in pinyon-juniper woodlands (Andrews and Righter 1992), especially when flowering shrubs and herbaceous plants are nearby.

Status:

For the United States population, which is restricted to the western U.S., Breeding Bird Survey data show a significantly positive population trend of 1.4% per year for the period 1966-2005 (Sauer et al. 2006).

Ferruginous Hawk

This species prefers relatively flat, open grasslands, shrublands and areas where these habitat types meet pinyon-juniper woodlands, especially outlier trees from main woodlots (Bechard and Schmutz 1995; Parrish et al. 2002). The bulky stick nest is usually placed on elevated sites, such as isolated trees (especially large, flat-topped junipers), shrubs, rock outcrops, and utility structures. Nesting occurs from March into July. Wintering habitat is similar to breeding (i.e., open areas with few trees). This species is particularly attracted to prairie dog colonies in winter.

The Ferruginous Hawk hunts by scanning for prey from an elevated perch, while soaring, or while standing on the ground near burrows of prey species. In pinyon juniper habitat Ferruginous hawks hunts jackrabbits, cottontails, and small mammals. Threats to this species include loss of habitat due to invasion by non-native species or conversion of native land cover types to cropland (although this is more of a problem on the Great Plains than the Intermountain West) and disturbance to nest sites.

Status:

This species has disappeared from some local areas used in times past. However, population trends over large areas are difficult to discern because the species is so rarely recorded by the Breeding Bird Survey, which records an average of just 0.25 Ferruginous Hawks/survey route (Sauer er al. 2006), which equates to one bird for every 100 survey miles. This is a U.S. Fish and Wildlife Service *Species of Conservation Concern* in Bird Conservation Regions 9 (Great Basin) and 16 (Southern Rockies/Colorado Plateau) and at the national level (U.S. Fish and Wildlife Service 2002). It is also a Bureau of Land Management *Sensitive Species* in Colorado, Idaho, Nevada, and Wyoming, a *Sensitive Species* in U.S. Forest Service Region 2, a Colorado Division of Wildlife and Idaho Department of Fish and Game *Species of Special Concern*, and a Utah Division of Wildlife Resources *Species of Concern*. Throughout most of its breeding range, Breeding Bird Survey trends are not statistically significant for the period 1966-2005, a reflection of the rarity of the species. For the United States as a whole, the population trend is a positive 2.2% per year (Sauer et al. 2006).

Pinyon Jay

This species is closely tied to pinyon-juniper woodlands, but also breeds in sagebrush, scrub oak, chaparral, ponderosa pine, and Jeffrey pine forests (Balda 2002). It prefers mature stages of pinyon (Short and McCulloch 1977), which produce more seeds. If habitat conditions are suitable, a flock may occupy the same home range for decades (Ryser 1985). However, because pinyon crops are unpredictable, flocks may wander in search of adequate seed supplies. Pinyon Jays build a nest that is relatively large, bulky, open cup composed of sticks and lined with grasses, hair, feathers, and soft plant parts (Balda 2002); the bulkiness presumably provides insulation because this species begins nesting in winter, as early as February (Balda 2002). Some nesting attempts may start later in the spring with young still in the nest as late as August. The nest is placed in ponderosa, pinyon, or juniper trees, often on the south-facing side (Balda 2002). This species nests colonially. This species is a year-round resident, although individuals may disperse far from their normal range in years of cone crop failure. The Pinyon Jay is an omnivore, consuming pine seeds, acorns, juniper berries, invertebrates, and small vertebrates; food items are collected on the ground, from vegetation, and occasionally by aerial capture (Balda 2002). The Pinyon Jay is a species of concern because of loss of pinyon-juniper habitat through conversion to other land cover types including clearing for residential development. Other factors include a widespread, prolonged drought in the Southwest, which has resulted in diminished cone crop production, engraver beetle infestations, and tree mortality. Also, this species is critically important in pinyon pine seed dispersal. Partners in Flight has called for a 100% increase in the continental populations of this species (Rich et al. 2004).

Status:

This is a Partners in Flight continental *Watch List Species* (Rich et al. 2004), a U.S. Fish and Wildlife Service *Species of Conservation Concern* in Bird Conservation Region 16 (Southern Rockies/Colorado Plateau) (U.S. Fish and Wildlife Service 2002), and an Idaho Department of Fish and Game *Species of Special Concern*. This species is undergoing a significant decline throughout its range; Breeding Bird Survey (BBS) data reveal statistically significant declines in the United States (-4.6% per year), the western U.S. (-4.7% per year), BBS Pinyon-Juniper Ecoregion (-7.3% per year), BBS Basin & Range Ecoregion (-7.2% per year), California (-8.4% per year), Colorado (-5.5% per year), and Nevada (-9.3% per year) during the period 1966-2005 (Sauer et al. 2006).

Juniper Titmouse

This species is a resident of juniper woodlands or pinyon-juniper woodlands where juniper is dominant; it requires large trees that provide natural cavities for nesting (Cicero 2000). In Wyoming, this species preferred mature juniper stands with high juniper cover, senescent trees, dead limbs, and presence of pinyon pines; the old trees provide cavity-nest sites; the pinyon pines may be preferred foraging substrate (Laudenslayer and Balda 1976). This species nests in tree cavities excavated by woodpeckers or formed by rot or broken branches. It will also use artificial nest boxes. It may partially excavate its own nest cavity if the wood is soft or rotten (Cicero 2000). The Juniper Titmouse is non-migratory, and pairs defend their territories year-round, although some birds may move upslope into ponderosa pine forests during winter.

This species eats seeds (and is known to be a major consumer of pinyon seeds), terrestrial invertebrates, and fruits. In fall and winter it eats mainly seeds and juniper berries. The insects are gleaned from the foliage and bark of trees and shrubs and from the ground (Cicero 2000). This species is a pinyon-juniper obligate. Because it is a cavity-nester, it needs mature woodlands, which provide trees large enough to support nest cavities.

Status:

Breeding Bird Survey (BBS) data for 1966-2005 do not show statistically significant population trends at the national scale or the scale of the western U.S., but they do show significant declines for the BBS Pinyon-Juniper Woodland Ecoregion (-2.7% per year), Colorado (-4.3% per year), and New Mexico (-2.8% per year) (Sauer et al. 2006).

Western Bluebird

This species breeds in open woodlands with snags and grassy areas, and burned forest with standing snags. It is most commonly associated with ponderosa pine and aspen forests, but also breeds in open pinyon-juniper woodlands (Guinan et al. 2000). This species nests in tree cavities, either those formed naturally by the tree or excavated by woodpeckers. It will also use artificial nest boxes. Nesting may begin as early as March, followed by a second brood as early as May. In some areas, pairs will produce a third brood (Guinan et al. 2000). During winter, the Western Bluebird moves down in elevation from its montane breeding sites to open woodlands, shrublands, and riparian areas. Some populations also move south as far as central Mexico.

The summer diet is primarily invertebrates while the winter diet includes small berries such as mistletoe and juniper. It frequently captures flying insects by sallying out from an

exposed perch, and collects invertebrates and small berries from foliage or on the ground. The Western Bluebird is dependent on large trees and snags, which provide substrate for nest cavities. It also serves an important role in the dispersal of juniper seeds.

Status:

Breeding Bird Survey (BBS) data for 1966-2005 fail to reveal a statistically significant population trend for any geographic region other than U.S. Fish and Wildlife Service Region 6 (Montana, Wyoming, Utah, Colorado, Kansas, Nebraska, and the Dakotas), where the population is increasing at a rate of 7.3% per year (Sauer et al. 2006).

3.4 Fire and Fuels

The project area fuels and vegetation conditions are analyzed to display how the proposed action accomplishes the purpose and objectives stated for this project. The affected environment description describes how the current situation affects fuel loading, fire behavior and management of fire on the landscape within and adjacent to the project area.

3.4.1 Affected Environment and Existing Conditions

Fire and fuels resources are primarily described by vegetation and fuel type and are influenced or affected by precipitation, temperature, soils, and seasonal fluctuations. Fuel in the natural environment includes live vegetation, as well as materials such as dead branches, needles, and cones. The fuels complex that makes up the project area today has been influenced primarily by European settlement, wildfire, wildfire suppression, and grazing.

Fire regimes represent an index of pre-settlement historical fire processes generated for the period from around 1500 to just prior to the mid-1800s and are described in terms of frequency and severity. As shown in Table 3-7, five fire regimes have been classified based on average number of years between fires combined with the severity of the fire on the dominant overstory vegetation.

Group	Frequency	Severity	Severity description
I	0 – 35 years	Low/ mixed	Generally low-severity fires replacing less than 25% of the dominant overstory vegetation; can include mixed-severity fires that replace up to 75% of the overstory
II	0 – 35 years	Replacement	High-severity fires replacing greater than 75% of the dominant overstory vegetation
III	35 – 200 years	Mixed / low	Generally mixed-severity; can also include low-severity fires
IV	35 – 200 years	Replacement	High-severity fires
V	200+ years	Replacement / any severity	Generally replacement-severity; can include any severity type in this frequency range

Table 3-7 Fire Regime Descriptions

Source: Joint Fire Science Program; http://www.firescience.gov/projects/09-2-01-9/supdocs/09-2-01-9_Chapter_3_Fire_Regimes.pdf

Sagebrush ecosystems vary in fire regime dependent on a number of factors. Site productivity (precipitation and soils) can lead to higher fire return intervals due to increased fuel loading over a shorter period of time (Chambers et al, 2014). In general, fire return interval in sagebrush varies from decades to centuries. Sites able to support juniper typically receive greater than 12" of precipitation and therefore are more productive, in general (Miller et al, 2014). Point fire history for the project area (discussed later in this section) suggests that this area has the potential to burn frequently, although the extent of fires has been altered due to livestock grazing and fire suppression (McIver et al, 2010). Estimates based off tree-ring studies suggest that pinyon-juniper has increased two to six fold since European settlement (Chambers et al, 2014), a further indication that fire regimes in sagebrush ecosystems have been altered. Areas of the project that are not proposed for treatment are characterized by juniper trees with old-growth characteristics growing in rocky soils – fire-safe sites (Miller et al, 2014).

Fire Regime Condition Classes (FRCC) describe the degree of departure from historical fire regimes resulting in alterations of key ecosystem components such as species composition, structural stage, stand age, and canopy closure. This departure from historical conditions may result from several factors including fire exclusion, timber harvesting, grazing, introduction and establishment of exotic plant species, insects and disease (introduced or native), or other past and present management activities (USFS 2008). There are three classes to describe the departure, and can be summarized as follows:

FRCC1: Fire regimes are within historical range, and the risk of losing key ecosystem components is low.

FRCC2: Fire regimes have been moderately altered, and the risk of losing key ecosystem components is moderate. This results in moderate changes to one or more of the following: fire size, intensity and severity, and landscape patterns. Vegetation attributes have been moderately altered.

FRCC3: Fire regimes have been significantly altered, and risk of losing key ecosystem components is high. This results in dramatic changes to one of more of the following: fire size, intensity and severity, and landscape patterns. Vegetation attribute have been significantly altered.

Table 3-8 quantifies the number of acres existing within each condition class for each of the two treatment types within the Goose Creek Project area (see Figure 3-8 – Map of FRCC for Goose Creek Project Area).

Table 1-8: Fire Regime Condition Classes of each treatment type within the Goose Creek Project.

Treatment	FRCC	Acres
Hand (Lop and Scatter)	1	1,328
	2	16,740
	3	1,324
Mechanical (or Pile and Burn)	1	415
	2	2,466
	3	345

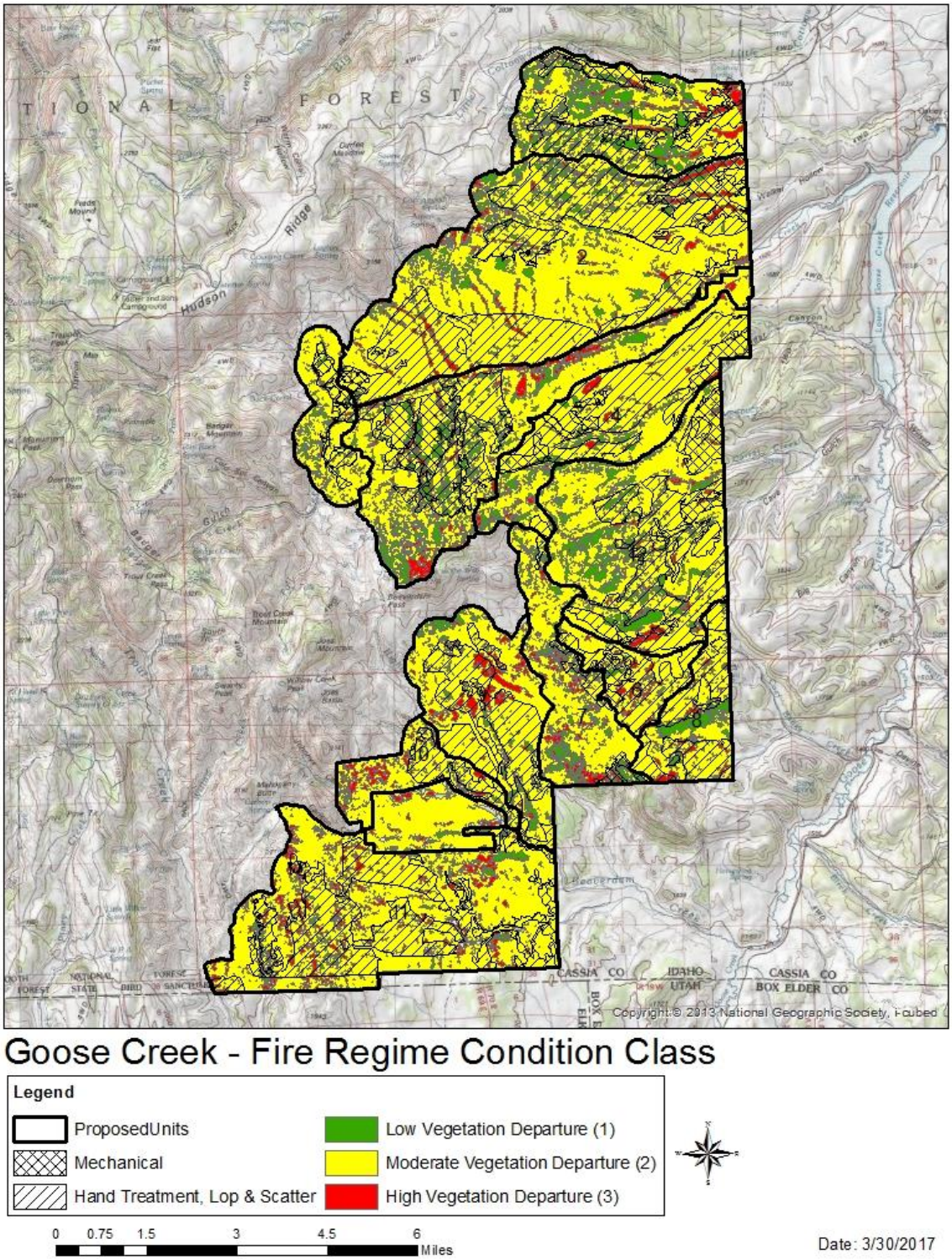


Figure 3-8. Project Area Fire Regime Condition Classes Map

Fire History

Fire history analysis was completed using data from the Forest Service GIS Reference Library. The earliest recorded fire dates back to 1953. While fires have not occurred every year within the vicinity of the project area, an average of 4 fires per year have occurred in this area from 1953-2016. This average includes 1981 in which 25 fires were recorded within the project and surrounding area (see Figure 3-9). The fires included in this portion of the analysis include ALL recorded fires, no matter how small. An average fire size of 4,949 acres was calculated for all fires greater than 1 acre in size, with the largest being 88,890 acres. (Fires less than one acre are excluded from the average in order to better represent the average size a fire would grow to that escapes initial attack.) The average size of fires whose perimeters cross or are within the project area boundary is 6,775 acres.

Grass and brush fuels are considered “flashy fuels” by the wildland fire community because the large surface area to volume ratio allows the vegetation to easily ignite and carry fire, especially with wind. Many areas within the project that exist as grass and brush today have been maintained by fires within this recent history. While the project area contains a relatively rich fire history, based on fire regimes, most acres within the project area **should have** burned at least once during the 1953-2016 timeframe.

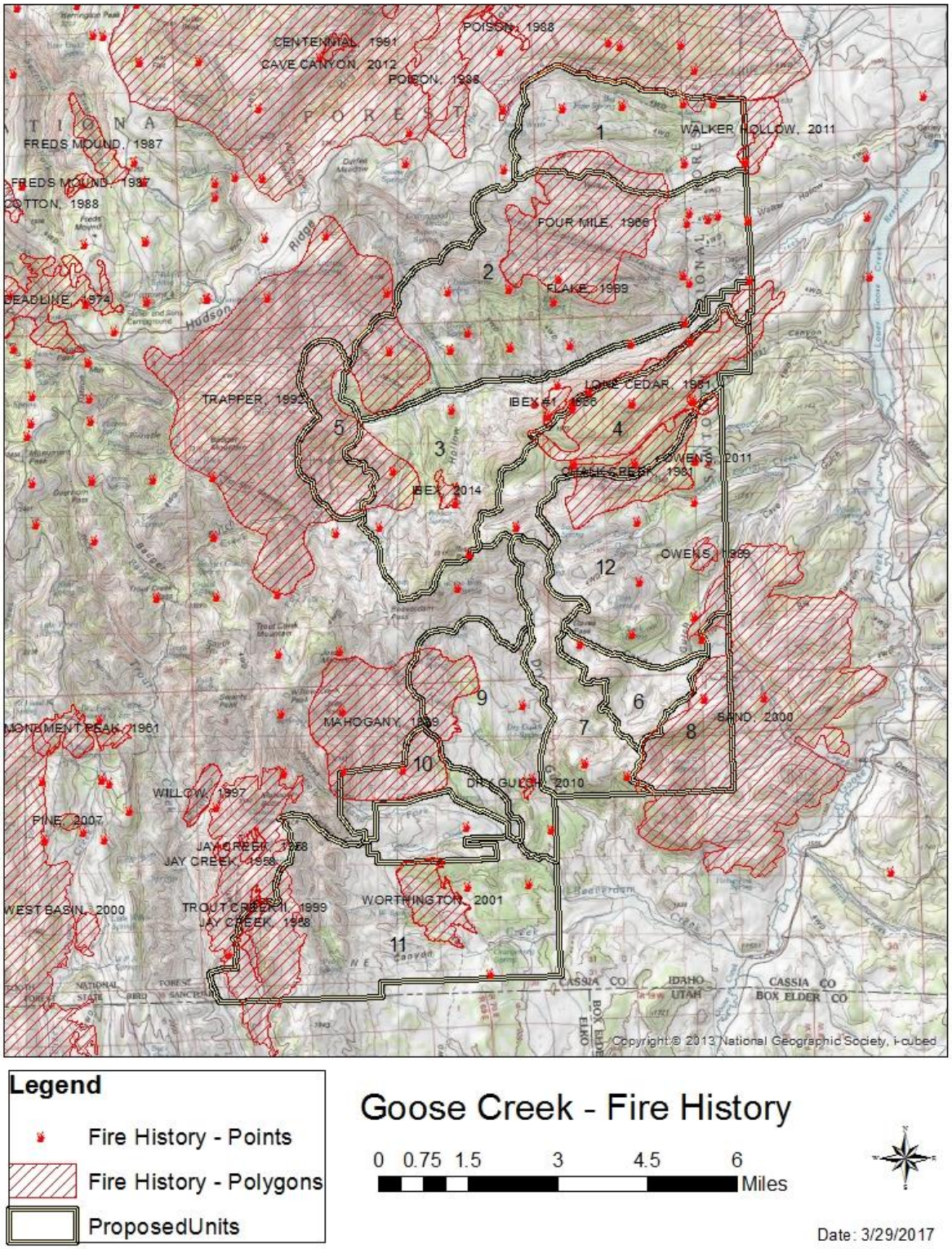


Figure 3-9. Project Area Fire History Map

3.5 Native Plant Communities and TECWS Plants- Affected Environment and Existing Conditions

Native Vegetation Communities

Potential Vegetation Group (PVG) is the "climax" vegetation that will occupy a site without disturbance or climatic change. PVG is an expression of environmental factors such as topography, soils and climate across an area. Where cover type is a classification of existing vegetation, PNV is a site classification based on climax vegetation. Because the existing cover type at any particular location and time may reflect a vegetation community anywhere along its successional pathway - from seral to climax - the cover type may be the same as the PNV.

PVG for the analysis area was queried from Arcmap. Potential vegetation groups are based on the concept of habitat types. Habitat types are an aggregation of all land areas capable of producing similar plant communities at climax, which is the culminating stage of plant succession. The PVG shares similar environmental characteristics, site productivity and disturbance regimes. There are 4 PVG's in the analysis area based on the Sawtooth National Forest Land and Resource Management Plan (Forest Plan). PVG 99 (non-forest) covers 47,599 acres. PVG 71 (juniper) covers 1,741 acres. PVG 70 (climax aspen) is found on 238 acres. PVG 10 (persistent lodgepole pine) is found on 194 acres. There are 67 acres that have no PVG identified.

Vegetation is naturally patchy in the project area, with islands of Juniper forest surrounded by sagebrush/grass communities. Based on the Sawtooth National Forest GIS cover type layer (USDA 2012) the project area is 38% forested, 62% non-forested and contains 13 distinct vegetation communities. See Table 3-9 below. Elevations in the proposed project area range from 4,590ft.(1,400 m) to 7,875ft.(2,400 m). Precipitation for this area averages 8 inches for lower elevations and 24 inches for higher elevations.

Table 3-9: Vegetation Communities in the Proposed Project Area

Vegetation Type	Acres in Project Area
Aspen	366
Bitterbrush	46
Dwarf Sagebrush	11,219
Shrubland	600
Grassland	1,126
Juniper Mix	17,662
Lodgepole Pine	13
Mixed Woodland	44

Mountain Big Sagebrush	8,247
Mountain Mahogany	431
Riparian	315
Total Acres	49,839

In the habitats present in the proposed project area, there are species including crested wheatgrass (*Agropyron cristatum*), intermediate wheatgrass (*Thinopyrum intermedium*), bulbous bluegrass (*Poa bulbosa*), dandelion (*Taraxacum officinale*), tumble mustard (*Sisymbrium altissimum*), Kentucky bluegrass (*Poa pratensis*), cheatgrass (*Bromus tectorum*), bur buttercup (*Ranunculus testiculatus*), and others.

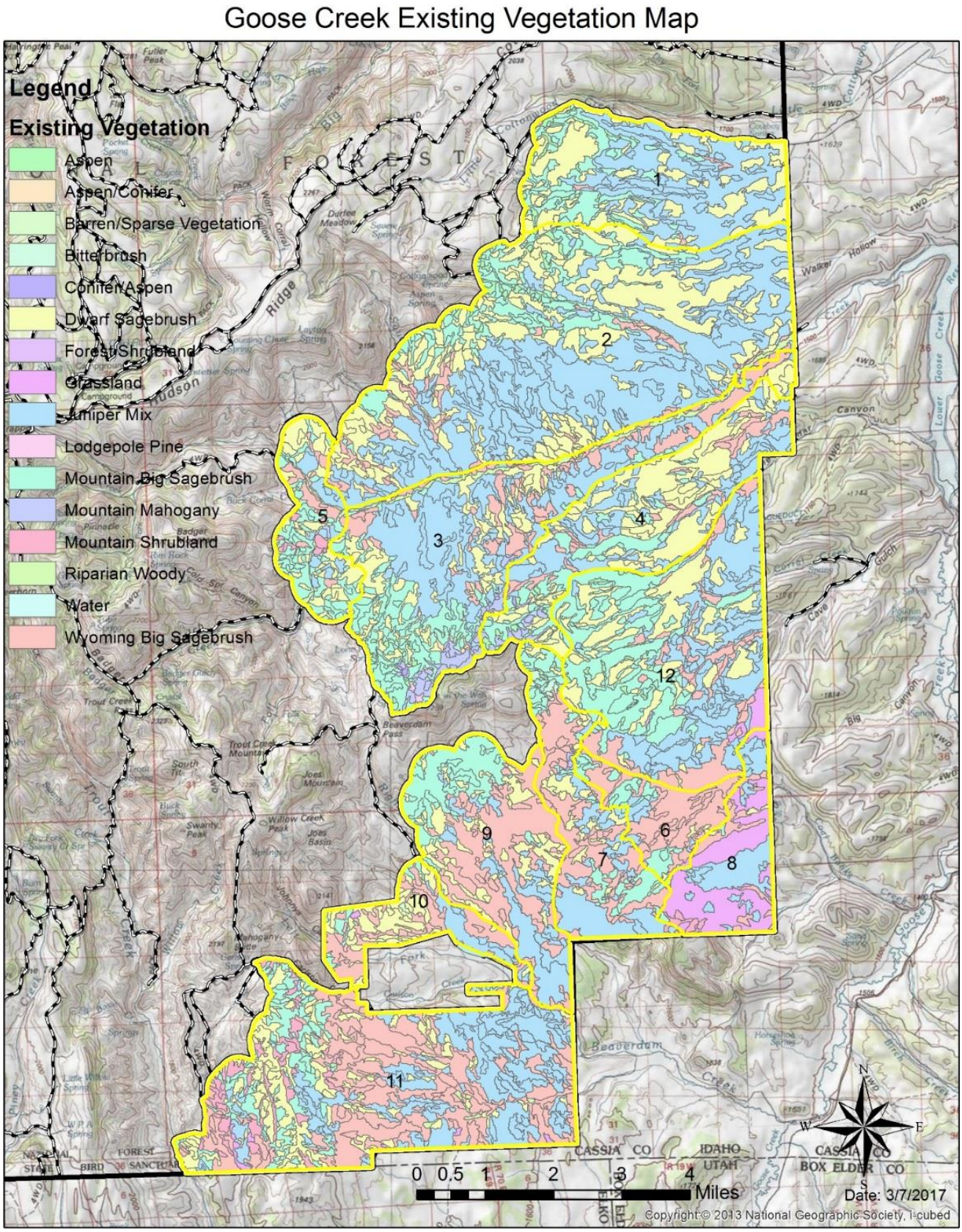


Figure 3-10. Existing Vegetation within Project Area

3.6 SAGEBRUSH COMMUNITIES

Within the project area there are three distinct sagebrush communities, Wyoming big, mountain big, and dwarf sage communities. Wyoming big sagebrush communities are dominated by Wyoming big sagebrush (*Artemisia tridentata Nutt. ssp. wyomingensis*) and occur on approximately 9,700 acres. Mountain big sagebrush communities are dominated by mountain big sagebrush (*Artemisia tridentata ssp. vaseyana*) and occur on approximately 8,200 acres of the project area. Dwarf sagebrush communities are dominated by little sage (*Artemisia arbuscula ssp. arbuscula*) and occur on 11,200 acres of harsher sites with shallow rocky soils within the project area. Common grasses include, Idaho fescue (*Festuca idahoensis*), slender wheatgrass (*Elymus trachycaulus*), Sandberg's bluegrass (*Poa secunda*), and bluebunch wheatgrass (*Pseudoroegneria spicata*). Forb species include littleleaf pussytoes (*Antennaria microphyllia*), prickly sandwort (*Arenaria capillarie*), balsamroot (*Balsamorhiza sagittata*), silky lupine (*Lupinus sericeus*), milkvetch (*astragalus sp*.), lupin (*lupines sp*.) sego lily (*Calochortus nuttallii*), lily (*Fritillaria affinis*) and longleaf phlox (*Phlox longifolia ssp. longifolia*).

The dwarf sagebrush community is functioning properly, although the herbaceous component could be increased to enhance diversity and maintain historic fire return intervals. The mountain big sagebrush community is functioning at risk, and the Wyoming big sagebrush community is not functioning properly in some areas due to fire exclusion and livestock grazing impacts, which have altered structure and species composition. Fire exclusion has allowed for high density sagebrush, which has reduced the understory herbaceous cover. Cheatgrass and other introduced species are scattered to locally common. Non-native grasses have been extensively seeded on lands adjacent to the Forest, with some seeding on Forest as well.

Sagebrush canopy modeling using the VCMQ 2012 canopy cover data indicates that sagebrush canopy coverage in the project area is not currently within the desired condition categories (Table 3-10) for all sagebrush communities except for Wyoming big sagebrush which is meeting for the low canopy cover category. VCMQ data is collected at a landscape scale. It will not always align with site specific data due to the scale at which it was collected. Sagebrush is generally at higher canopy levels than what is desired and there are many old, mature and dense stands of sagebrush.

Table 3-10. Sagebrush Canopy Cover

Community	Canopy Cover Class	Acres	Existing Condition	Desired Condition
Dwarf Sagebrush	Low (10-25%)	4,543	40%	80-100%
	Moderate (26-35%)	6,646	59%	0%

	High (36%+)	29	0%	0%
Mountain Big Sagebrush	Low (10-25%)	1,643	20%	27-47%
	Moderate (26-35%)	3,298	40%	12-32%
	High (36%+)	3,306	40%	8-28%
Wyoming Big Sagebrush	Low (10-25%)	3,292	34%	20-35%
	Moderate (26-35%)	5,851	60%	13-33%
	High (36%+)	599	6%	12-32%

3.7 ESA LISTED PLANT SPECIES

The Minidoka District provides potential habitat for one federally listed threatened terrestrial plant species. In September 2002, the USFWS removed Ute ladies'-tresses (*Spiranthes diluvialis*) from the Sawtooth National Forests' 90-day Species List and noted that future biological assessments need not address the species because they believe the plant does not occur on the Forest (USFWS 2002, 1-4-02-SP-911). However, as part of rare plant surveys, Ute ladies'-tresses orchid is surveyed for on projects within the Sawtooth National Forest. Due to direction from the USFWS and because Ute ladies'-tresses orchid are not known to occur within the proposed action area, and because 2016 rare plant surveys did not locate any populations, they will not be discussed further in this analysis.

The Minidoka District provides potential habitat for one species on the candidate list for ESA protection. Presently, seven populations of Goose Creek milkvetch (*Astragalus anserinus*) are known for Idaho. All populations occur on BLM land, with several extending onto adjacent private lands. No populations are known for the Sawtooth National Forest, although most populations are within a few miles of the south east boundary of the Cassia Division of the Minidoka District (Mancuso 1991). The proposed project is within the Goose Creek watershed and contains potential habitat for Goose Creek milkvetch although no populations have been located to date so it will not be discussed further in this report.

3.8 REGIONAL FORESTER'S SENSITIVE AND FOREST WATCH PLANT SPECIES

The Sawtooth National Forest has known occurrences and provides habitat for 45 Regional Forester's Sensitive Plant Species and Sawtooth Forest Watch Plant Species (See the Botany Specialist Report for complete list). The Minidoka District of the Forest has known occurrences and/or provides habitat for 12 of these plant species (Table 3-11).

Table 3-11: Minidoka Ranger District's Regional Forester's Sensitive and Forest Watch Plant Species

Common Name	Scientific Name	Status
Grouse Creek Rockcress	*Arabis falcatoria*	Watch
Armed Prickly Poppy	*Argemone munita*	Watch
Goose Creek Milkvetch	*Astragalus anserinus*	Sensitive
Slender Moonwort	*Botrychium lineare*	Sensitive
Christ's Indian Paintbrush	*Castilleja christii*	Sensitive
Malheur Cryptantha	*Cryptantha propria*	Watch
Davis' Wavewing	*Cymopterus davisii*	Sensitive
Desert Buckwheat	*Eriogonum desertorum*	Sensitive
Simpson's Hedgehog Cactus	*Pediocactus simpsonii*	Watch
Idaho Penstemon	*Penstemon idahoensis*	Sensitive
Cottam cinequefoil	*Potentilla cottami*	Sensitive
Rock Violet	*Viola lithion*	Watch

Surveys of the area were done during May and June 2016 and found 2 special status plants within the project area, Idaho penstemon and Simpson's hedgehog cactus. Surveys were not 100% inclusive of the project area and focused on areas of highest potential to contain rare plants and their habitat. Idaho penstemon is endemic to the Goose Creek watershed and is located in the south east portion of the project area. Simpson's hedgehog cactus is scattered throughout the entire project area, but tends to favor dwarf sagebrush communities. The largest densities of Simpson's hedgehog cactus are located in Units 1 and 2 of the project area. Slender Moonwort may occur within the project area at moderate to higher elevation grasslands, meadows, and small openings in lodgepole pine but would not be found within the areas targeted for treatments.

Due to no habitat or treatments not occurring within habitat for ten sensitive and watch species, these species will not be discussed further in this analysis. The two species, Idaho Penstemon and Simpson's Hedgehog cactus that occur within treatment areas will be analyzed below.

3.8.1 Forester's Sensitive Plant Species

3.8.1.1.1.1 Idaho Penstemon (Penstemon idahoensis)

Status of Species

Idaho penstemon (also known as Idaho beardtongue) is a Region 4 Forester's Sensitive species located on the Cassia division of the Sawtooth National Forest in the Goose Creek drainage of southern Idaho.

Species Description

Idaho penstemon is a short, perennial, glandular forb with a showy display of blue flowers.

Habitat Characteristics

Idaho penstemon is restricted to dry, light-colored, sparsely vegetated, tuffaceous exposures of Salt Lake formation sediments. Its narrow distribution is likely related to this substrate specificity.

Existing Condition

Idaho penstemon is a narrow endemic to the Goose Creek drainage in southern Cassia County, Idaho, and adjacent northern Box Elder County, Utah. Range wide, it is known from approximately 15 occurrences, 4 of these on lands administered by the Sawtooth National Forest on the Cassia Division of the Minidoka Ranger District.

Factors of Decline/Threats

Threats to this species include disturbances associated with livestock grazing, weed invasion/control measures, off-road vehicle use, and wildfires.

Forest Watch Plant Species

3.8.1.1.1.2 Simpson's Hedgehog Cactus (Pediocactus simpsonii)

Status of Species

Simpson's Hedgehog Cactus is a Forest Watch species. There are three generally recognized varieties of *Pediocactus simpsonii*, one of which is var. *robustior*. Hitchcock (1961a) states that *var. robustior* is the only one of the three found in the Pacific Northwest, the others being confined to points south and east of Idaho. There are 41 element occurrences (EO) known in Idaho and five of these are on the Minidoka District (Idaho Natural Heritage database 2017).

Habitat Factors

In Idaho, Simpson's hedgehog cactus occurs in a variety of open, rocky habitats, and across a wide range of elevations, from 1,600 to 8,500 feet. It is known from canyon ridges, benches and rims at low- to mid elevations, as well as exposed, mountain ridgecrests. Soils are generally shallow, rocky and well drained. Documented parent materials include basalt, rhyolite and quartzite. Sites also tend to be stable and not subject to migration. Throughout the state it can be associated with a variety of sagebrush, grassland or juniper communities. It occurs on all aspects, although mostly warmer exposures, and from flat to steep slopes.

Description

This spiny cactus grows singularly or in clusters. It is depressed to more or less subglobose in shape, with stems up to 5 inches in diameter. Stems are longitudinally ribbed, with the ribs bearing tubercules (small, rounded projections). Plants contain numerous whorls of sharp, stout, whitish to yellowish or reddish-brown spines up to nearly 2 inches long. Flowers are showy, up to 1 inch in diameter, occur in a crowded ring around the top of the plant, and are usually rosy-pink in color, although sometimes

yellowish-green or white. Fruits are small, subglobose to cylindric in shape, and splitting when ripe to discharge the large blackish seeds

Existing Condition

There are 41 element occurrences (EO) known in Idaho and five of these are on the Minidoka District. During site surveys in May and June 2016 individuals and populations were found scattered throughout the project area. The highest densities occur in Units 1 and 2.

Factors of Decline/Threats

Potential threats at some populations include over collecting, and habitat destruction or degradation. Overall, the species future looks secure in Idaho under current land management practices.

Key Issue # 2-Invasive Species

Issue #2 –Invasive Species: The volcanic ash derived soils are fragile, erosive and have a weak soil structure, and soil fertility is minimal. Because of these soil properties, the area may be more prone to invasion by cheatgrass and noxious weeds post mechanical treatment. Mechanical treatments may also impact physical and biological soil crusts and recovery is a concern in mechanically treated Phase III areas.

Indicator: Estimated total acres at risk of introduction and/or spread of noxious and invasive plant species.

The state of Idaho has designated species by law as noxious weeds. This official designation places the weed species into categories that have specific meanings. Below are the definition of each category from Idaho Statute 22 chapter 24 (22-2402):

Idaho state control list: "Control" means any or all of the following: prevention, rehabilitation, eradication or modified treatments.

Idaho state containment list: "Containment" means halting the spread of a weed infestation beyond specified boundaries.

Species that are not defined as noxious but are included below are considered invasive or undesirable species.

NON-NATIVE INVASIVE NOXIOUS (WEED) PLANT SPECIES

Black henbane, diffuse knapweed, musk thistle, whitetop, leafy spurge, Canada thistle, cheatgrass, bur buttercup, and scotch thistle are known to occur in or near the project area. The introduction of new weed infestations and the spread of cheatgrass are a concern for this project. The total estimated acres invaded by noxious weeds are detailed in Table 3-12 and invasions by unit are detailed in Table 3-13.

Black henbane *(Hyoscyamus niger)* is an annual or biennial plant that grows up to 3 feet tall from a single taproot. Seeds are small and black, and prolific seed production proliferates the spread of this plant, as a single plant can produce up to a half million

seeds. This species occurs in the project area and it is prevalent in pastures, fencerows, roadsides and waste areas. Idaho State Control List.

Diffuse knapweed (*Centaurea diffusa*) is a biennial to short-lived tap rooted perennial that readily establishes on disturbed soils, outcompeting native plants for moisture and nutrients and is difficult to control. Diffuse knapweed favors recently disturbed ground consisting of light, dry, and porous soils, which are common throughout the project area. Idaho State Containment List.

Musk thistle *(Carduus nutans)* is an annual or biennial plant that grows up to 3 feet tall. A single plant can produce up to 120,000 seeds, which are wind dispersed and the seeds may remain viable in the soil for over ten years. This species can be found along roadsides and in riparian areas within the project area. Idaho State Control List.

Whitetop *(Cardaria draba)* is a perennial up to 2 feet tall with dense clusters of white flowers at the top of each stem. It reproduces by seeds and by horizontal creeping roots. This species can be found in riparian areas, disturbed sites, and along roadsides in the project area. There are no proposed treatments in areas known to contain whitetop. Idaho State Containment List.

Leafy spurge *(Euphorbia esula)* is an erect perennial up to 2.5 feet tall with roots exceeding 20 feet in depth. This species can be found in riparian areas and along roadsides adjacent to the project area. Idaho State Containment List.

Scotch thistle *(Onopordum acanthium)* is a biennial plant, producing a large rosette of spiny leaves the first year. In the second year, the plant grows 1.5- 7 feet tall and a width of up to 4 feet. Establishes in disturbed areas, riparian areas, and dry sites and has the potential to spread rapidly. This species can be found in riparian areas, along roadsides, and within disturbance on dry sites near the project area. Idaho State Containment List.

Canada thistle (*Cirsium arvense*) is a creeping rooted perennial that occurs in riparian areas. It is highly mobile from wind-born seeds and the soil seed bank holds Canada thistle seeds that germinate and grow when areas are disturbed. This species can be found in riparian areas and along roadsides near the project area. Idaho State Containment List.

Cheatgrass (*Bromus tectorum*) is an annual grass found in many disturbed sites, roadsides, and dry slopes. Cheatgrass is not a listed noxious weed in Idaho but is abundant across south facing slopes, road, parking areas, trails, and other areas with continual disturbances. This is considered a difficult species to eradicate once established and often becomes a monotypic community out competing native species. Cheatgrass infestations occur within the proposed project area in isolated areas associated with dry washes, livestock and wildlife uses, south facing slopes and roads.

Bur buttercup (*Ceratocephala testiculata*) is an annual weed found in disturbed areas and along roadsides. It is not a listed noxious species but is abundant across south facing slopes, road, parking areas, trails, and other areas with continual disturbances. This is considered a difficult species to eradicate.

Table 3-12: Acres of Mapped Weed Infestations

Species	Acres

Whitetop-*Cardaria draba*	151
Musk Thistle-*Carduus nutans*	18
Canada Thistle-*Cirsium arvense*	184
Leafy Spurge-*Euphorbia esula*	145
Black Henbane-*Hyoscyamus niger*	40
Scotch Thistle-*Onopordum acanthium*	277
Other Weed Species	30

Acres presented are treated acres recorded.

Table 3-13: Acres of Weed Infestation by Unit

Unit	Acres
1	16
2	108
3	108
4	18
5	82
6	108
7	108
8	2
9	108
10	108
11	3
12	16

The Sawtooth NF Integrated Weed Management Program can use mechanical, biological control agents, and herbicide applications for the control of noxious and invasive species on the Minidoka District.

3.9 Soils

3.9.1 Affected Environment and Existing Conditions

Desired Conditions

Soil protective cover, soil organic matter, and coarse woody material are at levels that maintain or restore soil productivity and soil-hydrologic functions where conditions are at risk or degraded. Soils also have adequate physical, biological, and chemical properties to

support desired vegetation growth. Riparian and aquatic ecosystems have appropriate types and amounts of vegetation. There is sufficient large woody debris appropriate for land and stream channel forms to maintain water quality, filter sediment, aid floodplain development, improves floodwater retention and groundwater recharge, and contributes to diverse habitat components. Management actions result in no long-term degradation of soil, water, riparian, and aquatic resources conditions. Instream flows are sufficient to support healthy riparian and aquatic habitats, the stability and effective function of stream channels, and the ability to route flood discharges, and provide for downstream uses. Wetlands and floodplains are maintained where they are properly functioning, and restored where degraded. Improving watershed conditions contribute to the de-listing of water quality limited water bodies to meet Clean Water Act requirements. Public waters are restored where water quality does not support beneficial uses and otherwise are maintained or improved (Forest Plan III-18).

Forest-wide Goals, Objectives, Standards, and Guidelines

SWST02 (standard): Management activities that may affect soil detrimental disturbance (DD) shall meet the following requirements:

a) In an activity area where existing conditions of DD are below 15 percent of the area, management activities shall leave the area in a condition of 15 percent or less detrimental disturbance following completion of the activities.

b) In an activity area where existing conditions of DD exceed 15 percent of the area, management activities shall include mitigation and restoration so that DD levels are moved back toward 15 percent or less following completion of the activities.

To estimate soil DD, it is essential that the glossary definitions for *activity area*, *detrimental soil disturbance*, and *total soil resource commitment* (TSRC) are clearly understood.

SWGU05 (guideline): After completion of ground-disturbing activities in a watershed, the minimum ground cover should be sufficient to prevent erosion from exceeding the range of soil erosion rates that are characteristic of the local soil type, landform, climate, and vegetation of the area, or the soil-loss tolerance.

Not all of the Forest-wide soils management direction in the Forest Plan applies to every proposed activity or is included here. Rationale for why certain Forest-wide standards and guidelines are not applicable to this analysis is contained in this report and in the Forest Plan Consistency Checklist (Project Record). Refer to the Soils Specialist Report for further soils information.

Soil Quality Concerns and Indicators

Through review of the activities included in the Proposed Action, the following were identified as potential concerns influencing soil resources. The concerns were developed using cause-and-effect relationships that reflect potential impacts known to occur when implementing certain activities. The indicators allow for comparing qualitative or quantitative estimates of potential effects from implementing the proposed management activities. This comparative analysis validates if the potential effects from implementing the proposed activities are consistent with the applicable soils desired conditions, goals,

objectives, standards, and guidelines in the Forest Plan. This analysis incorporates by reference the Sawtooth National Forest Land and Resource Management Plan (Forest Plan), including Appendices A and B that provide essential data and analysis methodologies to establish a comparative baseline against potential effects of the Proposed Action and alternatives.

Soil Quality Concern 1: Proposed mechanical and pile burning activities have the potential to cause detrimental soil compaction and increase soil erosion above natural levels. Use of mastication equipment compacts, ruts, and disturbs surface soils. Snowmelt runoff and rainfall cannot infiltrate the compacted soil, causing overland water flow that erodes surface soils off-site, subsequently increasing sediment delivery to nearby streams. While these activities can result in temporary or short term detrimental soil impacts, ground disturbance may also occur without negative effects to soil quality.

Indicator: Percent detrimental soil disturbance (DD) within each activity area (Forest Plan Standard SWST02). DD can occur where soil has been displaced, compacted, puddled, or severely burned (Forest Plan GL-10).

Activity Areas

Soil quality indicators are evaluated in the context of an "activity area" (Forest Plan GL-1). Changes in the indicators are used as estimates of the potential direct, indirect, and cumulative effects of the Proposed Action on the soil resources for the temporary, short- and long term time frames. The NFS lands comprising each individual treatment unit are defined as the respective "activity areas" for this analysis.

3.10 Key Issue #2 Soils

Issue #2– Soils: The volcanic ash derived soils are fragile, erosive, have a weak soil structure, and soil fertility is minimal. Because of these soil properties, the area may be more prone to invasion by cheatgrass and noxious weeds post mechanical treatment. Mechanical treatments may also impact physical and biological soil crusts and recovery is a concern in mechanically treated Phase III areas.

Indicator: Estimated total acres of soils that will experience detrimental disturbance (DD).

The Goose Creek juniper reduction project is located in the Cassia Division, in the southeast corner and along the State lines of Nevada and Idaho, of the Minidoka Ranger District. This tract of land has two basic geologic types they are Volcanic Ash and Marine Limestone. These geologic parent materials have a direct influence on the soil characteristics and topographic features.

The surface topography or shape is the result of the erosion process on the bedrock. The Volcanic ash deposit in the southeast segment of the District is very erodible. This landscape is rolling with smooth, short slopes. When the volcanic ash has a basalt cap, for example, east of Dry Gulch, the slopes are long and steep. The basalt cap are old lava flows. They are more resistant to natural erosion than the volcanic ash soil.

Limestone deposits occur in the northern and western part of the project area. Within this area there are inclusions of basalt flows and small deposits of volcanic ash. The limestone topography is more distinct, the drainages are deep, narrow, V-shaped canyons. The slopes are long, steep and the ridge tops are very narrow. The broad smooth ridges are usually caps of basalt over the limestone.

The parent material also influences the soil characteristics. These properties are both physical and chemical. Soils derived from volcanic ash are erosive and have a weak soil structure. Soils developed from limestone parent material have a higher percentage of silt and clay, stronger soil structure and are less erosive than the ash soils.

The Volcanic Ash derived soils are fragile. This soil has a fine sandy loam surface texture. This texture has a low cohesion rating and is easily displaced. The soil structure is weak; therefore vegetative rooting is a primary source of soil surface stability. The water holding capacity is low based on the soil texture. The soil infiltration and permeability rates are moderate. Water from snow melt or gentle rains easily pass through the soil profile. Water not held by the soil for vegetative use percolates down to depths unreachable for plant use. The end result is low soil productivity potential.

The soil surface has 8 low organic matter percentages, a primary need for holding water. When the surface soil dries the combination of water, wind, and livestock produce a moderately high rating for soil erosion. Livestock movement loosens the surface soil by displacement. This loosened soil is ready for transport by, wind and water.

Drainage channel erosion is more severe on the Volcanic Ash soils. These gullies are frequently 10 to 20 feet deep and five to 15 feet wide at the top. The gully bottoms are usually narrow, two to eight feet wide. For example, a dry gully deepened by five feet in one summer storm in August 1989, on the Right Hand Fork of Beaverdam Creek. The ash soils appear to melt like sugar in flowing water. This is due to the weak physical structure of the soil.

Soils developed on limestone parent material are more resistant to water and wind erosion. These soils have strong internal cohesion. The combination of silt, clays and organic matter form a strong bond between the soil particles, this is referred to as soil structure. The bonding reduces the potential of soil particle displacement from livestock movement and wind-water action. The limestone soils also have a moderate water holding capacity. The available moisture for plant use results in a higher rating for the soil productivity potential.

The annual soil productivity for soils derived on both geologic types varies from year to year. The total production of forage, vegetation, depends on the amount of available moisture and when the moisture is available for plant use. The soil capable of storing spring snow melt water for a period of a few weeks will be more productive than a soil with a low water holding capacity. Plants do not start functioning until the soil temperature attains a temperature of 40 degree F. The ability of a soil to store water for plant use is a direct influence on the potential productivity rating of any soil. This physical characteristic is very important in semi-desert soil.

There are 18 landtype units delineated within the project area. Landtypes are a stratified mapping level that considers the lithology, geologic structure, and climate (basic

components) that, over time, produce varying soils, landforms, and plant communities (manifest components). The integrated relationships between the basic and manifest components allows for recognizing the geomorphic development of the earth's surface, along with understanding of how certain bio-physical ecosystem elements (hillslope erosion, sedimentation, stream channels, landforms, vegetation, animal life, etc.) respond to natural and management-caused disturbances (USDA Forest Service 1980). The landtype map unit descriptions can be found in Table 3-14.

Table 3-14. Landtype Soil-Hydrologic Characteristics (USDA Forest Service 1980).

Landtype Map Unit	Acres	EHR[a]
211-1	570	3
212-1	71	2
213-1J	7,582	3
214-1J	6,944	3
214-2C	482	2
261-1J	10,579	4
261-1A	1,078	4
263-1J	3,800	3
263-2C	721	4
263-2J	250	4
264-1J	3,755	4
265-1J	6,557	3
265-2J	695	4
266-2J	1,783	4
415-2J	2,474	3
416-2	149	4
465-2	386	3
465-2J	1,943	3

a. EHR - Erosion Hazard Rating

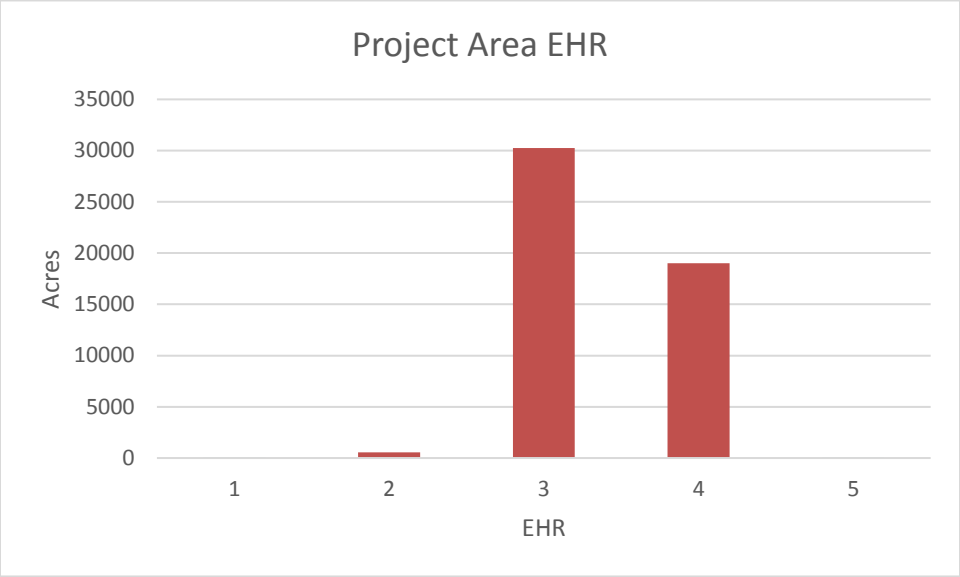


Figure 3-11. Project Area EHR Ratings

The five erosion hazard class ratings together with a description of sites limitations are as follows. The EHR Ratings for the Project Area are included in Figure 3-11.

I. Low - No appreciable hazard of erosion.

II. Mod. Low - Sufficiently resistant to erosion to permit exposure of bare soil under minimal precautionary restrictions.

III. Moderate - Sufficiently resistant to erosion to permit limited and temporary exposure of bare soil during development or use.

IV. Mod. High - Unprotected bare soil will erode sufficiently to severely damage productive capacity or will yield high volumes of sediment.

V. High - Unprotected bare soil will erode sufficiently to severely and permanently damage the production capacity of the soil or will yield excessively high volumes of sediment.

The public lands within the project area provide different seasonal recreation opportunities throughout the year which include big game hunting, dispersed camping, motorized and non-motorized trail uses. Past timber harvest, motorized and dispersed recreation, mining, road construction, and livestock grazing with associated improvements are the primary activities that have influenced soil quality within the project area. There is evidence of soil quality impacts from historic livestock grazing, mostly through soil displacement (i.e. erosion) due to loss of soil cover. Other impacts occur in localized areas, they are primarily historic impacts that have been perpetuated by current dispersed recreation uses and livestock.

Detrimental Disturbance

Management activities can detrimentally alter natural soil characteristics, resulting in immediate and/or prolonged degradation of onsite resources or vegetation productivity. Detrimental Disturbance (DD) is associated with unacceptable levels of soil displacement, soil compaction, soil puddling, or severely burned soils (USDA Forest Service 2012, p. GL-12). Detrimental disturbance will be evaluated using the activity areas that represent the individual units for the proposed vegetation treatments. The rationale for this delineation is based on Forest Plan definitions for activity areas (USDA Forest Service 2012, p. GL-1).

There is existing DD in each of the activity areas that can be attributed to livestock grazing and residual disturbances such as personal fuelwood gathering which are difficult to locate and quantify. Existing DD from past activities can be attributable to past and current livestock grazing, residual disturbances from commercial timber harvest, dispersed recreation, and personal fuelwood gathering. This existing DD was approximated at no more than three percent of the project area based upon field visit observations. The three percent was not ground-truthed. Within the delineated activity areas, detrimental soil conditions from disturbances occurring in the last twenty one years were considered to be residual detrimental impacts (Arnup 1998).

Chapter 4–Environmental Consequences and Cumulative Effects

4.1.1 Environmental Consequences

4.1.2 Environmental Consequences- Wildlife and Terrestrial Habitat

4.1.2.1 No Action Alternative- Greater Sage-grouse – Management Indicator Species

Alternative 1: No Action

The No Action Alternative means that no specific management activities proposed by the Goose Creek Project would occur. Ongoing and permitted uses on National Forest system lands would continue within the project area. Management activities previously approved by other environmental analyses and decision documents would also continue to be implemented. The No Action Alternative would result in a continued overall decline in sage-grouse habitat over the entire project area and juniper encroachment into sagebrush communities within the project area would continue.

Negative impacts to sage-grouse from continue juniper encroachment would be most pronounced in areas immediately adjacent to active sage-grouse leks. The 17 leks in unknown or inactive status would likely continue to have no or sporadic lek attendance. The four remaining active leks would likely become inactive in the long term as juniper expansion reached these sites. The leks adjacent to the project area could also become inactive or remain in an unknown or inactive status as a large area (approximately 60,212 acres of habitat) would have some level of sage-grouse avoidance. In shrub nesting habitats where sage-grouse use is the highest, sage-grouse would avoid using these areas for nesting and foraging due to increasing tree cover. Low sagebrush habitats adjacent to

leks would continue to increase in juniper cover and predation risk would increase in the long term. Combined, these impacts are expected over both the treatment area and the buffered 60,212 acre area where some level of sage-grouse avoidance would be expected. In encroached sagebrush sites, juniper would continue to increase in extent and canopy cover with continued declines in shrub and perennial grass cover, negatively impacting sage-grouse by decreasing nesting cover and decreasing nest success in the long term. This impact is expected over the entire treatment area. Thirty-seven of the pretreatment upland HAF sampling sites that could have their status improved by treatment would remain in unsuitable or marginally suitable condition since treatments would not be implemented. Juniper expansion would continue to decrease connectivity of habitat across the project area and the impacts of habitat fragmentation that juniper encroachment has caused would continue across the landscape. Based on the declining lek attendance it is likely that most if not all populations in the project area would become locally extirpated in the long term.

In the long term, sagebrush and sage-grouse habitats would become less resilient to disturbances such as fire; maintaining sagebrush communities across the project area with sufficient perennial grass and shrub composition for forage and hiding cover for sage-grouse would become increasingly difficult. This would be especially pronounced in Phase III juniper sites that would likely transition to an annual grassland following fire (Miller et. al. 2015). Of the 53 HAF upland sites sampled, 37 that would have been improved in the long term if treated, would have a higher risk of transitioning to an annual grassland in the event of a wildfire under the No Action Alternative.

Riparian sage-grouse brood rearing sites would continue to decline as juniper encroachment adjacent and within riparian sites continued. Negative impacts include increased vertical vegetation structure and increased predation risk, decreased riparian brood rearing habitat and overall use of brood rearing habitats due to behavioral avoidance of areas with tree cover, decreased water within the riparian zone and decreased riparian obligate plant species. Of the 29 riparian HAF plots sampled, the 21 sites that would have benefited from treatment under the proposed action, would not be treated and therefore habitat suitability for these sites would not be improved.

Under the No Action Alternative, no juniper treatments would be implemented and therefore no impacts relating to noise and human traffic to sage-grouse would occur. Overall, the no action is expected to have moderate negative impacts to sage-grouse habitat in the Project Area. The No Action Alternative could cause a loss of viability to the populations within the project area. The No Action Alternative would not make progress towards meeting desired vegetation and treatment goals outlined in Forest Plan Direction and the 2015 Sage-Grouse Plan Amendment ROD.

4.1.2.2 Proposed Action Alternative- Alternative 2:

The Proposed Action would directly improve sage-grouse habitat over approximately 23,492 acres by reducing juniper encroachment, increasing vigor of sage-steppe habitats, and increasing sagebrush cover. Benefits to sage-grouse would be most pronounced in areas immediately adjacent to active sage-grouse leks and in mountain shrub nesting habitats where sage-grouse use is highest. Habitat across the entire nearly 50,000 acres of the project area would be improved in the long term and behavioral avoidance of juniper

encroached area would be reduced by approximately 63,212 acres. Low sagebrush habitats adjacent to leks would benefit from reductions in juniper cover that would reduce predation risk and improve perennial grass cover and forb composition. In the long term, reductions in juniper around sage-grouse leks would reduce the possibility of lek abandonment and local extirpation of smaller lek sites that are currently encroached by juniper. It would be expected that under the Proposed Action, that the remaining four active leks in the project area would remain active and in the long term it is likely that some portion of the 17 leks of unknown or inactive management status would become active again as habitat benefits across the project area were realized in the long term. This benefit would also apply to sage-grouse that use the five leks adjacent to the project area, that likely use the project area to some degree. In mountain sagebrush sites, juniper reduction treatments would increase shrub and perennial grass cover; benefiting sage-grouse by increasing the amount of mountain brush communities available for nesting, increasing nesting cover, reducing predator effectiveness at detecting and predating nest sites, and increasing nest success in the long term. Of the 53 pre-treatment HAF upland sampling plots in the project area, 37 would have an increase in habitat suitability from unsuitable to a marginally suitable rating from the proposed action over time.

Juniper treatments would increase connectivity of habitat between leks across the project area and between the north and south end of the project area and ultimately between land ownerships. This would reduce the impacts of habitat fragmentation that juniper encroachment has caused by connecting sagebrush communities across the landscape. In the long term, sage-grouse habitats would become more resilient to disturbances such as fire and would maintain sagebrush communities across the landscape with increased perennial grass, forb and shrub composition for forage and hiding cover for sage-grouse. It is expected that at least 37 of the pre-treatment HAF sampling plots in the project area would benefit from the proposed action and would have increased resistance and resilience from treatments in the long term, even though slight short term reduction in resistance and resilience would occur as the sagebrush and native bunchgrasses understory began to dominate ecological processes on these sites in the long term. Riparian sites would also benefit from the proposed action by reducing juniper encroachment adjacent and within riparian sites. Benefits would include reduced vertical vegetation structure and reduced predation risk, increased riparian brood rearing habitat, increased water within the riparian zone, and increased riparian obligate plant species. Of the 29 riparian pre-treatment sampling points in the project area, 21 would have an increase in their habitat suitability for sage-grouse from the proposed action.

Some short term displacement of sage-grouse would occur as a result of the proposed action due to noise and human traffic associated with juniper treatments. This impact is expected to be short term due to implementation of Project Design Features during sage-grouse breeding season and the short time period it generally takes to implement treatments. Sage-grouse are expected to move back into treatment areas shortly after completion of treatments and in many cases on nearby sage-grouse juniper treatments on BLM lands, sage-grouse have moved back into treated areas that previously were not being used pretreatment even before treatments were fully completed (Connor White, Pheasants Forever, personal communication 2017, Nate Long, Utah DWR, personal communication 2017). Overall increases in nesting habitat available for sage-grouse would occur where juniper has been removed.

Juniper treatments could increase the risk of noxious weed invasion in sage-grouse habitat due to weed seeds or plant materials being transported on equipment used for treatments and soil disturbance associated with treatments. This risk is expected to be slight due to implementation of project design features. Overall, the proposed action is expected to have positive impacts to sage-grouse habitat in the Project Area. Alternative 2 **May Impact** sage-grouse individuals or potential habitat, **but will not likely contribute to a trend towards federal listing** or cause a loss of viability to the population or species.

4.1.2.3 Hand Treatment Only Alternative- Alternative 3 – The effects to sage-grouse from Alternative 3 are similar to the effects listed for Alternative 2 for hand treatment however with the elimination of any mechanical treatments under this alternative approximately 3,884 acres would not treated. This would result in the proposed mechanical treatment acres not providing suitable sage-grouse habitat in the long term. The resistance and resilience of these sites would not improve in the long term on the 3,884 acres not treated. In the event of a wildfire through this area, there would be a high likelihood that these sites would transition to an annual grassland and would neither provide sage-grouse habitat nor the management opportunities to recover these sites to a functional sage-steppe vegetation community. In juniper vegetation types, Phase III sites are at the most at risk of site conversion to cheatgrass and are the most difficult to restore post fire (Miller et al. 2015). Not treating the 3,884 acres of juniper associated with the mechanical treatments would impact two leks (one of an undermined management status and one of an active management status). These leks would likely become inactive in the long term. Fifteen of the 152 riparian sites that were mapped within the project area are within a 0.5 mile distance of mechanical treatments and six of the HAF riparian sampled sites are within 0.5 miles of the proposed mechanical treatments in Alternative 3. Not treating the 3,884 acres in alternative 3 would result in some degree of sage-grouse avoidance of these riparian brood rearing sites areas adjacent to the proposed treatments within 0.5 miles. For upland habitat areas, when the mastication treatment area is buffered by 0.5 miles, the mechanical treatments constituted an area of approximately 22,000 acres where some level of sage-grouse avoidance could occur. The habitat benefits of treating juniper on these sites associated with improved riparian function, improved nesting habitat, increased resistance and resilience and/or sage-grouse behavioral avoidance would also not be realized for the sites within 0.5 miles of the mechanical treatments. Alternative 3 **May Impact** sage-grouse individuals or potential habitat, **but will not likely contribute to a trend towards federal listing** or cause a loss of viability to the population or species.

4.2 Key Issue #1-Non Target Species

Alternative 1 – Deterioration of sagebrush communities would continue to increase over time due to juniper expansion. The No Action Alternative would have no impact on juniper habitat in the short term; in the long term juniper would increase in abundance and composition across the landscape, benefiting those species which prefer and select for juniper communities. In the long term, under the No Action Alternative, juniper would continue to expand into existing sagebrush communities and in the event that a wildfire occurred under dry and hot conditions, it is possible that large expanses of juniper would be lost due to the homogeneity of fuels across the landscape. While

difficult to predict, in the long term, if juniper continued to expand into sagebrush habitats, the landscape could become more conductive for a large scale wildfire that would be difficult to control, potentially resulting in large blocks of juniper habitat burning. That would have a negative impact on species that use juniper and migratory bird species that use juniper in particular. Overall however, in the long term, it is likely that juniper would exist on the landscape at a level where non target species habitat would be sufficient to support completion of life stages.

Alternatives 2 and 3 – The effects to juniper habitat from Alternatives 2 and 3 are expected to be similar in impact and effect. The proposed action (Alternative 2) would treat approximately 3,884 acres more of late phase II and phase III juniper communities that function as juniper woodland habitat now, so impacts would be slightly greater to non-target species under that alternative. For effects analysis, the effects for both action Alternatives are detailed below. Species that need open sagebrush habitat for their life cycle have been documented to decline when juniper has expanded or the shrub component has been lost and juniper adapted species have been stable to increasing, thereby favoring some species over others at a landscape scale. Juniper reduction treatments are expected to have a myriad of effects on species that use juniper. Treatments will immediately reduce the amount and extent of juniper habitat across the landscape for nesting, thermal cover and forage. For non-target species, species that use juniper for food and nesting will be impacted the most in the short term as the amount of habitat available would be reduced.

The extent of impact will depend to a large degree on the phase of juniper. Cutting Phase I juniper where trees are small and the landscape is not dominated by juniper would have few effects as these habitat types are not providing the habitat structure that taller and more mature trees provide to species that use juniper. While Phase I areas may not be used by sage-steppe obligates due to tree expansion, they also provide marginal juniper habitat for species that depend on juniper as the trees are relatively small and have few berries. In the project area, there are 12,842 acres of Phase I targeted for removal and 19,429 acres of Phase I within the project area. Phase II juniper areas likely provide the most habitat for the largest array of species that use juniper as they contain a unique assemblage of sagebrush plant community species and an over-story of juniper. In Phase II sites, the sagebrush understory under is co-dominant with the juniper canopy. There are 2,195 acres of Phase II juniper targeted for treatment and 5,372 acres within the project area. In Phase III sites, the juniper canopy is dominating ecological processes and the understory shrub composition is reduced or in some cases absent from the plant communities. These vegetation communities, while lacking the shrub understory, often produce copious amounts of berries that are consumed as forage by many bird species and have the largest amount of cavities for cavity nesting birds. Rodents often use phase III trees to forage and burrow around and these sites offer the largest amount of thermal cover for mammalian species. Phase III sites in many cases typify old growth juniper stands and are located on “fire safe sites.” Due to the lack of vegetation, typically associated with very shallow and rocky soils that are relatively unproductive, fire return intervals on these sites can extend beyond 400 years. Within the project area, old growth juniper stands are not targeted for treatment due to their high value to wildlife and the fact that they are not considered encroaching but rather a natural feature of the landscape that has relatively unaltered by fire suppression activities in the last century when

compared to other sagebrush sites that have had juniper expand into from existing stands on the landscape. Within the project there are 6,043 acres of Phase III targeted for treatment and 11,902 acres of Phase III in the project area. Overall, there are approximately 23,500 acres of juniper targeted for removal and 35,000 acres of juniper within the project area boundary.

Impacts from implementing both the Proposed Action and the Hand Treatment only alternative to non-target species are expected to primarily be associated with shifting habitat use patterns. Potential short term reductions in reproductive success associated with shifting habitat use, primarily associated with the 8,238 acres of Phase II and Phase III areas where treatment is proposed. As treatments are implemented, species that use juniper including migratory birds, small mammals and big game species are expected to shift use to areas where juniper would still occur on the landscape. More mobile animals, such as big game species are expected to be relatively unaffected by the treatments. Smaller mammals, such as wood rats, which are less mobile than big game species, would have more energetic requirements to move to areas where juniper still exists. Migratory birds would also be able to move to non-treated juniper patches on the landscape relatively easily; however, newly fledged birds would have more energetic requirements to move and potential loss of individuals could occur as treatments are implemented. As treatments are implemented and species that use juniper shift use to untreated patches on the landscape, reproductive success and loss of individuals may occur for a short time period (one season) as species learn terrain features and the most productive portions of the juniper communities that they recolonized. It is also likely that many of these habitats already have individuals occupying these habitats so interspecific and intraspecific competition is likely to occur in the short term also.

Overall, juniper communities are expected to remain on the landscape as a habitat feature that is available for supporting species populations that use juniper for completion of their life cycle at or near current levels in the long term. There is no information that suggests a population would begin to decline to a point where viability was lost at a regional or even local scale as juniper treatments were implemented. It is likely that some slight short term deleterious effects to individuals within a population would occur immediately during and after treatment.

4.2.1 Cumulative Effects

The National Environmental Policy Act (NEPA) defines cumulative effects as all past, present, and foreseeable future actions within the analysis area. The Analysis Area is defined as “all areas to be affected directly or indirectly by the Federal action and not merely the immediate area involved in the action” (50 CFR 402-02). The Goose Creek Sage-Grouse Habitat Restoration Project Analysis Area for terrestrial wildlife is generally associated with the project area boundary however, for the analysis of Cumulative Impacts and for some indirect impacts, the assessment area was developed based on topography, species habitat requirements and known use patterns from local knowledge, professional experience and scientific literature. The assessment area is spatially illustrated in Figure 4-1 and is the area where juniper treatments on both Forest Service and BLM is expected to have a cumulative effect on sage-grouse. The Cumulative Assessment Area (CAA) for this project was not expanded further to the north due to

local sage-grouse population behavior and the 2012 Cave Canyon Fire, which likely fragmented populations and changed habitat use in that area from populations to the south, in and adjacent to the project area. In total, the CAA is 86,920 acres.

The effects of vegetation treatments are expected to be long-term (> 15 years). The timeframe effects of implementation actions are expected to be limited to the short-term (3-10 years). The scope of analysis of cumulative effects will be focused on these time frames. Species with similar life history strategies and similar impacts as a result of past, present and reasonably foreseeable actions were grouped together for analysis purposes.

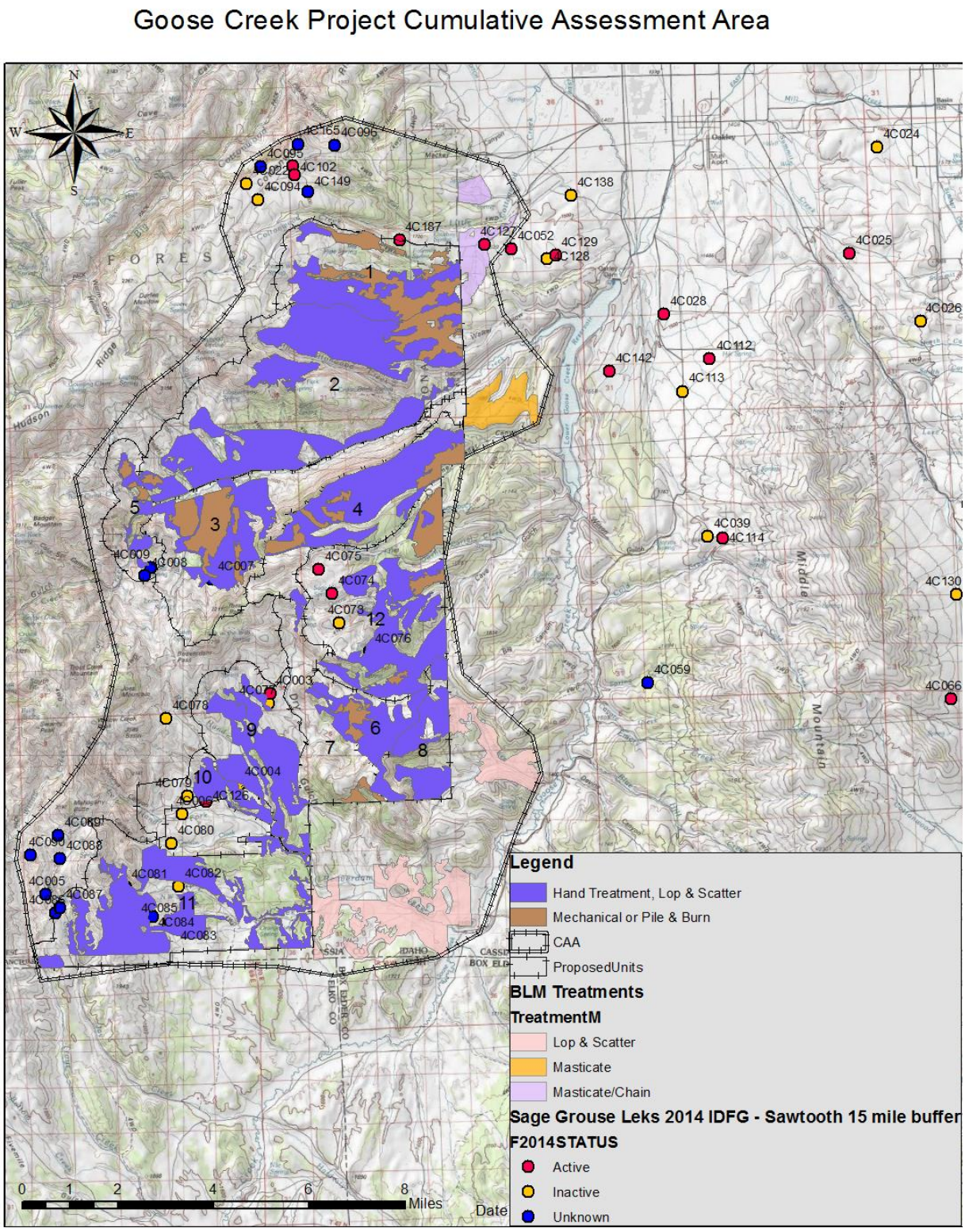


Figure 4-1. Cumulative Effects Analysis Area for terrestrial wildlife in the Goose Creek project area boundary

4.2.1 Past, Present and Reasonably Foreseeable Actions within the Cumulative Assessment Area (CAA)

The primary federal activities that have impacted sensitive wildlife species and their habitats on the Cassia Division of the Minidoka District include use of system and non-system roads, past and present livestock grazing, wildfire and wildfire suppression, pesticide (including herbicide) application, recreation and non-recreation special-use permitted activities, developed recreation, water diversion structures, irrigation, current and past timber harvest, current and past mining activity, personal use firewood cutting, and dispersed recreation (including skiing and snowmobiling). Past management activities and disturbances have contributed to the establishment and distribution of noxious and non-native invasive plant species in the analysis area, especially in riparian sites. Historic and in some cases, current livestock grazing within the CAA has affected upland and riparian habitats and changed vegetation composition. In the Cassia Division and within and adjacent to the Project Area, wildfires and wildfire suppression have played an important role in vegetation community composition at the landscape scale.

Reasonably foreseeable actions within the CAA include the above listed uses including recreation at or near similar use levels, continued livestock grazing at or near current levels within the two allotments (Oakley Valley and Goose Creek), wildfire suppression, travel management actions including rehabilitation of non-system routes and normal yearly maintenance of roads. Forest Service infrastructure and facilities are expected to be maintained through time. Current habitat fragmentation, high road densities and disturbance to wildlife from motor vehicles and the recreating public is expected to continue at or near current levels and is expected to continue to negatively affect to some degree wildlife distribution and productivity, especially for species that are sensitive to disturbance. Inventory and control of noxious weeds is expected to occur at or near current levels with mechanical treatment (i.e. hand pulling, mowing, etc.) and chemical pesticide (herbicide) application. In the future, management actions and projects to control invasive grasses and restore sagebrush habitat in sagebrush habitats are likely to occur. The BLM will likely implement juniper treatments to improve sage-grouse habitat on BLM lands adjacent to the project area as displayed on Figure 4-1 above.

State and private activities that occur within the CAA are: activities associated with road maintenance, including operation of material sources for road construction and maintenance, highway maintenance in the right-of-way consisting of clearing of vegetation in the right-of-way, drainage, cleaning and installation, herbicide application, livestock grazing operations on state and private lands, private land fuels reduction projects, diversions and the associated irrigation on state and private lands; and operation and maintenance, including vegetation management, along utility rights-of-way.

Landscape Analysis of Cumulative Effects

Cumulative Effects of No Action Alternative- The distribution, viability, and diversity of wildlife species and wildlife habitats within the Project Area would reflect increased juniper densities. Overall range health and ecological potential in the Project Area would continue to decline, and native sage-steppe vegetation would continue to be reduced in extent and vigor. Juniper encroachment would continue to negatively affect suitable habitat for sagebrush obligate species. Woodland and/or juniper-associated species

would likely experience benefits from the increased number of trees available for shelter and cover. However, according to USFS (2008), "The more tree dominated piñyon and juniper woodlands become, the less likely they are to burn under moderate conditions, resulting in infrequent high intensity fires." Over time more extreme fire behavior could result from the No Action Alternative, resulting in potentially widespread and unpredictable modifications to habitats throughout the cumulative impact analysis area. In many cases, site conversion from a juniper dominated or sagebrush dominated habitat to an exotic annual grassland could occur. Cumulative effects under the No Action Alternative are considered moderate because no proposed treatments would occur.

Cumulative Effects of Alternatives 2 and 3 – Cumulative effects from Alternatives 2 and 3 are expected to be very similar in scope and intensity. While some differences between the two alternatives exist, the total difference in acres treated in Alternative 2 and acres treated using different methods in Alternative 3 account for less than five percent of the total Cumulative Analysis Area. Juniper thinning and removal would result in impacts similar to those outlined in the direct and indirect effects section above. Short-term impacts to wildlife would transition to long-term benefits for most sensitive and non-sensitive species that rely on sagebrush within the treatment areas. Continued treatment would result in long-term cumulative benefits resulting from increased acreage of productive ecosystems characterized by diverse vegetative communities optimizing habitat values for wildlife within the Project Area. Cumulative effects resulting from implementation of the Alternatives 2 and 3 are considered minor.

4.2.2.1 Species Specific Cumulative Effects- Greater Sage-Grouse

No Action Alternative- The No Action Alternative would result in a continued decline in sage-grouse habitat over the entire project area and juniper encroachment into sage-grouse habitats within and adjacent to the project area would continue. Potential projects on adjacent BLM and private lands would reduce some of these effects but the remaining habitats on NFS lands would continue to decline in quality and would continue to remain fragmented due to juniper expansion.

Negative impacts to sage-grouse from continue juniper encroachment would be most pronounced in areas immediately adjacent to active sage-grouse leks and in mountain shrub nesting habitats where sage-grouse use is the highest. Low sagebrush habitats adjacent to leks would continue to increase in juniper cover; predation risk would increase in the long term with sage-grouse continuing to abandon lek sites as juniper expanded. In the long term this could result in the cumulative impact analysis area no longer providing the necessary habitat components for sage-grouse to complete their life cycle. In currently encroached sagebrush sites, juniper would continue to increase in extent with continued declines in shrub and perennial grass cover, negatively impacting sage-grouse by decreasing nesting cover and decreasing nest success in the long term. Juniper expansion would continue to decrease connectivity of habitat across the project area and the impacts of habitat fragmentation that juniper encroachment has caused would continue across the landscape, resulting in potential local population level declines.

In the long term, sage-grouse habitats would become less resilient to disturbances such as fire and maintaining sagebrush communities across the project area with increased

perennial grass and shrub composition for forage and hiding cover for sage-grouse would become increasingly difficult. Riparian sites would continue to decline as juniper encroachment adjacent and within riparian sites continues. Negative impacts include increased vertical vegetation structure and increased predation risk, decreased riparian brood rearing habitat, decreased water within the riparian zone and decreases in riparian obligate plant species. Under the No Action Alternative, no juniper treatments would be implemented and therefore no impacts relating to noise and human traffic to sage-grouse would occur. Overall, the No Action Alternative is expected to have moderate Cumulative Effects to sage-grouse and their habitat in and adjacent to the Project Area.

4.2.2.2 Proposed Action Alternative- Cumulative Effects of the Proposed Action and Hand Treatment Only Alternative

The Proposed Action would improve sage-grouse habitat directly over approximately 23,000 acres and indirectly over the entire project area boundary by reducing juniper encroachment and facilitating plant community succession, increasing vigor of sage-steppe habitats and increasing sagebrush cover. Benefits to sage-grouse would be most pronounced in areas immediately adjacent to active sage-grouse leks and in mountain shrub nesting habitats where sage-grouse use is highest. Low sagebrush habitats adjacent to leks would benefit from reductions in juniper cover that would reduce predation risk and improve perennial grass cover and forb composition. In the long term, reductions in juniper around sage-grouse leks would reduce the possibility of lek abandonment and local extirpation of smaller lek sites that are currently encroached by juniper. It is also possible that previously abandoned lek sites would be recolonized and birds would begin using these sites after treatments are completed. In mountain sagebrush sites, juniper reduction treatments would increase shrub and perennial grass cover, benefiting sage-grouse by increasing the amount of mountain brush communities available for nesting, increasing nesting cover, decreasing sage-grouse avoidance of these areas, reducing predator effectiveness at detecting and predating nest sites, and increasing nest success in the long term.

Juniper treatments would increase connectivity of habitat across the project area by connecting sagebrush habitats that are currently separated and encroached by juniper into existing suitable patches of habitat. This would reduce the impacts of habitat fragmentation that juniper encroachment has caused by connecting sagebrush communities across the landscape. In the long term, sage-grouse habitats would become more resilient to disturbances such as fire and would maintain sagebrush communities across the project area with increased perennial grass, forb and shrub composition for forage and hiding cover for sage-grouse. Riparian sites would also benefit from the proposed action by reducing juniper encroachment adjacent and within riparian sites. Benefits would include reduced vertical vegetation structure and reduced predation risk, increased riparian brood rearing habitat, increased water within the riparian zone, and increased riparian obligate plant species that are used for forage and hiding cover.

Some short term displacement of sage-grouse would occur as a result of the proposed action due to noise and human traffic associated with juniper treatments. This impact is expected to be slight due to implementation of Project Design Features during sage-grouse breeding season and the short time period it generally takes to implement treatments. Sage-grouse are expected to move back into treatment areas shortly after

completion of treatments. As sage-grouse begin nesting in habitats where juniper has been removed, predation of nests could be slightly less in and adjacent to the project area due to the overall increases in nesting habitat available for sage-grouse in the long term. Cumulative effects from implementation are expected to be negligible.

Alterative 3 would have similar Cumulative Effects as the Proposed Action but would have slightly reduced acreage. The acres not treated under this alternative would not provide habitat for sage-grouse and as the understory was lost, these sites would provide fewer habitat benefits to species that depend on sagebrush communities. In addition, fire suppression actions in these areas would be more difficult, possibly resulting in slightly larger fires than if they were treated. Overall, the proposed action and the Hand Only Alternative would be expected to have positive impacts to sage-grouse habitat in the Project Area and Cumulative Effects would be largely positive with the most benefits to sage-grouse being realized under the Proposed Action.

4.2.3 Cumulative Effects to Non Target Key Species

***Cumulative Effects of the No Action Alternative*:** Non target species within the project area, especially species that use juniper for completion of their life cycle would not be affected by the No Action Alternative in the short term as no treatment would be conducted. In the long term, as juniper expanded it is likely there would be long term increases in the amount of juniper habitat on the landscape. Under the No Action Alternative, fire frequency (starts) from natural causes (lightning) could decrease through time as the shrub and herbaceous understory was lost however if a fire start became established, control would be more difficult under the No Action Alternative in the long term and the likelihood of a high severity wildfire with negative impacts to vegetation and habitat recovery post fire would increase through time. While difficult to predict, it is possible that large amounts of juniper habitat could burn in a single fire event and non-target species could lose large quantities of associated juniper habitat long term if sites transition to annual grasslands post fire. Overall, the No Action Alternative is expected to have minor negative Cumulative Impacts to Non Target Species.

***Cumulative Effects of Alternative 2 and 3*:** Under Alternative 2, a portion (8,238 acres) of the available juniper habitat would be treated and removed as functional juniper habitat. This number assumes that Phase I juniper provides relatively poor habitat for non-target species that use juniper and was not considered in the analysis. That would have an immediate short term negative effect however there are an estimated 12,500 acres of Phase II and III juniper habitat within the CAA that would still be available, providing functional habitat in the long term. With the amount of juniper habitat still available for non-target species, there is no evidence that proposed actions would result in non target species experiencing local population declines under either Alternative in the long term however some short term impacts to reproduction could occur. This impact is even less for Alternative 3, where the acres of Phase II and Phase III is reduced even further since the mastication acres are removed from this alternative. It is likely that fire suppression would be more effective as the mosaic of vegetation across the landscape would be more heterogeneous and firefighting tactics would be more effective with hand crews and engines. This would result in a higher probability of the remaining juniper

habitat remaining on the landscape when compared to the No Action Alternative. Overall, Alternative 2 and 3 are expected to have minor negative impacts to Non Target Species.

4.3.1 Environmental Consequences- Fire and Fuels

This analysis is based primarily on relevant, existing fire and fuels research as well as landscape restoration in sage-steppe research from various sources. The assumption is made that all FRCC mapping provided in the Forest Service reference library is accurate to a scale that fits the project analysis. There is also the assumption that weather and fire behavior data and research is adequate and was done using the best available information and science.

4.3.1.1 No Action Alternative

Under the No Action Alternative, vegetative communities would continue to be effected by natural processes and current management practices such as grazing. This alternative fails to address the Forest Plan's objective to return juniper to its desired pattern which is inconsistent with Appendix A (2012 Forest Plan). Areas mapped as FRCC 2 and 3 are already inconsistent with the Forest Plan's desire to return conditions to their Historic Range of Variability (HRV), and the No Action Alternative would lead to even more acres converted to these classes.

Phase III landscapes alter the fire regime to infrequent, high severity due to the lack of understory vegetation to carry fire under normal conditions and the stand-replacing nature of fires that do occur in this fuel-type. The high severity effects from fires include erosion, soil hydrophobicity, and conversion to annual grasslands. While fires may occur less frequently due to lack of understory vegetation, the condition in which juniper stands do burn create increased resistance to control, often resulting in costly and dangerous suppression efforts. In addition, post-disturbance efforts to mitigate these effects are both costly and intensive. In some cases, high severity fires create a vector for conversion of a landscape to annual grasslands, further altering the fire regime (McIver et al, 2010). In summary, the area would not be managed in a way that is consistent with the Forest Plan or National Cohesive Strategy, specifically maintaining resistant and resilient landscapes.

4.3.1.2 Proposed Action Alternative

The proposed action aligns with both Forest Plan and Greater Sage-Grouse ROD direction by restoring and maintaining the sage-steppe ecosystem. Implementing these juniper reduction treatments mimics fire disturbance in order to return and/or maintain more acres in a FRCC 1 and 2. Since a majority of the project exists in FRCC 2, implementing the proposed action would not only move vegetation communities to a more desired composition, it will prevent these acres from further declining to FRCC 3.

For hand-cutting in Phase II and early Phase II juniper, the effect on surface fuel loading and resultant fire behavior would be negligible under normal conditions. The sage-steppe fuel-type is already flammable, whether small-medium juniper trees exist there or not. There is a chance that under extreme weather conditions, the additional surface fuel loading could lead to severe fire effects such as hydrophobic soils. After the trees are felled, and the needles fall off (within 1-5 years – depending on snow), the shrub/grass

components would be the driver of fire behavior. Fire return interval and fire effects would mimic natural disturbance.

For hand-cutting in late Phase II and early Phase III juniper, a short-term increase in surface fire behavior would occur due to the continuity of laying all the fuel closer to the ground. After the needles fall off, the shrub/grass component would again drive fire behavior as it did prior to treatment. There would also be a long-term increase in likelihood of fire ignition from pre-treatment, since these Phases have declining grass/brush understories prior to treatment and treatments would maintain and increase the shrub and herbaceous vegetation component; however, the post treatment vegetation would mimics a more natural fire regime. When closed-canopy stands of juniper do burn, typically this occurs under high-wind, severe weather conditions. The weather conditions in combination with the high, unnatural fuel loading create severe fire effects that can damage soils and encourage invasive plants and transitioning of sites to annual grasslands.

For masticated fuels, fire behavior is best predicted using slash fuel models (SB1 and SB2) developed by Scott and Burgan, 2015 (Knapp et. al., 2008 and Shakespear, 2014). Masticated fuels are more compact than standing brush and grass of the same depth reducing rate of spread. The flame lengths for the slash fuel models are at or slightly above those of the models used for grass and brush (GR2 and GS2). In other words, fire behavior of masticated fuels would be very similar to that of the desired fuel-bed, and much less than untreated areas of standing juniper. The difference would be in the severity of a wildfire in masticated fuels; because the fuel bed is much more compact, resonance time of the flaming front and residual smoldering can have soil heating effects under dry conditions. (Soils having >20% moisture show little effect from fire, even under severe burning conditions.)

There may be areas within the identified mastication treatment where equipment access or implementation may not be feasible. In these areas, juniper may be cut and piled, with the piles burned after an adequate period of drying. Because piles are a concentration of flammable fuel, burning can cause short-term effects on soil productivity and encourage weeds. This is the only treatment that includes any type of prescribed burning and therefore could impact air quality. The Minidoka Ranger District is a member of the Montana/Idaho Airshed Group and follows all of their approvals and guidelines when conducting burning (MT/ID Airshed Group, 2010).

4.3.1.4 Cumulative Effects Fire and Fuels

The area identified for cumulative effects analysis includes all of the Headwaters, Upper, Middle, and Lower Goose Creek watersheds (5th Order HUC) within the sage-steppe vegetation type. Other vegetation types in the area are generally less flammable and fire/fuels treatment or other management activities in alignment with current policies would not be relevant to fuels composition or fire behavior on this portion of the landscape (See Figure 4-2.)

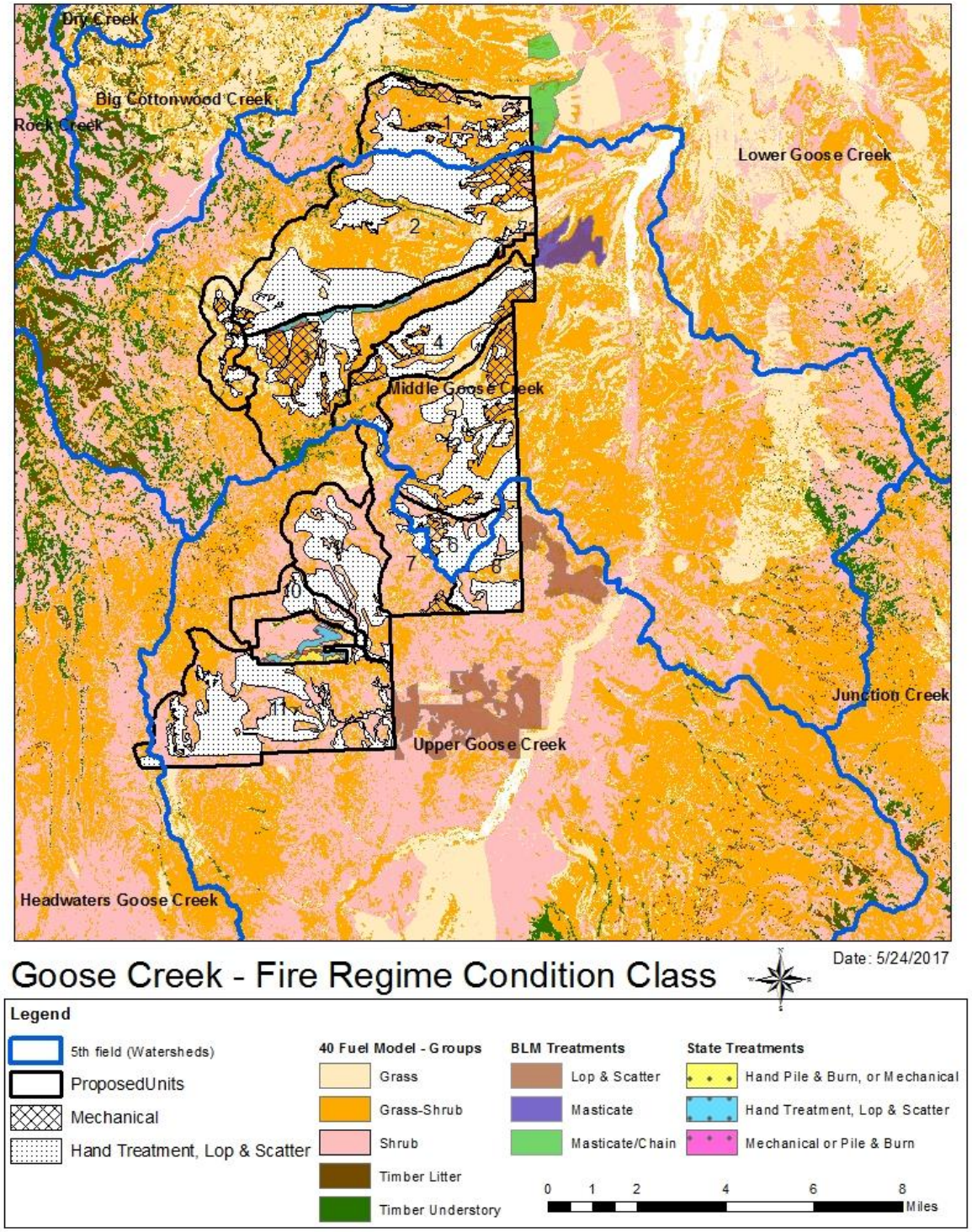


Figure 4-2. Cumulative Effects Area Map for Fire and Fuels

Past disturbances on the landscape include wildfire, post-wildfire vegetation treatment, grazing improvement treatments, other small vegetation (timber) treatments and livestock grazing. Currently the BLM is conducting sage-grouse improvement projects on their lands similar to the proposed action. The NRCS has money available and encourages private landowners to make improvements for sage-grouse habitat as well. Current known private land activities include cattle grazing and cultivation.

Past, present and future wildfire response has been full suppression for a variety of management objectives; the most current being protection of Greater Sage-grouse habitat for both Forest Service and BLM lands. Livestock grazing is likely to continue at or near current levels unless new environmental analysis is completed to justify changes. Other foreseeable future actions would be continued improvement of the sage-steppe ecotype for both wildlife habitat and resistance/resilience to disturbances such as fire.

Cumulative Effects of No Action Alternative:

The No Action Alternative will have a moderate (negative) cumulative effect on the landscape, as the identified acres in the proposed action would go untreated. If/when these untreated acres burn in a wildfire they may produce severe fire effects, including but not limited to, the conversion of sage-steppe ecotype to annual grasslands, hydrophobic soils, and in the event of an uncharacteristically large fire, loss of landscape mosaic exhibiting various seral stages. Resistance to control of wildfire in juniper versus sagebrush and grass is much higher, indicating that fires may grow larger despite fire suppression efforts. Higher resistance to control translates to higher fire suppression costs, potential for greater suppression impacts to the landscape, and often increased risk to firefighters. Post-fire rehabilitation of fires in juniper dominated landscapes requires costly erosion stabilization efforts, weed control, and intensive management to restore native vegetation. In addition, the opportunity to create seamless habitat across jurisdictional boundaries would be lost.

Cumulative Effects of Proposed Action Alternative:

The proposed action (Alternative 2) and the hand treatment only alternative (Alternative 3) both have short-term risk of increase fuel loading. Any treatments conducted by the BLM simultaneously would increase the number of acres at potential risk from negative wildfire impacts. In contrast, following the short-term risk, a larger number of acres would be moved towards FRCC 1.

Cumulative effects of air quality are mitigated through participation in the MT/ID Airshed Group. This group closely monitors air quality and approves or declines prescribed burning operations dependent on air quality and dispersion forecasts. Because of these controls, cumulative effects would be negligible.

Cumulative Effects of Hand Treatment Alternative:

This alternative would have the same effects as the proposed action with the exception of the masticated fuels section, since no mastication or pile burning would occur. Under this alternative, less acres of juniper encroachment would be treated which means fewer acres would be converted towards more desirable fuels and vegetation conditions.

Mastication treatments are identified when hand treatment methods would not be effective. In other words, the resultant fuel loading from hand treating these acres would be too great, and vegetative response would not be ideal. Leaving these acres untreated increases the resistance to control for wildfires and increases the risk to firefighters when compared to the Proposed Action.

Environmental Consequences- Native Plant Communities and TECSW Plants

The environmental consequences associated with vegetation and potential effects to rare plant species and habitats from the proposed project are described in the following paragraphs. These effects include vegetation, soil and hydrological disturbances, and the introduction and establishment of noxious and non-native invasive plant species. Although known occurrences of rare plant species would be avoided with compliance to project design features and best management practices. It is possible there are unknown occurrences in areas of potential habitat that could be affected by activities associated with the proposed action.

Vegetation disturbances include removal, uprooting, and trampling all which could affect TECSW plants, an increase in annual and monoculture communities which results in regressive plant succession. Soil compaction by equipment could reduce the supply of oxygen to the root system. These disturbances could kill or stress the TECSW plant species making them more susceptible to disease and insect attack.

Soil compaction created by equipment and vehicles alters the rate at which water penetrates the soil surface and reduces the soil moisture holding capacity and consecutively increases run off and soil erosion. Decreased water infiltration changes soil nutrients and organic matter available for plants (Facelli & Pickett 1991) and reduces plant productivity. An increase in overland flow into the surrounding habitat as a result of soil compaction could saturate soils and cause lack of oxygen filtration and nutrient deficits which when combined reduces plant productivity and vegetative cover creating a negative progression that further degrades both TECSW plant species habitat and native plant communities.

Temporary transportation corridor construction and maintenance activities facilitate spread of plant seed by way of soil and material movement, vehicles, tools, humans, and equipment. When vehicles, tools, humans, and equipment encounter noxious and non-native invasive plant species there is a risk of spreading the seed or plant parts to non-infested areas.

All sites with noxious and non-native invasive species have viable seed in the soil and movement of the soil scarifies the seed and aids in germination as well as moving seed to other locations on vehicles, equipment, tools, humans, domestic livestock, wildlife, or natural vectors. Ground disturbance within existing noxious non-native invasive plant species stimulate stoloniferous root growth, increasing the density of the infestation. Invasive plant population spread can indirectly displace or reduce native plant populations by filling in plant interspace creating a modification of vegetation structure

and microhabitats. Non-native species invasion impacts are not narrowly confined to treatment areas; they actively spread along disturbed corridors or patches, and increase invasion pressures (seed rain) on even intact plant communities.

The introduction of noxious and non-native invasive plant species as a result of the proposed action activities into native plant communities could potentially reduce the competitive and reproductive capacities of native species, shift community composition, alter available resources, displace less vigorous native species ensuing regressive plant succession, and an increase in annual and monoculture communities. Consequently, altered native plant communities affect TECSW plant species existence.

Potential indirect effects associated with noxious weeds and non-native invasive plant species infestations may include loss of wildlife habitat, soil erosion due to shorter-lived annual species invasions, and consequent increased fire susceptibility due to dry dead stands of annual non-native invasive plant species (e.g., cheatgrass stands). Left untreated, infestations of noxious weeds or non-native invasive plant species sites would increase, eventually eliminating the native vegetation and replacing the plant regime with an undesirable plant community.

Exposed ground surfaces, a flush of nutrients, and high light and low shade may favor regrowth and expansion of noxious and non-native invasive plant species in treated areas. Because of their early germination and rapid growth rates, noxious and non-native invasive plant species may quickly capture newly available resources. Invasive plant species (i.e. cheatgrass) may create conditions that alter the characteristics of fire regimes such as spread patterns, intensity, frequency, and seasonality (Brooks et al. 2004). This occurs when invading plants are different in their life-form or phenology from the native plants and thus change the continuity, biomass, and vertical distribution of fuels in a community (D'Antonio 2000). Changes in fire regimes have the potential to further impact the remaining plant community by suppressing species that are poorly adapted and promoting species that are well adapted to fire patterns under the new regime.

Disturbances include soil compaction, displacement, and subsequent soil erosion would occur in mechanically treated areas. Soil compaction created by equipment and vehicles alters the rate at which water penetrates the soil surface and reduces the soil moisture holding capacity and consecutively increases run off, and soil erosion. Decreased water infiltration changes soil nutrients and organic matter available for plants (Facelli & Pickett 1991) and reduces plant productivity. Vegetation disturbances include removal, uprooting, and trampling.

4.2.1.1.1.1 Mastication—Mechanical Disturbance

The removal of vegetation during mastication activities will create ground disturbance. Equipment and vehicles used during mastication activities could kill or injure TECSW plant species. The removal of vegetation will alter sage-steppe habitats making them less suitable for TECSW plant species that occupy forested habitat, and reduce the availability of potential habitat for these species in the project area.

Mastication activities within existing noxious non-native invasive plant species could stimulate stoloniferous root grow increasing the density of the infestation, and spread seed with the movement of soil. All sites with noxious and non-native invasive species

have viable seed in the soil and movement of the soil scarifies the seed and aids in germination as well as moving seed to other locations on vehicles, equipment, tools, humans, domestic livestock, wildlife, or natural vectors. Mastication activities create areas of disturbed soil optimal for colonization of noxious non-native invasive plant species. Non-native invasive species could alternative community composition, increase annual species that compete for resources eventually excluding less vigorous species ensuing regressive plant succession, and monoculture communities.

4.2.1.1.1.2 Pile Burning

Pile burning generates scars with increased susceptibility to noxious non-native invasive plant species. Pile burning scars often remain unvegetated (Covington et al. 1991) or become colonized by noxious non-native invasive plant species (Dickinson & Kirkpatrick 1987) or early successional species of disturbed habitats. Pile burning significantly reduces the viable seed bank, propagule densities of arbuscular mycorrhizae fungi as well as alters soil properties (Korb et al. 2004).

4.2.1.1.1.3 Hand Treatments

The scattering of hand harvested understory vegetation during hand thinning activities will alter sage-steppe habitats making them less suitable for TECSW plant species that occupy this habitat, and reduce the availability of potential habitat for these species in the project area. TECSW plant species could be killed or injured during lop and scatter activities. Lop and scatter fuels created by the treatments, would be more likely to burn as a surface fire than crown torching fire ultimately increasing surface temperature of the fire.

Not all areas treated by hand require piling of material. There will be no pile burning in Phase I (15,000 acres) juniper areas. Pile burning is most likely to occur in late Phase II (1,900 acres) and Phase III (2,700 acres) stands. As vegetation becomes denser the need to pile and burn increases. Based upon past projects on the Sawtooth National Forest debris piles are constructed in a manner to cover an area of ground six feet by six feet. Piles will be limited to no more than 100 acres of piles per treatment unit.

4.3 NATIVE PLANT COMMUNITIES

Environmental Consequences

Native plant communities in the analysis area would incur vegetation and soil disturbances during implementation of proposed activities. Direct vegetation disturbances include removal, uprooting, and trampling. Indirect disturbances include soil compaction, hydrology alteration, weed introduction and spread, and microbial crust disturbances.

Determinations

Alternative 1- No Action means no projects would occur within the analysis area. All effects would continue to exist as they have in the past. The No Action Alternative would have no direct impact on native plant communities. Current levels of risk of negative effects from non-native invasive and noxious plant species would continue to exist under

the no action alternative. Fuels would continue to increase over time and contribute to a continued aging and deterioration of sagebrush communities. Activities that continue as they have in the past and currently occur include construction and use of system and non-system roads, past and present livestock grazing, pesticide and herbicide application, recreation and non-recreation special use permitted activities, developed recreation, water diversion structures, irrigation (inadvertent), current and past timber harvest, current and past mining activity, personal use firewood cutting, and dispersed recreation. Existing non-native and noxious plant species continue to produce a seed source in the area. Seed from these locations would continue to be transported into adjacent and currently intact communities via vehicles, humans wildlife, livestock, and by non-anthropogenic agents (e.g. rodents, wind, and water).

***Alternative 2* -** Impacts from mastication, as described above, could occur across 3,884 acres of the project area (8%). Impacts from pile burning, as described above, could occur on up to 947 acres.

Hand treatments areas could occur over 19,608 acres and would be done by individuals using a chainsaw. Pile burning could occur within this acreage created from thinning activities (hand treatments). All activity areas could have some amount of drop, lop, and scatter activities which could impact native plant communities as described above.

Alternative 2 would create short term disturbances in native plant communities. Compliance with project design criteria, mitigation measures and best management practices would most likely cause long-term benefits in native plant communities including improved ecological health and vigor as new plants replaced older late seral plants.

***Alternative 3* –** Impacts from hand treatments would be identical to Alternative 2. No mastication would occur under this alternative.

Alternative 3 would create short term disturbances in native plant communities. Compliance with project design criteria, mitigation measures and best management practices would most likely cause long-term benefits in native plant communities including improved ecological health and vigor as new plants replaced older late seral plants.

4.4 REGIONAL FORESTER'S SENSITIVE AND FOREST WATCH PLANT SPECIES

Forester's Sensitive Plant Species

4.4.1.1.1.1 Idaho Penstemon (*Penstemon idahoensis*)

Environmental Consequences

Any undetected plants that may fall within treatment units would experience impacts as described above. Mastication will not occur in known occupied Idaho Penstemon habitat.

Project activities within potential habitat could directly kill individuals through burning, crushing, or removal and could alter soil conditions necessary for the existence of this species. These activities could bury or destroy seeds that exist in the soil.

Determinations

Alternative 1- No Action means no projects would occur within the analysis area. All effects would continue to exist as they have in the past. The No Action Alternative would have no direct impact on Idaho penstemon. Current levels of risk of negative effects from non-native invasive and noxious plant species would continue to exist under the no action alternative. Fuels would continue to increase over time and contribute to a continued aging and deterioration of juniper communities. Activities that continue as they have in the past and currently occur include construction and use of system and non-system roads, past and present livestock grazing, pesticide and herbicide application, recreation and non-recreation special use permitted activities, developed recreation, water diversion structures, irrigation (inadvertent), current and past timber harvest, current and past mining activity, personal use firewood cutting, and dispersed recreation.

Alternative 2 – There would be no mastication treatments in known Idaho penstemon EOs. Hand treatments areas may slightly overlap with some EOs and individuals may experience trampling, uproot, soil disturbance, or piles placed on top of them. Alternative 2 would create short term disturbances in Idaho penstemon habitats. Compliance with project design criteria, mitigation measures and best management practices would most likely cause long-term benefits in native plant communities including improved ecological health and vigor as new plants replaced older late seral plants which would benefit Idaho penstemon.

Alternative 2 **May Impact** Idaho penstemon individuals or potential habitat, but will **not likely contribute to a trend towards federal listing or cause a loss of viability to the population or species**.

Alternative 3 – Impacts from hand treatments would be identical to Alternative 2. No mastication would occur under this alternative. Alternative 3 **May Impact** Idaho penstemon individuals or potential habitat, but will **not likely contribute to a trend towards federal listing or cause a loss of viability to the population or species**.

4.4.2 Forest Watch Plant Species

4.4.2.1.1.1 Simpson's Hedgehog Cactus (*Pediocactus simpsonii*)

Environmental Consequences

Simpson's Hedgehog cactus is a wide ranging species that can be found in many diverse habitats (i.e. meadows, open forested areas, high elevation cushion plant habitats, and manmade habitats such as road shoulders), there are many areas of potential habitat that exist within the analysis area. Individuals and populations were identified during project surveys, however, the fact that the entire project area was not surveyed and that surveyors

could have missed individuals means that unknown individuals could occur in the project area.

Project activities within the potential habitat could directly kill individuals through burning, crushing, or removal and could alter soil conditions necessary for the existence of this species. These activities could bury or destroy seeds that exist in the soil.

Determinations

Alternative 1- No Action means no projects would occur within the analysis area. All effects would continue to exist as they have in the past. The No Action Alternative would have no direct impact on Simpson's hedgehog cactus. Current levels of risk of negative effects from non-native invasive and noxious plant species would continue to exist under the no action alternative. Fuels would continue to increase over time and contribute to a continued aging and deterioration of sagebrush communities. Activities that continue as they have in the past and currently occur include construction and use of system and non-system roads, past and present livestock grazing, pesticide and herbicide application, recreation and non-recreation special use permitted activities, developed recreation, water diversion structures, irrigation (inadvertent), current and past timber harvest, current and past mining activity, personal use firewood cutting, and dispersed recreation.

Alternative 2 –Mastication treatments in Unit 1 and 2 are at highest risk to impact Simpson's hedgehog cactus. Large populations occur in these units and avoidance would be difficult. These 1,600 acres will see impacts to habitat and individuals that may include directly killing individuals through burning, crushing, or removal.

Hand treatments areas may slightly overlap with some EOs and individuals may experience trampling, uproot, soil disturbance, or piles placed on top of them. Mitigation measures will aid in the avoidance of this through education of hand crews on plant identification.

Alternative 2 would create short term disturbances to Simpson's hedgehog cactus and its habitat. Compliance with project design criteria, mitigation measures and best management practices would most likely cause long-term benefits in native plant communities including improved ecological health and vigor as new plants replaced older late seral plants which would benefit Simpson's hedgehog cactus. Alternative 2 **May Impact** Simpson's hedgehog cactus individuals or potential habitat, but will **not likely contribute to a trend towards federal listing or cause a loss of viability to the population or species**.

Alternative 3 – Impacts from hand treatments would be identical to Alternative 2. No mastication would occur under this alternative. Alternative 3 **May Impact** Simpson's hedgehog cactus individuals or potential habitat, but will **not likely to contribute to a trend towards federal listing or cause a loss of viability to the population or species**.

4.5 (Key Issue) Non-Native Invasive Noxious (Weed) Plant Species

Indicator: Estimated total acres at risk of introduction and/or spread of noxious and invasive plant species.

Environmental Consequences

Proposed activities would occur in known populations of non-native invasive and noxious plant species. This could stimulate the sprouting of stoloniferous root systems, spread seed with the movement of soil, and create areas of disturbed soil for new colonization by existing and new species. All sites with non-native invasive species have viable seed in the soil and movement of this soil scarifies the seed and aids in germination as well as moving seed to other locations on vehicles, equipment, tools, foot wear, and clothing. Proposed activities could introduce non-native plant species into areas that currently do not have them.

Potential indirect effects associated with noxious weeds and non-native invasive plant species infestations may include loss of wildlife habitat and loss of rangeland for grazing due to the diminished native vegetation communities, soil erosion due to shorter-lived annual species invasions, and consequent increased fire susceptibility due to dry dead stands of annual non-native invasive plant species (e.g., cheatgrass stands). If infestations are not eradicated or contained, noxious weeds or non-native invasive plant species sites would increase, eventually eliminating the native vegetation and replacing the plant regime with an undesirable plant community. Vehicles and equipment leaving the analysis area that have traveled through area infested with noxious weeds or non-native invasive plant species, if not washed prior to leaving, may transport and spread noxious weeds or non-native invasive plant species to other locations. Wildlife and livestock in the area also could transport noxious weeds or non-native invasive plant species seed in their fur and hooves. Birds that have eaten seeds and wind dispersion are additional possible seed vectors.

The increase or introduction of non-native plant species could shift the species composition of native plant communities to a less diverse community of non-natives, annuals, or monoculture. The use of chemical herbicides to treat noxious plant species are lethal to most plants killing them along with the targeted non-native species. Chemicals used to treat non-native plants can affect the performance, foraging, and reproduction of plant pollinators and soil microbes associated with many native species eliminating them from the area and changing pollination reproduction and associated soil conditions.

Project design criteria and best management practices incorporate features to increase the health of native plant communities and reduce potential for weed introduction and spread; such as RCA and noxious and non-native invasive plant species avoidance, ongoing noxious species treatments and monitoring, and prevention measures such as cleaning vehicles and equipment prior to entering the Forest and after they have traveled through or worked in infested areas before moving to an area where no known non-natives exist.

Determinations

Alternative 1- No Action means no projects would occur within the analysis area. All effects would continue to exist as they have in the past. The No Action Alternative would have no direct impact on weed species. Indirect impacts would be positive in the fact that no new disturbance would occur. The Forest would continue the treatment of weed species as money and personnel allowed. Most weed species establish and expand due to disturbance. Under Alternative 1 no new disturbances would be introduced into the project area. There would be no increase in land that becomes highly susceptible to weed introduction or spread under this alternative in the short term.

Activities that continue as they have in the past and currently occur include construction and use of system and non-system roads, past and present livestock grazing, pesticide and herbicide application, recreation and non-recreation special use permitted activities, developed recreation, water diversion structures, irrigation (inadvertent), current and past timber harvest, current and past mining activity, personal use firewood cutting, and dispersed recreation.

Alternative 2 - Impacts from mastication, as described above, could occur across 3,884 acres of the project area (8%) and pile burning could occur within this acreage created from thinning activities (both mechanical and hand). Impacts from mastication and pile burning, as described above, could occur on up to 738 acres based on the analysis of machinery used for mastication and typical pile burning projects.

Hand treatments areas could occur over 19,608 acres and would be done by individuals using a chainsaw. Pile burning could occur on up to 947 acres of areas identified for hand treatments under this alternative. All activity areas could have some amount of drop, lop, and scatter activities.

Currently within the project area there are 845 acres of mapped weed infestations. According to the analysis on the Sawtooth Forest Plan (2012) Management Area 12, Units 1, 2, and 5 are predicted to have 4,611 acres (21%) of land highly susceptible to weed infestation. Within Management Area 13, Units 3, 4, and 6-12 are predicted to have 7,249 acres (26%) of land highly susceptible to weed infestation (Forest Plan 2012). Mastication activity units would cause disturbance and increase susceptibility across an additional 3,884 acres. Hand treatments would not contribute to a measurable increase in spread and establishment from weed species. Pile burning on 3,726 acres would cause disturbance that increased the lands susceptibility to weed establishment and expansion.

Alternative 2 would create short term disturbances in native plant communities. These disturbances would increase the risk of weed establishment and expansion on an additional 7,610 acres. This is a 65% increase over Alternative 1 in area that would become highly susceptible to weed introduction and spread. Compliance with project design criteria, mitigation measures and best management practices would help in mitigating this increase in risk of introduction or spread of noxious weeds.

Alternative 3 – Impacts from hand treatments would be identical to Alternative 2. No mastication would occur under this alternative. Alternative 3 would create short term disturbances in native plant communities. These disturbances would increase the risk of weed establishment and expansion on the 3,726 acres were the pile burning would occur.

This is a 32% increase over alternative 1 in area that would become highly susceptible to weed introduction and spread. Compliance with project design criteria, mitigation measures and best management practices would help in mitigating this increase in risk of introduction or spread of noxious weeds.

4.4.1.5 Cumulative Effects- Native Plant Communities and TECSW Plants

The National Environmental Policy Act (NEPA) defines cumulative effects as all past, present, and foreseeable future actions within the analysis area. The effects of vegetation treatmants are expected to be long-term (> 15 years). The timeframe effects of implementation actions are expected to be limited to the short-term (3 - 15 years).

Within the cumulative analysis area (defined here as the larger project area), the primary federal activities that have impacted the area are livestock grazing, firewood cutting, mining, summer and winter recreation trail uses, dispersed camping activities, fire suppression, and forest Service Administrative Site activities. Of these activities the greatest impacts for plant species of concern in the area and native plant communities are fire suppression which has altered natural disturbance regimes and community succession, removing native vegetation, introduction of non-native invasive plant species, and soil erosion and loss. Foreseeable future actions include additional recreation, livestock grazing, and fuels reduction through timber harvest consisting of thinning and patch cuts, and prescribed fire.

State and private activities that occur on the Minidoka District of the the Sawtooth National Forest are: 1) activities associated with the Idaho Department of Transportation including operation of material sources for road construction and maintenance, highway maintenance in the right-of-way consisting of clearing of vegetation in the right-of-way, drainage cleaning and installation, herbicide application, sanding and snowplowing; 2) operation of organization camps on state and private lands; 3) livestock grazing operations on state and private lands; 4) private land fuels reduction projects; 5) diversions and the associated irrigation on state and private lands; 6) operation and maintenance including vegetation management along utility rights-of-way.

Past management activities and disturbances have contributed to the establishment and distribution of noxious and non-native invasive plant species in the analysis area. Past activities include; historic livestock grazing and sheep trailing, timber sales, vegetation treatments, recreation uses, road and trail construction, use and maintenance. However, without historic information on known occurrences and distribution, the past effects of management actions are unclear for sensitive plant species.

4.4.1.6 No Action Alternative-

Alternative 1- Under the no action alternative there would be no hand cutting of juniper, no mastication of juniper, and no pile burning. This would result in there being no direct or indirect project effects to contribute to cumulative impacts from the no action alternative on Vegetation Communities, Noxious and Invasive Species introduction and spread, Regional Forester's Sensitive and Forest Watch Plant Species, and Pollinators would occur.

4.4.1.6 Proposed Action Alternative-

The project would contribute to cumulative effects to Native Vegetation Communities, Noxious and Invasive Species introduction and spread, Regional Forester's Sensitive and Forest Watch Plant Species, and Pollinators. Activities would be additive to the existing recreation, road, livestock, and firewood cutting uses.

Cumulative effects increase impacts to individuals or potential habitats of special status plants above the impacts (as described above) of implementing the proposed action and **May Impact** individuals or potential habitat, but will **not likely contribute to a trend towards federal listing or cause a loss of viability to the population or species**. Activities associated with an increase in cumulative effects include soil disturbances, removal of native vegetation, soil compaction, introduction and spread of non-native invasive and noxious plant species, alterations to native plant communities, and loss of plant pollinator's habitat and pollinators.

4.4.1.6 Hand Treatment Alternative-

The project would contribute to cumulative effects to Native Vegetation Communities, Noxious and Invasive Species introduction and spread, Regional Forester's Sensitive and Forest Watch Plant Species, and Pollinators, but these impacts would be less than that of Alternative 2 due to no mechanical treatment occuring. Activities would be additive to the existing recreation, road, livestock, and firewood cutting uses.

Cumulative effects increase impacts to individuals or potential habitats of special status plants above the impacts (as described above) of implementing the the hand treatment only alternative and **May Impact** individuals or potential habitat, but will **not likely contribute to a trend towards federal listing or cause a loss of viability to the population or species**. Activities associated with an increase in cumulative effects include soil disturbances, removal of native vegetation, soil compaction, introduction and spread of non-native invasive and noxious plant species, alterations to native plant communities, and loss of plant pollinator's habitat and pollinators.

4.4.1 Environmental Consequences- Soils

Analysis Assumptions

The analyses for estimating the potential effects of vegetation management treatments on soil resources employed several assumptions based upon literature and professional judgment relative to historic land use, treatment prescriptions, existing vegetation conditions, soil-hydrologic resource responses, and management restrictions. The assumptions used in the analysis include:

1. The inherent properties for the dominant soil family for each landtype map unit were used to estimate potential effects to soil quality. This approach was used to more closely represent the potential effects that may occur within each activity area. The dominant soil family was identified through interpretation of GIS

mapping using the existing soil information in the Soil-Hydrologic Reconnaissance (USDA Forest Service 1980). Limited field verification to determine the dominant soil family for each landtype was completed for the individual activity areas.

2. Data or qualitative information from various reconnaissance and inventories for fuels, wildlife, and vegetation indicates conditions for the soil quality indicators across the majority of the project area contributing to meeting desired conditions for soils.
3. Activities that include permitted livestock grazing, motorized recreation and dispersed camping, and fuel wood gathering has occurred historically and recently in the project area. There are existing impacts to soil quality from current and historic grazing, as well as current accelerated erosion from recreation uses observed in localized areas, primarily valley bottom and riparian settings.
4. Assumptions for estimating detrimental soil disturbance (DD):
   a. Existing detrimental soil conditions (DD), attributed to historic livestock grazing, and past/current developed and dispersed recreation uses is estimated to be about three percent. This assumption is based on extrapolating field data collected from analysis completed for similar restoration/ projects in the area.
   b. Existing DD estimates from dispersed recreation and fuelwood gathering apply only to those activity areas adjacent to open roads. These disturbances have varying levels of intensity and are not in the same site-specific locations, but are expected to occur from year to year.
5. Total soil resource commitment (TSRC) is primarily from the existing routes (authorized and unauthorized) and improved or dispersed recreation campsites.
6. When comparing various resource analyses, differences in values for total acres and soil analysis components (i.e. landtypes) may exist. These discrepancies are the result of numerical rounding operations in GIS or spreadsheet functions. Differences in these numbers are minor and inconsequential with regard to the overall findings for the environmental analysis.

4.6 Key Issue #2—Soils

Issue – Soils: The volcanic ash derived soils are fragile, they are erosive and have a weak soil structure, and soil fertility is minimal. Mechanical treatments may also impact physical and biological soil crusts and recovery is a concern in mechanically treated Phase III areas.

The most significant impacts on the soil resource is a direct result of management. The type of activity, time of season and length of use determine the effects on the resource. This tract of land is remote. There are no trees of commercial interest in the project area, therefore timber harvest methods are not an impact. The primary impact on the soil derived from both geologic types is mastication and pile burning. The degree of impact on the soil resource is directly related to the physical and chemical characteristics of a particular soil.

Indicator: Estimated total acres of soils that will experience detrimental disturbance (DD).

Detrimental Disturbance

Alternative 1- Under the No Action alternative there would be no short term increase in detrimental soil disturbance. There would be no direct effects as the proposed activities would not be implemented. The previously stated assumption that about three percent of the project area is currently in detrimental soil condition attributable to past and current livestock grazing, dispersed recreation, and personal fuelwood gathering would represent the cumulative effects of the No Action alternative. However, fuels would continue to build up with in the project area. This increase in buildup would result in higher burn severity during wildfire. High severity fire can cause detrimental disturbance. The 3 percent assumption was not verified for each activity area and represents an estimate based on extrapolating information from limited visits to the project area. The No Action alternative would be consistent with Forest Plan Standard SWST02 for detrimental disturbance.

Alternative 2- Mechanical Treatments- A temporary increase in DD is expected in the activity areas where ground-based equipment would masticate trees. There will be short-term increases (up to 15 years) in DD from residual impacts of off road travel and soil quality conditions transition to soil capable of supporting native vegetation. This is mainly going to occur at location were the masticator drives and turns. The estimated DD is based off from a 30 foot turn radius, 59 foot reach, and 5 foot track foot print of a 330C excavator (Ritchie 2017) (Table 4-1).

Table 4-1: DD Acreage by Unit Alternative 2

Unit	Unit Size	Treatment Acreage	Mechanical DD Acreage	Hand treatment DD Acreage	Pile Burning	DD Acres in Unit	Percentage DD
1	10696	2238	102	0	100	202	9
2	7712	5732	77	0	100	177	3
3	3766	2189	94	0	100	194	9
4	5804	2546	41	0	100	141	6
5	3551	358	11	0	52	63	2
6,7,8	1392, 2610, 1251	2350	25	0	100	125	5
9	1776	1780	0	0	100	100	6
10	1498	504	0	0	96	96	6
11	3840	3155	0	0	100	100	3
12	5943	2640	65	0	100	165	6
Total	**49839**	**23492**	**415**	**0**	**947**	**1362**	6

Impacts of DD from mechanical treatments are estimated to occur across 415 acres.

Hand treatments- As previously stated, DD is associated with ground disturbance that negatively accelerates soil displacement (erosion) or causes compaction. Lop and scatter would occur over 19,608 acres and be accomplished with hand felling using chainsaws and not result in ground disturbance, no direct or indirect detrimental soil impacts (erosion or compaction) would be expected from implementing this activity.

Pile Burning- Pile burning could be used as a treatment in association with hand treatments across 19,608 acre of the project area. When mapping soil burn severity only a percentage of land in each burn severity class has conditions that could result in detrimental soil disturbance. Fundamentally, the intent of pile burning is to reduce slash build up while minimizing impacts to other resources. Pile burning would result in a higher percentage of severely burned soils (high) impacting approximately 947 acres across the entire project area.

Summary- The use of masticators on the landscape would cause 415 acres of DD to soil. Pile burning would result in an additional 947 acres in hand treatment units for a total of 1,362 acres across the project area. Per the Sawtooth Forest Plan DD is calculated on an activity unit area bases. Units 6, 7, and 8 have been combined due to treatment sizes and location. For this project each unit is considered an activity area. Table 4-1 displays the DD by unit.

The detrimental soil disturbance (DD) estimated for all activity areas are below 15 percent. Based on literature, most detrimental conditions will recover in the temporary (one to three year) time frames (Robichaud and Brown 1999, Robichaud et al 2000). With the exception of the project being implemented over 10 years; there is no set schedule for when and where pile burning ignitions will happen. Considering: 1) the above values reflect a percentage of the individual treatment units; 2) DD effects across the treatment units will not occur all in one year; and 3) treatment of any individual activity area may or may not be completed during one year (i.e. mastication, hand treatments, burning operation), the total DD effects estimated for a specific activity area are not likely to be realized. However, it is also difficult to take into consideration the fragile and highly erodible soils in the above DD calculations. For this reason the following soil resource design feature has been included. "Mastication treatments in units with land types rated at a four or higher for erosion potential will be monitored and detrimental disturbance (DD) will be calculated. If it is found that DD exceeds the Forest Plan standard of 15% than all further mastication on these high erosion potential lands will not occur. Hand treatments could still occur in these units." Since the DD calculations are based on experience from past projects on differing soil types DD is most likely under calculated for the proposed activities. Applying the above information with professional judgment the direct and indirect effects of the Proposed Action are consistent with Forest Plan Standard SWST02.

Alternative 3- No Mechanical is proposed under Alternative 3. No DD would occur.

As previously stated, DD is associated with ground disturbance that negatively accelerates soil displacement (erosion) or causes compaction. Lop and scatter would occur over 19,608 acres and be accomplished with hand felling using chainsaws and not

result in ground disturbance, no direct or indirect detrimental soil impacts (erosion or compaction) would be expected from implementing this activity.

Pile Burning- would result in 947 acres of DD spread out across the 12 units. Per the Sawtooth Forest Plan DD is calculated on an activity unit area basis. Units 6, 7, and 8 have been combined due to treatment sizes and location. For this project each unit is considered an activity area. Table 4-2 displays the DD by unit.

Table 4-2: DD Acreage by Unit Alternative 3

Unit	Unit Size	Treatment Acreage	Hand treatment	Pile Burning	DD Acres in Unit	Percentage DD
1	10696	2238	0	100	100	4
2	7712	5732	0	100	100	2
3	3766	2189	0	100	100	5
4	5804	2546	0	100	100	4
5	3551	358	0	52	52	1
6,7,8	1392, 2610, 1251	2350	0	100	100	4
9	1776	1780	0	100	100	6
10	1498	504	0	96	96	6
11	3840	3155	0	100	100	3
12	5943	2640	0	100	100	4
Total	**49839**	**23492**	**0**	**947**	**947**	4

The detrimental soil disturbance (DD) estimated for all activity areas are below 15 percent. Based on literature, most detrimental conditions will recover in the temporary (one to three year) time frames (Robichaud and Brown 1999, Robichaud et al 2000). With the exception of the project being implemented over 10 years and a no burn window for migratory birds; there is no set schedule for when and where pile burning ignitions will happen. Considering: 1) the above values reflect a percentage of the individual treatment units; 2) DD effects across the treatment units will not occur all in one year; and 3) treatment of any individual activity area may or may not be completed during one year (i.e. burning operation), the total DD effects estimated for a specific activity area are not likely to be realized. However, it is also difficult to take into consideration the fragile and highly erodible soils in the above DD calculations. Since the DD calculations are based on experience from past projects on differing soil types DD is most likely under calculated for the proposed activities. Applying the above information with professional judgment the direct and indirect effects of Alternative 3 are not consistent with Forest Plan Standard SWST02.

4.4.1.5 Cumulative Effects-Soils

Detrimental Disturbance

Past, present, and reasonably foreseeable future actions in the project area include livestock grazing, fire suppression, dispersed recreation, use of system and non-system roads. These actions generally result in scattered areas of increased compaction and potential for soil erosion that would add to detrimental soil disturbance.

The cumulative effects analysis area for detrimental disturbance is aggregated up from the individual activity area to the respective treatment unit. When applying the assumption that no more than three percent of each unit within the project area is in a detrimentally disturbed condition, the potential incremental effect of implementing the Proposed Action will slightly increase cumulative detrimental disturbance. When considering the proposed activities are to be implemented over a 10-year period and any detrimental soil disturbance that may result from the pile burning operations will recover within one to three years (Robichaud and Brown 1999, Robichaud et al 2000), any incremental increase in DD will be ameliorated within the life span of the project

No Action Alternative- The cumulative effects analysis area for detrimental disturbance is aggregated up from the individual activity area to the respective treatment unit. The National Environmental Policy Act (NEPA) defines cumulative effects as all past, present, and foreseeable future actions within the analysis area. The primary federal activities that have impacted soil resources on the Minidoka District of the Sawtooth Forest include construction and use of system and non-system roads, past and present livestock grazing, pesticide and herbicide application, recreation and non-recreation special use permitted activities, developed recreation, water diversion structures, irrigation (inadvertent), current and past timber harvest, current and past mining activity, personal use firewood cutting, and dispersed recreation (including skiing and snowmobiling).

Within the project area, the primary federal activities that have impacted the area dispersed camping activities, fire suppression, and livestock grazing. Of these activities the greatest impacts for soil resources in the area are livestock grazing which has altered natural disturbance regimes and community succession, removing native vegetation, introducing non-native invasive plant species, and increasing soil erosion and loss.

Foreseeable future actions include additional recreation, livestock grazing, and fuels reduction through timber harvest consisting of thinning and patch cuts, and prescribed fire.

Under the no action alternative there would be no hand cutting of juniper, no mastication of juniper, and no pile burning. This would result in there being no direct or indirect project effects to contribute to cumulative DD from the no action alternative.

Proposed Action Alternative- This existing DD was approximated at no more than 3% of the project area based upon field visit observations. This is going to be the same amount of DD added due to cumulative effects as described above. The cumulative effects of the Proposed Action combined with the effects from ongoing activities would remain below the 15 percent threshold for all units and be consistent with the criteria

defined under Forest Plan Standard SWST02 (Table 4-3). No irreversible and irretrievable commitments of soil resources are expected from proposed activities that operate within the guidance and standards of the Forest Plan.

Table 4-3: Cumulative Detrimental Soil Disturbance by Alternative

Unit	Alternative 2 DD	Alternative 3 DD
1	9%	4%
2	3%	2%
3	9%	5%
4	6%	4%
5	2%	1%
6,7,8	5%	4%
9	6%	6%
10	6%	6%
11	3%	3%
12	6%	4%

***4.4.1.8 Hand Treatment Only Alternative*- Alternative 3-** This existing DD was approximated at no more than three percent of the project area based upon field visit observations. This is going to be the same amount of DD added due to cumulative effects as described above. The cumulative effects of the Proposed Action combined with the effects from ongoing activities would remain below the 15 percent threshold for all units and remain consistent with the criteria defined under Forest Plan Standard SWST02 (Table 4-3). No irreversible and irretrievable commitments of soil resources are expected from proposed activities that operate within the guidance and standards of the Forest Plan.

Consultation and Coordination

Interdisciplinary Team

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Contribution-Interdisciplinary Team Leader, Writer-Editor, Wildlife Resources, Special Status Fauna, Fisheries, Livestock Grazing Analysis

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Position: District Fuels Planner

Contribution- Fire and Fuels Management Analysis, Air Quality Analysis

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Contribution-Watershed Analysis

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Contribution-Cultural Resource Analysis

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Contribution: Roadless Analysis

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Contribution-Cartographic Analysis

Federal, State, and Local Agencies:

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Cassia County Commissioners

Bureau of Land Management, Burley Field Office

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*For all references used for the project. See individual specialist reports.

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Chapter 5–Appendix A – Monitoring

Monitoring activities can be divided into Forest Plan monitoring and project-specific monitoring. The National Forest Management Act requires that National Forests monitor and evaluate their forest plans (36 CFR 219.11). Chapter 4 of the Forest Plan includes the monitoring and evaluation activities to be conducted as part of Forest Plan implementation. There are three categories of Forest Plan monitoring: implementation monitoring, effectiveness monitoring, and validation monitoring. Implementation monitoring and any additional project-specific monitoring is an important aspect of complying with the standards and guidelines established in the Forest Plan for all projects.

Effectiveness and validation monitoring are typically done as part of Forest scale monitoring. Items to be monitored with associated information are found in the Forest Plan, Chapter IV. Monitoring for this project, the timing of monitoring and who on the Forest or District is responsible for the monitoring is detailed in Table 5-1 below.

Table 5-1: Goose Creek Project Monitoring Plan

Item to be Monitored	Responsibility	Timing of Monitoring	Objectives for Monitoring
Sage Grouse lek counts	Wildlife Biologist	Prior to, concurrent with, and following implementation	To monitor populations in and adjacent to project area.
Weed Infestation and Spread	Range Staff Officer or Designee	Pre and Post implementation	To ensure compliance with Project Design Criteria requirements.
Air Quality Impact for Prescribed Burning Operations	District Fuels Planner	Concurrent with and post implementation	To ensure compliance with Project Design Criteria requirements.
Soil and Vegetation Recovery in Burn Pile Locations	District Staff and Monitoring Crews	Post implementation	To evaluate soil and vegetation recovery in burn pile locations.
Vegetation Recovery	Wildlife Biologist, Fuels Planner	Post implementation (2, 5, 15 years)	Evaluate and monitor treatment effects on vegetation/ habitat

			structure and composition
Fuel Loadings	District Fuels Planner	Prior to and Post implementation (1, 3, 5 years)	Evaluate and monitor project success