United States Department of the Interior
Bureau of Land Management

Revised Biological Assessment
for the
Programmatic Environmental Impact Statement
for Fuel Breaks in the Great Basin

DOI-BLM-ID-0000-2017-0001-EIS

BLM

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ACRONYMS AND ABBREVIATIONS

	Full Phrase
AIM	Assessment, Inventory and Monitoring
AHAS	acetohydroxy acid synthase
ALS	acetolactate synthase
ATV	all-terrain vehicle
BA	biological assessment
BLM	US Department of Interior, Bureau of Land Management
BMP	best management practice
BSEOC	Bi-State Executive Oversight Committee For Conservation of Greater Sage-Grouse
CCA	Candidate Conservation Agreement
DPS	distinct population segment
EA	environmental assessment
ESA	Endangered Species Act
EPSP	enolpyruzyl shikimate-3-phosphate
GIS	geographic information system
IGBC	Interagency Grizzly Bear Committee
IPaC	Information for Planning and Consultation
LUPA	land use plan amendment
NCDE	Northern Continental Divide Ecosystem
NRCS	Natural Resources Conservation Service
NPS	National Park Service
NFWO	Nevada Fish and Wildlife Office
OHV	off highway vehicle
PAC	Protected Activity Centers
PCE	Primary Constituent Elements
PEIS	programmatic environmental impact statement
PMU	Population Management Unit
RA	recovery area
REA	recovery emphasis area
RMP	resource management plan
ROD	record of decision
ROW	right-of-way
RU	recovery unit
SOP	standard operating procedure
TEP	threatened, endangered, or proposed
USDA	United States Department of Agriculture

USDOI	United States Department of Interior
USC	United States Code
USFWS	United States Fish and Wildlife Service
WUI	Wildland Urban Interface

1.0 INTRODUCTION

The purpose of this biological assessment (BA) is to address the effects of the Bureau of Land Management's (BLM's) Programmatic Environmental Impact Statement (PEIS) for Fuel Breaks in the Great Basin (referred to as the Fuel Breaks PEIS) on species and their designated critical habitat listed under the Endangered Species Act (ESA) as threatened, endangered and proposed. Potential effects are related to the BLM implementing the PEIS preferred alternative, Alternative D. The activities described in alternative D are expected to occur over the next 10-20 years, or more, if the analysis remains valid.

Section 7 of the ESA directs federal departments and agencies to ensure that actions authorized, funded, or carried out are not likely to jeopardize the continued existence of threatened or endangered species or destroy or adversely modify their critical habitats (16 US Code [USC] 1536). The PEIS is programmatic in level; however, it includes a description of how and where fuel break treatments on BLM-administered surface lands could affect listed species and critical habitat.

BLM policy on special status species as described in Manual 6840, Special Status Species would be adhered to for all site specific projects which tier to the PEIS and BA. This policy requires BLM to consult with USFWS for actions which may affect ESA-listed species. At the program-level it is not feasible to determine the precise time and location of all project treatments nor the exact effects on listed species; however, the programmatic application of design features, conservation measures, and existing land use plan stipulations and best management practices (BMPs) discussed in the PEIS and this BA would allow the BLM to avoid or reduce adverse effects on listed species or critical habitat such that residual effects would be not likely to adversely affect these species. The BLM district or field office resource specialists would use the PEIS and this BA to determine the locations of avoidance areas and where to apply design features to protect resources during fuel break creation and maintenance at the project-level.

This BA, and associated United States Fish and Wildlife Service (USFWS) consultation, is intended to satisfy ESA Section 7 consultation for project-level actions that follow the Direction in the PEIS. Therefore, treatments that falls within the scope of this consultation would not require further Section 7 consultation. The effects analysis in this BA covers a range of fuel break types, methods, design features and conservation measures, as well as, provides spatial analysis where effects may occur to listed species. Spatial analysis is based on best available LANDFIRE modeling and data of known linear features suitable for fuel break treatments. Although modeling and datasets for linear features may not fully capture every potential treatment area that may be used to create fuel breaks, the effects analysis, conservation measures, and level of determinations in this BA would be applicable to most site-specific treatment areas. Where the design features, conservation measures and determinations of this BA are not applicable additional consultation may be required. The BLM seeks the USFWS' concurrence that the proposed action would result in the effects determinations listed in **Table 1-1** and **Table 1-2** for species or critical habitat with implementation of program design features and conservation measures.

Maps of species and critical habitat are shown in **Appendix A**.

1.1 SUMMARY OF DETERMINATIONS

There are many listed species in the region of the planning area identified by the USFWS' Information for Planning and Consultation (IPaC) lists; however, some were excluded from detailed analysis. These listed species are contained in **Appendix B**, with a brief rationale for excluding them from detailed analysis.

ESA-listed species and critical habitat with a potential to be affected by the proposed action are analyzed in detail in Chapter 3 and summarized in **Table 1-1** and **Table 1-2**.

Table 1-1
Summary of Effects Determinations by Treatment Type on Listed Species in the Action Area

Species Common and Scientific Name	Listing Status[1]	States of Occurrence Within the Project Area	Effects Determinations[2] by Treatment Type					
			Chemical	Manual	Mechanical	Prescribed Burn	Target Grazing	Revegetation
Carson wandering skipper (*Pseudocopaeodes eunus obscurus*)	E	NV, CA	NLAA	NLAA	NLAA	NLAA	NLAA	NLAA
Columbia Basin pygmy rabbit (*Brachylagus idahoensis*)	E	WA	NLAA	NLAA	NLAA	NLAA	NLAA	NLAA
Gray wolf (*Canis lupus*)	E, Exp.	OR, CA	NLAA	NLAA	NLAA	NLAA	NLAA	NLAA
Grizzly bear (*Ursus arctos horribilis*)	T, Exp.	ID	NLAA	NLAA	NLAA	NLAA	NLAA	NLAA
Mexican spotted owl (*Strix occidentalis lucida*)	T	UT	NLAA	NLAA	NLAA	NLAA	NLAA	NLAA
Sierra Nevada bighorn sheep (*Ovis canadensis sierrae*)	E	CA	NLAA	NLAA	NLAA	NLAA	NLAA	NLAA
Southwestern willow flycatcher (*Empidonax trailii extimus*)	E	CA, NV, UT	NLAA	NLAA	NLAA	NLAA	NLAA	NLAA
Utah prairie dog (*Cynomys parvidens*)	T	UT	NLAA	NLAA	NLAA	NLAA	NLAA	NLAA
Yellow-billed cuckoo (*Coccyzus americanus*)	T	All	NLAA	NLAA	NLAA	NLAA	NLAA	NLAA
Barneby reed-mustard (*Schoenocrambe barnebyi*)	E	UT	NLAA	NLAA	NLAA	NLAA	NLAA	NLAA
Clay phacelia (*Phacelia argillacea*)	E	UT	NLAA	NLAA	NLAA	NLAA	NLAA	NLAA
Clay reed-mustard (*S. argillacea*)	T	UT	NLAA	NLAA	NLAA	NLAA	NLAA	NLAA
Jones cycladenia (*Cycladenia humilis* var. *jonesii*)	T	UT	NLAA	NLAA	NLAA	NLAA	NLAA	NLAA
Kodachrome bladderpod (*Lesquerella tumulosa*)	E	UT	NLAA	NLAA	NLAA	NLAA	NLAA	NLAA
Last Chance townsendia (*Townsendia aprica*)	T	UT	NLAA	NLAA	NLAA	NLAA	NLAA	NLAA
Pariette cactus (*Sclerocactus brevispinus*)	T	UT	NLAA	NLAA	NLAA	NLAA	NLAA	NLAA
San Rafael cactus (*Pediocactus despainii*)	E	UT	NLAA	NLAA	NLAA	NLAA	NLAA	NLAA
Shrubby reed-mustard (*Schoenocrambe suffrutescens*)	E	UT	NLAA	NLAA	NLAA	NLAA	NLAA	NLAA
Slickspot peppergrass (*Lepidium papilliferum*)	T	ID	NLAA	NLAA	NLAA	NLAA	NLAA	NLAA
Spadling's catchfly (*Silene spaldingii*)	T	WA, ID	NLAA	NLAA	NLAA	NLAA	NLAA	NLAA
Uinta Basin hookless cactus (*Sclerocactus wetlandicus*)	T	UT	NLAA	NLAA	NLAA	NLAA	NLAA	NLAA
Webber's ivesia (*Ivesia webberi*)	T	NV, CA	NLAA	NLAA	NLAA	NLAA	NLAA	NLAA
Wright fishhook cactus (*Sclerocactus wrightiae*)	E	UT	NLAA	NLAA	NLAA	NLAA	NLAA	NLAA

Notes:
[1] Listing Status:
C—Candidate for listing
E—Endangered
Exp.—Experimental population
PT—Proposed Threatened
T—Threatened

[2] Determination codes:
NE—No effect
NLAA—Not likely to adversely affect
NLJE—Not likely to jeopardize the continued existence

Table 1-2
Summary of Effects Determinations by Treatment Type on Critical Habitat in the Action Area

Species Common Name	Critical Habitat	Effects Determinations[3] by Treatment Type					
		Chemical	Manual	Mechanical	Prescribed Burn	Target Grazing	Revegetation
Mexican Spotted Owl	Final	NLAA	NLAA	NLAA	NLAA	NLAA	NLAA
Sierra Nevada bighorn sheep	Final	NLAA	NLAA	NLAA	NLAA	NLAA	NLAA
Slickspot peppergrass	Proposed	NLDAM	NLDAM	NLDAM	NLDAM	NLDAM	NLDAM
Webber's ivesia	Final	NLAA	NLAA	NLAA	NLAA	NLAA	NLAA

Determination codes:
NLAA—Not likely to adversely affect
NLDAM—Not likely to destroy or adversely modify

1.2 CONSULTATION HISTORY

BLM began consulting with the USFWS early in the PEIS process. The USFWS provided input on issues, data collection and review, and alternatives development. The BLM discussed the BA with the USFWS during conference calls on the following dates:

- October 18, 2018—Pre-consultation and coordination meeting BLM, EMPSi, and USFWS
- March 12, 2019—Pre-consultation and coordination meeting BLM, EMPSi, and USFWS

1.3 PURPOSE OF AND NEED FOR THE PROPOSED ACTION

A system of strategically placed fuel breaks in the Great Basin region would slow the spread of wildfires; thereby reducing wildfire size, improving firefighter safety and providing an anchor point for fire suppression activities, providing opportunities to control catastrophic wildfire, and creating buffers for maintaining important habitats. Fuel breaks would also offer greater protection to human life and property, sagebrush communities, and ongoing/pending habitat restoration investments, and reduce invasive plant species expansion.

Wildfires continue to increase in size and frequency throughout the western United States in recent years. These fires negatively impact healthy rangelands, sagebrush communities, and the general productivity of the lands. In the last decade, fires have exceeded 100,000 acres on a regular basis, and the number of areas that burn repeatedly before habitats can be re-established has increased. Over a 10-year period (2005-2015), the proposed project area experienced approximately 50,000 fires, with each fire burning on average approximately 2,000 acres. Efforts to suppress wildfires on BLM-administered lands in Utah, Nevada, and Idaho (for which data are available) have cost approximately $373 million dollars between 2009 and 2018. These wildfires result in increased destruction of private property, degradation and loss of rangelands, loss of recreational opportunities, and habitat loss for a variety of species, including the conversion of native habitats to invasive annual grasses. The conversion of rangeland habitats to invasive annual grasslands further impedes rangeland health and productivity by slowing or preventing recovery of sagebrush communities.

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2.0 PROPOSED ACTION

The proposed Fuel Breaks PEIS evaluates creating and maintaining a system of fuel breaks in the Great Basin. The project area covers approximately 223 million acres and includes portions of California, Idaho, Nevada, Oregon, Utah, and Washington (**Figures A-1 to A-6**).

2.1 APPLICABLE VEGETATION COMMUNITIES

The current and historic extent of sagebrush vegetation communities within the project area, including those areas where pinyon-juniper has encroached, would be treated to create fuel breaks (**Figures A-1** to **A-6**).

2.2 ACTION AREA

The action area is "all areas to be affected directly and indirectly by the federal action, and not merely the immediate area involved in the action" (ESA 50 CFR 17.11). The proposed action area is defined by the current and historical presence of sagebrush on BLM-administered lands within the PEIS project area boundary. The action area was further refined by excluding areas described in **Section 2.3**. The action area covers approximately 38 million acres on BLM-administered lands within the PEIS project area boundary (**Figure A-7**). The action area provides a general representation of land types where fuel break treatments could potentially occur.

Under the proposed action, treatments would only occur along existing roads and rights-of-way (ROWs) within the action area, so the actual area affected would be smaller. Therefore, a focused action area was also defined using best available information on road and ROW locations. This focused action area is the basis of the quantitative analysis for effects on species, as it includes all potential treatment areas where fuel breaks could be placed. This consists of a subset of available linear features, such as roads and ROWs on BLM-administered lands in in portions of California, Idaho, Nevada, Oregon, Utah, and Washington. In addition, a half-mile buffer surrounding the potential treatment area is included to capture direct and indirect effects on listed species and critical habitat (see **Figure A-7**).

While the proposed action does not include the construction of any new roads or other linear features, available data for linear features is likely incomplete. The focused action area is the most likely representation of where treatments could occur, but due to the incomplete status of available data for linear features, it is not entirely accurate.

2.3 ANALYSIS EXCLUSION AREAS

Fuel breaks are not being proposed in the following areas:

- Riparian exclusion areas
  - Perennial streams—300 feet on each side of the active channel, measured from the bank full edge of the stream or the outer extent of riparian vegetation, whichever is greater
  - Seasonally flowing streams (including intermittent and ephemeral streams with riparian vegetation)—150 feet on each side of the active channel, measured from the bank full edge of the stream or the outer extent of riparian vegetation, whichever is greater
  - Streams in inner gorge (defined by adjacent stream slopes greater than 70 percent gradient)—Top of inner gorge

  - Special aquatic features, such as including lakes, ponds, playas, seasonal wetlands, wetlands, seeps, wet meadows, vernal pools, and springs—300 feet from the edge of the feature or the outer extent of riparian vegetation, whichever width is greater
- Wilderness
- Wilderness Study Areas
- Lands with wilderness characteristics that are managed to maintain or enhance those characteristics, including natural areas managed to protect their wilderness character
- National Conservation Areas and National Monuments
- Areas designated through the John D. Dingell Jr. Conservation, Management, and Recreation Act (2019)
- Areas of Critical Environmental Concern
- Visual Resource Management Class I areas
- Areas within a quarter-mile of a Wild and Scenic River
- Within National Scenic and Historic Trails and trail ROWs/corridors as identified in the Trailwide Comprehensive Plan and applicable land use plan
- Areas in mapped Canada lynx distribution and wolverine primary habitat
- Native, sparsely vegetated areas or sparsely vegetated areas dominated by low sagebrush species

Some analysis exclusion areas, or portions thereof, may fall within the action area buffer and provide habitat for listed species, but they are unlikely to be adversely modified by the proposed action. Through the Fuel Breaks PEIS, is it likely that fuel breaks may be constructed on lands not owned or administered by the BLM, in conjunction with fuel breaks implemented on BLM-administered lands (i.e., where fuel breaks cross lands under other jurisdictions). Where this occurs, the BLM will collaborate with other landowners for resource management and fuel break creation, but activities occurring outside BLM administered lands are not part of the proposed action.

2.4 FUEL BREAK PLACEMENT CRITERIA

Site specific conditions may necessitate deviation from these criteria to maximize fuel break effectiveness but generally offices should follow this criteria in siting fuel breaks. All fuel breaks proposed in this PEIS would be placed along existing roads or BLM-administered linear ROWs. Coordination across ownership and management boundaries is encouraged to maximize the efficacy of any fuel break system.

Fuel break effectiveness potential would be maximized while minimizing to the extent practicable impacts to high-value resources by emphasizing the following criteria:.

1. Position fuel breaks in areas with high fire probability
2. Position fuel breaks where they are most effective for firefighters
3. Position fuel breaks to protect the most important at-risk habitats and resources
4. Position fuel breaks to protect existing and ongoing restoration actions
5. Place fuel breaks in or adjacent to already disturbed/degraded areas
6. Place fuel breaks adjacent to rather than through remnant patches of sagebrush
7. Use the minimum number of fuel breaks needed to effectively protect large intact sagebrush patches and minimize edge effects

2.5 Permitted Grazing

The proposed action would not change permitted grazing in accordance with 43 Code of Federal Regulations (CFR) 4130.2 (2005). However, the BLM may work with permittees through voluntary agreements or coordination within the authorized permitted use to temporarily modify grazing to increase the success of seedings or targeted grazing within fuel breaks.

2.6 Road Creation and Maintenance

No new roads would be created. Improvement or maintenance of roads beyond the current definition, designation, and maintenance level would require additional site-specific analysis. For the purposes of this PEIS, road maintenance levels 1, 3, and 5 are defined in BLM Manual MS 9113 - Roads. Maintenance level 1 roads are generally 2-tracks with little traffic that don't have a regular maintenance schedule and may be impassible for extended periods of time. Traffic is often seasonal (e.g., during hunting season). Maintenance level 3 roads are typically gravel roads with low to moderate traffic that are maintained for almost year-round use that have planned maintenance actions. Maintenance level 5 roads are typically paved but may be gravel, with high traffic volume that are intended for year-round use with scheduled annual maintenance actions. (see Manual MS 9113 for complete definitions.)

2.7 Native Plant Material Policy

It is the policy of the BLM to manage for biologically diverse, resilient and productive native plant communities to sustain the health and productivity of the public lands. This policy in BLM Handbook H-1740-2, *Integrated Vegetation Management Handbook*, and the *National Seed Strategy for Rehabilitation and Restoration* (Plant Conservation Alliance 2019), requires that native plant material shall be used except under limited circumstances and provides necessary procedures for compliance. As a last resort, it may be necessary to introduce nonnative, non-invasive plant materials to break unnatural disturbance cycles or to prevent further site degradation by invasive plant species. Non-native seeds as part of a seeding mixture are appropriate only if: 1. suitable native species are not available, 2. the natural biological diversity of the proposed management area will not be diminished, 3. exotic and naturalized species can be confined within the proposed management area, 4. analysis of ecological site inventory information indicates that a site will not support reestablishment of a species that historically was part of the natural environment, and 5. resource management objectives cannot be met with native species. For example, nonnative plant material may be used in areas with low resistance and resilience that are invaded by invasive annual grasses.

2.8 Fuel Break Types and Vegetation States

Effective fuel breaks are those that have reduced fuel loading and continuity or increased fuel moisture, compared with surrounding vegetation. To achieve this, vegetation would be removed, modified, or replaced using various methods depending on vegetation states. Vegetation states were derived using data from the US Geological Survey National Land Cover Database (Homer et al. 2015). Effective fuel breaks are those that expand the circumstances in which firefighters can attack a wildfire and reduce the time necessary to establish an effective fire line and stop a wildfire. Fire needs fuel and oxygen to continue burning; since oxygen levels cannot be modified, we focus on removing or modifying the fuel or making it less flammable. All wildland fire fighting involves interrupting fuels with a line of bare ground, burned vegetation, water, or fire retardant. Fuel breaks are pre-positioned fire lines situated in or adjacent to areas where a fire is likely and designed to increase the opportunities for firefighters to catch and control a wildfire. Time is a very limited and valuable resource in fire season. Fuel breaks can be constructed or maintained outside of the fire season which can give firefighters what they never have enough of; more time when confronting a wildfire. Human caused fires typically start along busy roadways. Fires burning in the short fuels of a fuel break adjacent to the road will burn more slowly than one burning in tall thick vegetation. This gives firefighters more time to get to the fire and control it. Wildfire behavior is dynamic and even with many years of well-developed firefighting techniques we cannot keep fires small every time. Not every fuel break will be effective every time; even the best lines get jumped sometimes. Firefighting is always a gamble and there is never a guarantee that any particular line will hold a fire.

The fuel breaks would be constructed along roads—Maintenance Level 5 roads (interstates, state highways, county roads), Maintenance Level 3 roads (BLM-administered roads), and Maintenance Level 1 roads (primitive roads)—as well as along BLM-administered ROWs in sagebrush communities. These potential treatment areas cover approximately 38 million acres in the project area. While the treatment area identifies all potential acres that may be treated, only portions of this area would actually receive treatment. Under the proposed action, up to 11,000 miles of new fuel breaks may be created over a potential treatment area of 1,088,000 acres. Cross-country fuel breaks would not be constructed, and no new roads would be created.

Three fuel break types—brown strips, mowed or targeted grazing, and green strips—would be created to meet proposed action objectives. Manual, mechanical, and chemical treatments, prescribed fire, reseeding, and targeted grazing could be used in all areas. Fuel breaks would be constructed using a variety of treatment methods, depending on site conditions, and each type of fuel break has a maximum disturbance width as described below. **Table 2-1** provides considerations for planning and creating three fuel breaks types to meet desired functions. Methods and tools are included in the table, but selection would be based on site-specific conditions and project objectives. Strategic fuel breaks would be constructed and maintained using the tools or methods described in **Section 2.9**.

Brown Strips: Removal/Unvegetated
Width:[1] 0–50 feet

[1]Total maximum width of fuel break (This includes both sides of the road).

Brown strips would be constructed using mechanical and chemical treatments, that is tilling and spraying herbicide, to remove vegetation and limit fire starts. Treatment areas would be along Maintenance Level

5 roads (e.g., interstates and highly traveled routes). Brown strips would require more intensive maintenance than other fuel break types. They would need to be regularly maintained due to the higher likelihood of invasion by nonnative annual grasses, compared with other fuel break types; their effectiveness is short lived without regular maintenance.

Table 2-1
Fuel Break Type by Vegetation State

Vegetation State *(Miles of Roads and ROWs with each Vegetation State)*[1]	**Preferred Fuel Break Type**	**Methods and Tools By Fuel Break Type**
Invasive Annual Grasses *Maintenance Level 1 Roads:* 617 miles *Maintenance Level 3 Roads:* 988 miles *Maintenance Level 5 Roads:* 2,533 miles *ROWs:* 548 miles	**1a: Brown Strip Fuel Break:** Method of treatment along interstates and state highways or highly traveled corridors (roads with Maintenance Level 5). **1b: Green Strip Fuel Break:** Method of treatment in areas that have undergone conversion to invasive annual grasses outside of interstates and state highways or highly traveled corridors, or affected by repeated fire. **2: Mowed Fuel Break:** Method of treatment is relatively easy to implement in reducing the vegetation height and can be used in areas that have undergone conversion to invasive annual grasses or affected by repeated fire. **3: Targeted Grazing Fuel Break:** Could be implemented in any areas where there are invasive annual grasses or areas where mechanical mowing is inaccessible or other methods are not cost effective.	**Brown Strip Fuel Break:** Removal of vegetation by mechanical and chemical treatment. **Green Strip Fuel Break:** Initially removing vegetation through tilling, chemical, or prescribed fire or modifying vegetation via targeted grazing, followed by drill, aerial, or ground broadcast seeding (follow-up cover treatment using chaining, harrowing, or imprinting would follow broadcast reseeding). **Mowed Fuel Break:** Manipulation of vegetation through the use of a mowing implement. **Targeted Grazing Fuel Break:** Manipulation of vegetation through the use of cattle, goats, or sheep.

Vegetation State *(Miles of Roads and ROWs with each Vegetation State)*[1]	**Preferred Fuel Break Type**	**Methods and Tools By Fuel Break Type**
Invasive Annual Grasses and Shrubs *Maintenance Level 1 Roads:* 635 miles *Maintenance Level 3 Roads:* 1,181 miles *Maintenance Level 5 Roads:* 2,650 miles *ROWs:* 537 miles	**1a: Brown Strip Fuel Break:** Can be used along interstates and state highways or highly traveled corridors (roads with Maintenance Level 5). **1b: Green Strip Fuel Break:** Method of treatment in areas that have undergone conversion to invasive annual grasses or affected by repeated fire. **2: Targeted Grazing Fuel Break:** Could be implemented in any areas with a sparse shrub layer, where there are invasive annual grasses. **3: Mowed Fuel Break:** Method of treatment is relatively easy to implement in reducing the vegetation height and can be used in areas that have undergone conversion to invasive annual grasses or affected by repeated fire.	**Brown Strip Fuel Break:** Removal of vegetation through the use of chemical treatment and mechanical treatment. **Green Strip Fuel Break:** Removal of vegetation using prescribed fire or a combination of chemical, mechanical treatments and targeted grazing. A broadleaf chemical treatment may be used to further reduce shrub cover, if needed. Followed by drill, aerial, or ground broadcast seeding (follow-up cover treatment using chaining, harrowing, or imprinting would follow broadcast reseeding). Follow up seeding treatments may be required to ensure success. **Targeted Grazing Fuel Break:** Manipulation of vegetation through the use of cattle, goats, or sheep. **Mowed Fuel Break:** The manipulation of vegetation through the use of a mowing implement.
Perennial Grasses and Forbs *Maintenance Level 1 Roads:* 471 miles *Maintenance Level 3 Roads:* 601 miles *Maintenance Level 5 Roads:* 1,461 miles *ROWs:* 262 miles	**1a: Brown Strip Fuel Break:** Can be used along interstates and state highways or highly traveled corridors (roads with Maintenance Level 5). **1b: Mowed Fuel Break:** Method of treatment that is relatively easy to implement in reducing the vegetation height and can be used along all roads where mechanized equipment can be utilized. **2: Targeted Grazing Fuel Break:** Could be implemented in any areas to reduce the vegetation height. **3: Green Strip Fuel Break:** These types of fuel breaks would be limited to areas with nonnative perennial seedings, where fire risk remains, or in areas with vegetation that is more resistant to invasive plant species introduction.	**Brown Strip Fuel Break:** Removal of vegetation through the use of chemical treatment and mechanical treatment. **Mowed Fuel Break:** Manipulation of vegetation through the use of a mowing implement. **Targeted Grazing Fuel Break:** Manipulation of vegetation through the use of cattle, goats, or sheep. **Green Strip Fuel Break:** Removal of vegetation using prescribed fire or a combination of chemical and mechanical treatments. Followed by drill, aerial, or ground broadcast seeding (follow-up cover treatment using chaining, harrowing, or imprinting would follow broadcast reseeding). Follow up seeding treatments may be required to ensure success.

Vegetation State *(Miles of Roads and ROWs with each Vegetation State)*[1]	**Preferred Fuel Break Type**	**Methods and Tools By Fuel Break Type**
Perennial Grasses, Forbs, and Shrubs *Maintenance Level 1 Roads:* 2,219 miles *Maintenance Level 3 Roads:* 2,856 miles *Maintenance Level 5 Roads:* 6,326 miles *ROWs:* 858 miles	**1a: Brown Strip Fuel Break:** Can be used along interstates and state highways or highly traveled corridors (roads with Maintenance Level 5). **1b: Mowed Fuel Break:** Method of treatment that is relatively easy to implement in reducing the vegetation height and can be used along all roads where mechanized equipment can be utilized. **2: Targeted Grazing Fuel Break:** Could be implemented in any areas with sparse shrub layer, where grasses and forbs are present to reduce the understory vegetation height. **3: Green Strip Fuel Break:** These types of fuel breaks would remove shrubs within the fuel break and retain the native understory. In areas with nonnative exotic perennial seedings, where fire risk remains, or in areas with vegetation that is more resistant to invasive plant species introduction.	**Brown Strip Fuel Break:** Removal of vegetation through the use of chemical treatment and mechanical treatment. **Mowed Fuel Break:** Manipulation of vegetation through the use of a mowing implement or other mechanical treatments such as chaining, Dixie harrowing, or land imprinting, or through manual treatments utilizing handsaw or chainsaws, grubbing, or hoeing, or broadleaf chemical application. **Targeted Grazing Fuel Break:** Manipulation of vegetation through the use of cattle, goats, or sheep. **Green Strip Fuel Break:** Removal of vegetation using prescribed fire or a combination of chemical and mechanical treatments. A broadleaf chemical treatment may be used to further reduce shrub cover, if needed. Followed by drill, aerial, or ground broadcast seeding (follow-up cover treatment using chaining, harrowing, or imprinting would follow broadcast reseeding). Follow up seeding treatments may be required to ensure success.
Perennial Grasses, Forbs, and Invasive Annual Grasses *Maintenance Level 1 Roads:* 792 miles *Maintenance Level 3 Roads:* 1,600 miles *Maintenance Level 5 Roads:* 3,501 miles *ROWs:* 810 miles	**1a: Brown Strip Fuel Break:** Can be used along interstates and state highways or highly traveled corridors (roads with Maintenance Level 5). **1b: Targeted Grazing Fuel Break:** Could be implemented in any areas to reduce the vegetation height. **2: Mowed Fuel Break:** Method of treatment that is relatively easy to implement in reducing the vegetation height and can be used in areas that have undergone conversion to invasive annual grasses or affected by repeated fire. **3: Green Strip Fuel Break:** These types of fuel breaks would be limited to areas with nonnative perennial seedings, where fire risk remains, or in areas with vegetation that is more resistant to invasive plant species introduction.	**Brown Strip Fuel Break:** Removal of vegetation through the use of chemical treatment and mechanical treatment. **Targeted Grazing Fuel Break:** Manipulation of vegetation through the use of cattle, goats, or sheep. **Mowed Fuel Break:** Manipulation of vegetation through the use of a mowing implement. **Green Strip Fuel Break:** Removal of vegetation using prescribed fire or a combination of chemical and mechanical treatments. Followed by drill, aerial, or ground broadcast seeding (follow-up cover treatment using chaining, harrowing, or imprinting would follow broadcast reseeding). Follow up seeding treatments may be required to ensure success.

Vegetation State *(Miles of Roads and ROWs with each Vegetation State)*[1]	**Preferred Fuel Break Type**	**Methods and Tools By Fuel Break Type**
Shrubs, Perennial Grasses, Forbs, and Invasive Annual Grasses *Maintenance Level 1 Roads:* 2,247 miles *Maintenance Level 3 Roads:* 4,269 miles *Maintenance Level 5 Roads:* 8,312 miles *ROWs:* 1,270 miles	**1a: Brown Strip Fuel Break:** Can be used along interstates and state highways or highly traveled corridors (roads with Maintenance Level 5). **1b: Mowed Fuel Break:** Method of treatment that is relatively easy to implement and reduces vegetation height and can be used along all roads where mechanized equipment can be utilized. **2: Targeted Grazing Fuel Break:** Could be implemented in any areas with sparse shrub layer, where grasses and forbs are present to reduce the understory vegetation height. **3: Green Strip Fuel Break:** These types of fuel breaks would remove shrubs and invasive annual grasses from within the fuel break.	**Brown Strip Fuel Break:** Removal of vegetation through the use of chemical treatment and mechanical treatment. **Mowed Fuel Break:** Manipulation of vegetation through the use of a mowing implement or other mechanical treatments such as chaining, Dixie harrowing, or land imprinting or through manual treatments utilizing handsaw or chainsaws, grubbing, or hoeing, or broadleaf chemical application. **Targeted Grazing Fuel Break:** Manipulation of vegetation through the use of cattle, goats, or sheep. **Green Strip Fuel Break:** Removal of vegetation using prescribed fire or a combination of chemical and mechanical treatments. A broadleaf chemical treatment may be used to further reduce shrub cover if needed. Followed by drill, aerial, or ground broadcast seeding (follow-up cover treatment using chaining, harrowing, or imprinting would follow). Follow up seeding treatments may be required to ensure success.

Vegetation State *(Miles of Roads and ROWs with each Vegetation State)*[1]	**Preferred Fuel Break Type**	**Methods and Tools By Fuel Break Type**
Shrubs with Depleted Understory *Maintenance Level 1 Roads:* 586 miles *Maintenance Level 3 Roads:* 1,511miles *Maintenance Level 5 Roads:* 3,678 miles *ROWs:* 845 miles	**1a: Brown Strip Fuel Break:** Can be used along interstates and state highways or highly traveled corridors (roads with Maintenance Level 5). **1b: Mowed Fuel Break:** Method of treatment that is relatively easy to implement and reduces vegetation height and can be used along all roads where mechanized equipment can be utilized. **2: Green Strip Fuel Break:** Method of treatment involving multiple stages.	**Brown Strip Fuel Break:** Removal of vegetation through the use of chemical treatment and mechanical treatment. **Mowed Fuel Break:** Method of manipulating vegetation through the use of a mowing implement or other mechanical treatments such as chaining, Dixie harrowing, or land imprinting, or through manual treatments utilizing handsaw or chainsaws, grubbing, or hoeing, or broadleaf chemical application. **Green Strip Fuel Break:** Removal of vegetation using prescribed fire or a combination of chemical and mechanical treatments. A broadleaf chemical treatment may be used to further reduce shrub cover, if needed. Followed by drill, aerial, or ground broadcast seeding (follow-up cover treatment using chaining, harrowing, or imprinting would follow broadcast reseeding). Follow up chemical and seeding treatments may be required to ensure success.
Sites with Pinyon or Juniper *Maintenance Level 1 Roads:* 6,362 miles *Maintenance Level 3 Roads:* 12,808 miles *Maintenance Level 5 Roads:* 2,783 miles *ROWs:* 4,130 miles	**Phase I[2]:** Due to the low tree cover, fuel break establishment would be dependent on the dominant vegetation state as described above. Limbing of trees may be required to eliminate ladder fuel component. **Phase II or III[2]:** Fuel break establishment within these vegetation states would require treatment of both the overstory and understory. Overstory treatments would increase spacing between trees to reduce the canopy closure to reduce crown fire potential. Limbing remaining trees may be required to eliminate ladder fuel component. Understory treatments would be determined by vegetation states described above.	**Phase I:** Identify dominant vegetation state to determine preferred fuel break type and reference treatment methods described above. **Phase II or III:** Identify dominant vegetation state to determine preferred fuel break type and reference treatment methods described above. Mastication in phase II or III pinyon-juniper areas (Miller et al. 2008) would include aerial seeding before treatment, as needed on a site-specific basis, unless additional seedbed preparation occurs. Burn piles or other intensely burned areas, as found in jackpot burning, would also be seeded following burning as needed on a site-specific basis. Trees left in fuel breaks may require limbing to reduce ladder fuels.

Source: BLM GIS 2019; Shinneman et al. 2018; Monsen et al. 2004; Maestas et al. 2016; BLM interdisciplinary team input.
[1]Miles of roads are estimates based on existing road data, which may not be complete.
[2]Phases refer to successional phases of pinyon-juniper. See glossary in **Appendix B, Section B.3** of the PEIS for definitions of the successional phases.

Brown strips are the most simplistic of the linear fuel breaks, with respect to potential fire behavior, because they are devoid of vegetation and cannot burn. However, during higher intensity fires, there remains the potential for breaching or breaking through the brown strip due to flame lengths or spotting distances exceeding the width of the fuel break.

Mowed Fuel Breaks or Target Grazed Fuel Breaks
Modification Width:[1] 0–500 feet

[1]Total maximum width of fuel break (This includes both sides of the road).

The purpose of mowed or targeted grazing fuel breaks would be to reduce or compact the vertical extent of the fuel bed to lower flame lengths and possibly reduce rates of spread. The potential number of miles of mowed fuel breaks is based on meeting the objective of reducing vegetation height along existing roads in vegetation states dominated by invasive annual grasses or perennial grass, forbs and shrubs (except for sagebrush) with less than 5 percent invasive annual grass cover.

Targeted grazing fuel breaks could be created in all vegetation states except shrubs with depleted understory and Phases II and III pinyon-juniper. Targeted grazing could be used to remove, reduce, or alter the vegetation in the identified fuel break and may be used as a maintenance tool.

Mowed fuel breaks are the preferred method of treatment in patches of intact sagebrush. This is because they are relatively easy to implement and can help to disrupt wind-driven fires and limit their spread; however, reducing the canopy cover can increase herbaceous plants in the short term, requiring further intervention (Shinneman et al. 2018). Native perennial grasses would not be removed, and other native vegetation could be retained.

Follow-up preemergent treatments may be used in low resistant and resilient areas with less than 20 percent pretreatment grass and forb cover. Treatments in certain vegetation types, such as invasive annual grasses, may need to occur every year, versus treatments in sagebrush, which would be less frequent.

Green Strips: Replacement
Width:[1] 0–500 feet

[1]Total maximum width of fuel break (This includes both sides of the road).

The objective for green strips would be to replace more flammable and contiguous plant communities (particularly those dominated by invasive annual grasses, such as cheatgrass [*Bromus tectorum*]) with perennial plants that retain moisture later into the growing season, often by using widely spaced, low-statured plants. This would result in large, bare interspaces to reduce flame lengths and rate of wildfire spread.

Green strips would be constructed first by removing vegetation using manual, mechanical, or a combination of manual and mechanical treatments, and then replacing this vegetation by drill, aerial, or ground broadcast seeding. It may be necessary to follow up with cover treatments using chaining, harrowing, or imprinting, especially following broadcast seeding. Further, where invasive annual grasses are present, the use of a preemergent chemical treatment would be applied after seeding to prevent the reestablishment of invasive annual grasses. Green strips could be created in all vegetation states except Phases II and III pinyon-juniper.

Green strips would be the preferred fuel break in areas that have undergone conversion to invasive annual grasses, in areas highly susceptible to invasion by annual grasses, or in areas affected by repeated fire. If established under ideal conditions, such fuel breaks may require relatively little maintenance, especially if planted species are drought resistant, tolerant of grazing, or able to survive fire or if they have competitive advantages over more fire-prone species. Green strips may require multiple mechanical, chemical, and prescribed fire treatments or targeted grazing to reach desired objective. If not maintained, the ability of a green strip to alter fire behavior generally diminishes over time, due to the potential for reinvasion by invasive annual species and the risk of maladaptation. Targeted grazing could be used to remove or reduce cheatgrass, thereby decreasing fuel continuity and lowering competition with seeded species and helping to maintain the longevity of the fuel break.

2.9 Methods for Fuel Break Creation and Maintenance

Methods described in Restoring Western Ranges and Wildlands (Monsen et al. 2004, pages 57-294) would be used for fuel break construction and maintenance and are incorporated by reference. Additional tools not described in Monsen et al. (2004) are manual methods and targeted grazing; these are described below. The success of any method or tool is subject to a wide variety of uncontrollable environmental factors; given this uncertainty, it is sometimes necessary to treat an area multiple times to achieve the desired objectives. Fuel break creation and maintenance would also be subject to any existing landscape-level Environmental Assessments (EAs) (See Appendix E of the PEIS).

The BLM would follow the *National Seed Strategy for Rehabilitation and Restoration* (Plant Conservation Alliance 2015), which guides the development, availability, and use of seed needed for timely and effective restoration.

The treatment methods listed below would be used to create the fuel breaks. Depending on the goal of a particular fuel break, a single method or treatment may be used or a combination of treatments may be required to produce the desired result.

2.9.1 Chemical Treatment Methods

BLM-approved chemical treatments (herbicides), application methods, and conditions of use are incorporated by reference in this document from the *Vegetation Treatments Using Herbicides on Bureau of Land Management Lands in 17 Western States Programmatic Environmental Impact Statements* and *the Final PEIS on using Aminopyralid, Fluroxypyr, and Rimsulfuron* (BLM 2007 pages 4-1 to 4-11, BLM 2016, pages 4-1 to 4-6), including all standard operating procedures (SOPs) contained therein. These include the following chemical treatments: 2,4-D, bromacil, chlorsulfuron, clopyralid, dicamba, diuron, glyphosate, hexazinone, imazapyr, metsulfuron methyl, picloram, sulfometuron methyl, tebuthiuron, triclopyr, imazapic, diquat, diflufenzopyr (in formulation with dicamba), fluridone, aminopyralid, fluroxypyr, and rimsulfuron. Chemical treatment application methods can be applied on the ground with vehicles or manual application devices or aerially with helicopters or fixed-wing aircraft (BLM 2007, pages 2-13 to 2-14). The BLM anticipates that it would use chemical treatments, typically following manual or mechanical (or both) treatments. The BLM also anticipated that it could use chemical treatments year-round.

2.9.2 Manual Treatment Methods

Manual treatment involves the use of hand tools and hand-operated power tools to cut, clear, remove, or prune herbaceous and woody species to reduce fuel continuity. Potential hand tools that could be used are the handsaw, axe, shovel, rake, machete, grubbing hoe, mattock,[1] Pulaski,[2] brush hook, and hand clippers. In addition, hand held power tools, such as chainsaws and power brush saws, may be used.

2.9.3 Mechanical Treatment Methods

Mechanical treatments would be used where manual treatments would be impractical or too expensive. Mechanical treatment methods are for vegetation reduction or removal, seedbed preparation, seeding, and special uses and are described in detail in Monsen et al. (2004, pp. 65–88). Vegetation removal equipment described in Monsen includes agricultural mowers and masticators. An agricultural mower can be used to reduce the height of herbaceous vegetation. A masticator can also be used; also known as mulchers or brushcutters, masticators are machines that cut and chop or grind vegetation into particles that are usually left in place as mulch. Debris will be removed from the road surface to allow for access through the treatment area. A common type of masticator uses a rotary drum equipped with steel chipper

[1] Combination cutting edge and grubbing hoe
[2] Combination axe and grubbing hoe

tools to cut, grind, and clear vegetation. In addition, an air curtain burner can be used in wildland-urban interface (WUI) areas to remove vegetation, due to its low environmental impact from smoke. Seedbed preparation equipment described in Monsen includes disks and plows, chains and cables, pipe harrows, rails and drags, land imprinters, and root plows. Monsen et al. (2004) identify equipment used for seeding, including drills, broadcast seeders, seed dribblers, brillion seeders, surface seeders, interseeders, and hydro seeders. Finally, mechanical tools for special uses under Monsen are transplanters, roller choppers, dozers and blades, trenchers, scalpers and gougers, fire igniters, chemical sprayers, and steep-slope scarifier seeders. The selection of a particular mechanical method would be based on the characteristics of the vegetation and/or on seedbed preparation and/or re-vegetation needs. Topography and terrain, soil characteristics, and climatic conditions would also determine the specific mechanical treatment.

2.9.4 Prescribed Fire Methods

Prescribed fire can be used to reduce or modify existing fuel loads or prepare the ground for seeding. Qualified personnel would implement prescribed fire under specific weather and wind conditions. Implementation would comply with direction from the Departmental Manual 620, the BLM Manual 9214 Fuels Management and Community Assistance Manual, and the 9214 Manual and Handbook direction, which is annually distributed to the field.

Examples of prescribed fire are broadcast, jackpot, and pile burning. Prior to broadcast burning, a fireline may be constructed via digging, wet line, or other means around the perimeter to assist in containment. The need for a fireline, how it is constructed, width, and length are based on site-specific conditions. The BLM would develop a prescribed fire burn plan in accordance with guidance in the PMS-484 *Interagency Prescribed Fire Planning and Implementation Procedures Guide* (NWCG 2017). For a detailed description of prescribed fire treatments and techniques, see Monsen et al. (2004, pp. 101-120).

2.9.5 Revegetation

Fuel breaks would be reseeded in accordance with the BLM's *Integrated Vegetation Management Handbook* (BLM 2008) and the *National Seed Strategy for Rehabilitation and Restoration* (Plant Conservation Alliance 2015).

The BLM would revegetate an area using drill, aerial, or ground broadcast seeding. It would follow this up with a cover treatment, using manual tools, chaining, harrowing, or imprinting. The policy in BLM Handbook H-1740-2 requires that native species be used, except under limited circumstances, and provides necessary procedures for compliance.

As a last resort, it may be necessary to introduce nonnative, non-invasive plant materials to break unnatural disturbance cycles or to prevent further site degradation by invasive species. Using nonnative seeds as part of a seeding mixture is appropriate only under the following circumstances:

- Suitable native species are not available
- The natural biological diversity of the proposed management area would not be diminished
- Exotic and naturalized species can be confined within the proposed management area
- Analysis of ecological site inventory information indicates that a site would not support reestablishment of a species that historically was part of the natural environment
- Resource management objectives could not be met with native species

Vegetation could be treated in highly resistant and resilient sites. Follow-up chemical and seeding treatments may be required to ensure success.

2.9.6 Targeted Grazing Methods

Targeted grazing uses livestock (goats, sheep, and/or cattle), intensively managed by a grazing operator, to reduce or modify vegetation within a specific area. Targeted grazing may be implemented through agreement or contract, including coordination with affected permittees. This will be determined by the local field office on a project basis. Land managers would decide on a site-specific basis when and where to apply targeted grazing. This would be based on a number of factors, including vegetation state, desired vegetation objective, terrain, and current year growing conditions. A targeted grazing plan would be used to achieve objectives, while avoiding damaging nontarget species (see **Section 2.10**, Design Feature 21).

Targeted grazing may be used to maintain established fuel breaks in certain vegetation states (**Table 2-1**). Timing of the treatment will be dependent on current year growing conditions and the type of fuel break being maintained. Repeated treatments may be required to accomplish the objective of the fuel break and will be dependent on current year growing conditions.

Temporary fencing may be used to limit the grazing to the fuel break footprint. Where temporary fencing is not used, the grazing operator would follow a graduated-use plan to limit grazing impacts outside the fuel break footprint. (See Appendix D of the PEIS for a complete description of the graduated-use plan.)

2.10 DESIGN FEATURES

The BLM would use all applicable design features when implementing site-specific projects (see **Table 2-2**). During site-specific analyses, BLM district or field office resource specialists would determine the locations for avoidance and where to apply design features to protect resources.

2.10.1 Graduated Use Plan

Because livestock are mobile, the BLM anticipates that some incidental grazing may occur beyond the fuel treatment zone in the graduated use area – a ½-mile buffer zone along the fuel break. Utilization caps for perennial grasses would be assigned in the graduated use area to ensure that targeted grazing does not impact regularly scheduled grazing, and to limit or eliminate the need for fencing to accomplish the treatment.

- Utilization respective to targeted grazing use will be limited to the following to ensure resource damage does not occur and permitted AUMs are not negatively impacted:
    1) No more than 30%[3] utilization (light use) of perennial grasses allowed within the ¼-mile graduated use area - the buffer from the edge of the 200-foot treatment area (i.e., fuel break) out to ¼ mile.
    2) No more than 16%[4] utilization (slight use) of perennial grasses between ¼ mile and ½ mile graduated use areas.

[3] Utilization class interval midpoint for Key Species and Landscape Appearance Methods per Technical Reference 1734-03 "Utilization Studies and Residual Measurements."

[4] Utilization class interval midpoint for Key Species and Landscape Appearance Methods per Technical Reference 1734-03 "Utilization Studies and Residual Measurements."

Table 2-2
Fuel Breaks PEIS
Design Features

#	Design Feature	Applicable Resources[1]
GENERAL		
1.	Where feasible, place equipment (e.g., vehicles and mechanical treatment equipment) in previously disturbed areas.	GEN
2.	When applicable, monitor to determine if objectives are being met for any affected resources.	GEN
3.	Consider the maintenance or rehabilitation of existing fuel breaks before new fuel breaks are constructed.	GEN
4.	Apply restrictions and design features in applicable land use plans and land use plan amendments. Develop resource-specific buffer distances and apply seasonal restrictions based on site-specific conditions, best available science, applicable land use plan guidance, and professional judgement. If any design features in this PEIS conflict with state or local BLM guidance, defer to state or local guidance.	GEN
5.	Use best available science when designing and implementing fuel breaks.	GEN
6.	As feasible to achieve objectives, keep disturbance commensurate with the scope of the fuel break.	GEN
7.	Where feasible, fuel breaks would be constructed where vegetation disturbance by wildland fire or surface-disturbing activities has already occurred.	GEN
8.	Fuel breaks would be constructed in locations determined through interdisciplinary dialogue (including consultation and coordination with adjacent landowners), to best meet the goals of the local fire management plan, and can be effectively monitored and maintained. They would be placed in a way that is strategically appropriate for fire suppression, while minimizing short- and long-term impacts on other resources.	GEN
9.	All project personnel would be required to attend an environmental training prior to initiating Project construction. The training would address environmental concerns and stipulations and requirements for compliance with the project.	GEN
10.	Signs would be installed in treatment areas during activities for public safety.	AIR, REC, TM
11.	During times of high fire danger, all equipment would be equipped with a functional spark arrestor. Operators would be required to have, at a minimum, a shovel and a working fire extinguisher on hand.	FF
12.	During fuel break design and implementation, the location, such as topography for project screening, minimal disturbance, and consideration of visual contrasts with the surrounding landscapes, would be considered. For example, vegetation may be drill seeded in a serpentine pattern or using drill modifications, such as minimum-or-no-till drills, slick discs, and drag chains, so that drill rows are not apparent.	SD, VIS
13.	Fuel breaks in a ROW must be compatible with the ROW holder's grant prior to construction of the fuel break.	TM
14.	Applicable Standard Operating Procedures and Mitigation Measures from the Vegetation Treatments Using Herbicides on Bureau of Land Management Lands in 17 Western States Programmatic Environmental Impact Statement and Record of Decision (BLM 2007, PEIS Table 2-8 and Record of Decision Appendix B) and the Final PEIS on using Aminopyralid, Fluroxypyr, and Rimsulfuron (BLM 2016, Table 2-5) would be required.	GEN

#	Design Feature	Applicable Resources[1]
PRESCRIBED FIRE		
15.	Prescribed fire operations would be conducted by qualified personnel when prescription parameters as defined in the burn plans are met.	GEN
16.	Debris piles created during fuel break implementation would be ignited when prescription burn conditions are appropriate—that is, when soils are either wet or frozen.	AIR, SD
17.	Through site-specific smoke analysis, the BLM would comply with their respective state department of environmental quality or other state air monitoring group to ensure that smoke emissions from treatments remain below the National Ambient Air Quality Standard for $PM_{2.5}$. The BLM would identify smoke-sensitive receptors at the site-specific project level.	AIR, SD
18.	Signs would be posted on primary roads accessing the area being burned to alert drivers of the potential for reduced visibility due to smoke.	AIR
19.	Ensure atmospheric conditions are within prescriptions when a prescribed burn is ignited and monitor smoke throughout the fire.	AIR
20.	If smoke threatens unacceptable impacts on transportation safety or communities, ignition should cease, provided control of the burn is not compromised.	AIR

#	Design Feature	Applicable Resources[1]
TARGETED GRAZING		
21. Before targeted grazing begins, complete a targeted grazing plan that optimizes successful reduction of the target species, while avoiding damaging desired plants. The plan would include the following: 1. Objectives that specify target species, grazing duration, intensity, stocking level, type of livestock, and measurable outcomes 2. A monitoring plan 3. Stipulations, including the following: ● To minimize the risk of introducing or spreading invasive plant species through livestock manure, a quarantine period may be needed before livestock are turned out into an area for targeted grazing and when they are removed from such an area. ● Coordinate with applicable permittees, state agencies, or other landowners in advance of targeted grazing treatment. This is to identify and minimize any potential conflicts of targeted grazing with regularly permitted livestock grazing. In case-specific situations, rest from regularly permitted grazing may be necessary in order to accomplish targeted grazing objectives (Hendrickson and Olson 2006). ● Construct all fencing using proper wildlife specifications contained in BLM handbook 1741-1 Fencing and applicable approved land use plans. ● Consider on a project-by-project basis potential impacts on cultural resources from targeted grazing, including fences, corrals, and watering sites, per Section 106 of the NHPA and other cultural resource authorities. Compliance may include tribal and SHPO consultations, an archaeological inventory, and mitigation. ● Use of domestic sheep or goats for targeted grazing will not occur within 30 miles of Sierra Nevada bighorn sheep critical habitat. ● Use of domestic sheep or goats for targeted grazing would be avoided within 30 miles of bighorn sheep habitat. If targeted grazing is desired within this area, BLM would prepare a separation and response plan, included in the targeted grazing plan, coordinated with the appropriate state agency to provide sufficient separation to minimize the risk of contact and disease transmission of domestic sheep or goats from bighorn sheep (Does not apply to Sierra Nevada bighorn sheep). USFWS would be consulted if listed bighorn sheep may be affected. ● Annually target-graze sites that are dominated by invasive annual grasses. Where there are substantial areas of desirable perennial herbaceous species, consider targeted grazing strategies that would maintain perennial plant vigor. ● Carefully consider using supplements for livestock during targeted grazing during site-specific planning. Supplements would be nontoxic to wildlife and would be placed to minimize impacts on wildlife or native vegetation. ● Install wildlife escape ramps in temporary tanks to facilitate the use of and escape from livestock watering troughs by greater sage-grouse and other wildlife. ● Placement and use of temporary watering facilities will be placed to meet site specific conditions and treatment objectives. They will be removed following the targeted grazing treatment.		FW, LG, SD, SOIL, SSS, VEG

#	Design Feature	Applicable Resources[1]
22.	Provide adequate rest from livestock grazing: to allow desired vegetation to recover naturally; in suitable habitat for threatened and endangered plants; and for seeded species in treated areas to successfully become established. All new seedings of grasses and forbs should not be grazed until, at least, after the end of the second growing season, or when fuel break objectives are met to allow plants to mature and develop robust root systems. This would stabilize the site, compete effectively against cheatgrass and other invasive annuals, and remain sustainable under long-term grazing management. Adjust other management activities to meet project objectives.	FW, LG, SD, SOIL, SSS, VEG
23.	Manage targeted grazing to conserve suitable habitat conditions for special status species, while implementing rangeland health standards and guidelines (BLM 2014).	SSS
24.	A Graduated Use Plan is included after this table.	FW, LG, SD, SOIL, SSS, VEG
SURVEY REQUIREMENTS AND RESOURCE PROTECTION		
VEGETATION AND INVASIVE AND NOXIOUS WEEDS		
25.	All prescribed soil disturbance would need to incorporate noxious and invasive weed management, including pre-work evaluation or avoidance.	CULT, FW, SD, SSS, LG, VEG
26.	Noxious weeds and invasive plants would be monitored to track changes in populations over time, and corrective action would be prescribed where needed, in accordance with local weed programs. Thresholds and responses for noxious weeds and invasive plants (particularly invasive annual grasses) will be included in fuel break implementation and monitoring plans.	CULT, FW, SD, SSS, LG, VEG
27.	Mowed fuel breaks would be re-mowed when grass has reached a height between 1 and 2 feet or exceeds the Tons Per Acre of the Grass Fuel Model 2 (GR2), as described in Standard Fire Behavior Fuel Models: A Comprehensive Set for Use with Rothermel's Surface Fire Spread Model (Scott and Burgan 2005).	FF
28.	Locally adapted or genetically appropriate perennial forbs and grasses would be applied at jackpot and pile burn sites when appropriate to facilitate establishment of vegetation.	SD, VEG, VIS
29.	Power wash all vehicles and equipment prior to allowing them to enter the project area and between sites where invasive and noxious weed species are different to minimize the introduction and spread of invasive plant species.	CULT, FW, SD, SSS, VEG
CULTURAL, TRIBAL, AND PALEONTOLOGICAL RESOURCES		
30.	Cultural and paleontological inventories and consultations appropriate to the scale and level of disturbance would occur in advance of project activities; the results would be used early in project planning to determine the need for project redesign or other mitigation.	CULT
31.	Potential adverse effects on historic properties[3] would be avoided during ground-disturbing activities. A cultural resource specialist would identify avoidance areas before treatment begins, including subsequent retreatments. If protection of resources compromises the effectiveness of a given treatment and life, safety, or other resources are threatened, flexibility would be maintained to allow for project redesign, while protecting cultural resources. If historic properties could not be avoided without significantly compromising the success of a treatment, the effects would be minimized, in consultation with SHPO, ACHP, tribes, or interested members of the public.	CULT

#	Design Feature	Applicable Resources[1]
32.	Archaeological inventories and assessments of potential significance under the National Historic Preservation Act (NHPA) would be conducted in accordance with the National Programmatic Agreement between the Advisory Council of Historic Preservation (ACHP) and BLM, state protocol agreements with respective State Historic Preservation Offices (SHPOs), guidelines set forth in the BLM 8110 and 8040 Manuals, and according to other relevant authorities listed in the above documents, including Section 106 of the NHPA.	CULT
33.	Potentially affected tribes would be consulted according to guidance set forth in BLM Manual and Handbook 1780, Department of Interior Manual 512 DM 3, and relevant authorities listed therein, before herbicide spraying or other treatments begin that are likely to affect the access or availability of resources or locations important to traditional lifeways, including subsistence, economy, ritual, and religion.	CULT, VEG
34.	The need for a paleontological inventory would be determined based on criteria set forth in BLM Instruction Memorandum (IM) 2016-124, using potential fossil yield classification, if available, or geologic characteristics and previous study data, if not. Ground-disturbing and chemical treatments in areas with paleontological resources would be addressed on a site-by-site basis. Project activities at significant paleontological sites would be coordinated with the regional BLM paleontologist to determine mitigation or monitoring needs in areas with a high potential for fossil resources. This would be done to minimize adverse effects.	GEN
35.	If cultural or paleontological resources are encountered during project implementation, all ground-disturbing activity in the vicinity of the find must cease until the resource is evaluated by an appropriate BLM resource specialist. The BLM would follow the procedures outlined in 36 CFR 800. If human remains or objects covered by the Native American Graves Protection and Repatriation Act are encountered, all work would cease and the BLM Authorized Officer would be contacted immediately by phone, with written follow-up, and other guidelines set forth in 43 CFR 10 would be followed.	CULT
SOIL AND WATER RESOURCES		
36.	Minimize ground-disturbing treatments in areas with highly erosive soils (see **Chapter 3** for highly erosive soil criteria).	FW, SD, SOIL, SSS, VEG, WR
37.	Avoid or minimize ground-disturbing activities when soils are saturated.	SSS
38.	Use best management practices and soil conservation practices during project design and implementation to minimize sediment discharge into streams, lands, and wetlands from such treatments as mowing, disking, and seeding. This is to protect designated beneficial uses.	FW, SSS
39.	Soils, site factors, and timing of application must be suitable for any ground-based equipment used for creating a fuel break. This is to avoid excessive compaction, rutting, or damage to the soil surface layer. Equipment would be used on the contour, where feasible.	SD, SOIL, VIS
40.	For safety and to protect site resources, treatment methods involving equipment generally would not be applied on slopes exceeding 35 percent.	SD, SOIL
41.	Bare soil (disked) portions of fuel breaks adjacent to roadways would not exceed 25 feet on either side of the roadway.	SSS
WILDLIFE AND SPECIAL STATUS SPECIES (WILDLIFE AND PLANTS)		
42.	If special status plant or animal populations and their habitats occur in a proposed treatment area, assess the area for habitat quality and base the need for treatment on special status species present. Conduct appropriately timed surveys within suitable or potential habitats for federally listed, proposed, and BLM special status species prior to treatment. Federally listed species and BLM special status species with the potential to occur in the project area are presented in **Appendix J**.	SSS

#	Design Feature	Applicable Resources[1]
43.	Implement restrictions and conservation strategies for special status species, including federally listed, proposed, candidate, and BLM sensitive species, as contained in approved recovery and conservation plans, cooperative agreements, and other instruments in whose development the BLM has participated. If none are available, coordinate with the USFWS and/or state wildlife agencies to develop appropriate restrictions.	SSS
44.	Avoid creating new barriers to big game movement in migratory corridors.	FW
45.	Aerial herbicide treatments would be designed to avoid chemical drift into the riparian exclusion area or other aquatic species-specific buffers.	-
46.	[This Design Feature has been purposefully left blank – it is included in the PEIS alternatives but not the Proposed Action]	-
47.	In sage-grouse Biologically Significant Units occurring within Priority and Important Habitat Management Areas, ensure that sagebrush treatments do not lead to a soft or hard habitat trigger trip.	SSS
48.	Restrict activities in big game habitat during the following periods, unless short-term exemption is granted by the BLM field office manager, in coordination with the appropriate state wildlife agency (dates may be determined based on local conditions): big game wintering; elk/deer calving/fawning; pronghorn calving/fawning; and bighorn sheep lambing (See Design Feature 59 relating to Sierra Nevada Bighorn).	FW
49.	Manage domestic sheep grazing to minimize contact between domestic sheep and bighorn sheep, using the currently accepted peer-reviewed modeling techniques and best available data, such as the Bighorn/Domestic Sheep Risk of Contact Model, in accordance with BLM Manual 1730, Management of Domestic Sheep and Goats to Sustain Wild Sheep.	FW, SSS
50.	Treatments in mule deer winter range would not reduce the total area having shrub cover suitable for browse below 70% of site-specific winter range areas (Cox et al. 2009).	FW
51.	Complete surveys for migratory bird and raptor nesting activity and establish a seasonal buffer around raptor nests. Avoid fuel break construction and maintenance during the peak of the local nesting season in the project area for priority migratory land bird species (e.g., Birds of Conservation Concern, BLM sensitive species). Specific dates and buffer distances for the seasonal restrictions may be determined in coordination with the USFWS Migratory Bird Division and/or state wildlife management agency, and should be based on species, variations in nesting chronology of particular species locally, topographic considerations, such as an intervening ridge between the treatment activities and a nest, or other factors that are biologically reasonable.	FW, SSS
52.	Aerial seeding treatments and aerial application of herbicides would be avoided within one mile of active American bald and ½ mile of active golden eagle nests during the nesting season. Avoidance distances would be determined by the amount of screening provided by vegetation or topographic features.	SSS
53.	Avoid disturbance within 0.5 mile of communal bald eagle winter concentration sites during the winter roosting season.	SSS
54.	Aerial treatment applications will be avoided within 0.5 mile of bald eagle winter concentration sites during the winter roosting season.	SSS
55.	Surveys would take place in potential known pygmy rabbit habitats (non-listed populations). Select fuel break routes with the least density of active burrows.	SSS
56.	Design projects so facilitating practices (e.g. staging areas or travel routes) avoid affecting USFWS listed Threatened, Endangered or Proposed species.	SSS
57.	Comply with any additional conservation measures developed during ESA Section 7 consultation for this PEIS.	SSS
58.	Avoid removal or disturbance to old growth trees, such as old growth pinyon-juniper.	VEG

#	Design Feature	Applicable Resources[1]
59.	No activities would occur in Sierra Nevada bighorn sheep critical habitat during lambing periods (April – July).	SSS

Source: BLM interdisciplinary team input

[1] Resource codes

GEN: General design feature that is not resource-specific
AIR: Air quality
CULT: Cultural, paleontological, and tribal resources
FF: Fire and fuels
FW: Fish and wildlife
LG: Livestock grazing
REC: Recreation
SD: Special designations
SOC: Socioeconomics
SOIL: Soil resources
SSS: Special status species
TM: Travel management
VEG: Vegetation resources
VIS: Visual resources
WR: Water resources
WHB: Wild horses and burros

[2] Historic properties are cultural resources that are archaeological sites, districts, or Traditional Cultural Properties (TCPs) that are significant, or are suspected to be significant, under the National Register of Historic Places, as defined in 36 CFR 63; TCPs are defined in National Register Bulletin 38. Other significant cultural resources are those important historic or traditional places, landscapes, or resources with significance to Native American tribes and other cultural groups, according to regulations and guidance discussed in BLM Manuals and Handbooks 8100 and 1780.

Diagram of Targeted Grazing Treatment Expectations

¼ to ½-mile graduated use area: ≤16% utilization

¼-mile graduated use area: ≤30% utilization
250-foot targeted grazing treatment area
Road
250-foot targeted grazing treatment area
¼-mile graduated use area: ≤30% utilization

¼ to-½ mile graduated area: ≤16% utilization

- If utilization standards are exceeded in graduated use areas, within 48 hours livestock must be removed or moved to another portion of the treatment area that has not exceeded utilization levels/has not yet met fuel break treatment objectives (i.e., 2-inch stubble height in treatment area).
- In instances where targeted grazing occurs in a pasture where authorized grazing (identified on a grazing permit) has already occurred per the current year's grazing schedule, utilization levels on perennial grasses within the graduated use area may exceed the 30% and 16% utilization levels, respectively, but will not exceed the utilization level identified in the existing grazing permit or land use plan.
- Temporary electric avoidance fencing may be utilized to protect sensitive resources (e.g., riparian areas) within the treatment area or graduated use area during targeted grazing, and will be removed once treatment is complete.
- Targeted grazing resource adaptive management triggers:
  - >30% utilization of perennial grasses in ¼-mile graduated use area (buffer from edge of treatment area out to ¼ mile); and/or
  - >16% utilization of perennial grasses in ½-mile graduated use area (buffer from ¼ mile out to ½ mile from treatment).

2.11 CONSERVATION MEASURES

To avoid or minimize most adverse effects on ESA-listed species with potential to occur in the action area, the BLM would implement design features as described in **Section 2.10**, Design Features. Where implementation of design features was determined to be insufficient to reduce the magnitude of adverse effects to an insignificant level, or reduce the potential for adverse effects to a low enough level to be discountable, the BLM developed species-specific conservation measures. The purpose of conservation measures would be to avoid or reduce residual adverse effects to the point where they were insignificant or discountable.

Species-specific conservation measures are detailed under the respective species they would apply to. In addition, Conservation Measure Listed Species 1, below, was created to aid USFWS and state wildlife agencies with documenting listed species occurrence and aid in population status assessments to better conserve species. This conservation measure as well as Conservation Measure Listed Species 2 would apply to all ESA-listed species assessed in this BA.

Conservation Measure Listed Species 1: Report to the appropriate USFWS office or state agency within 48 hours of the sighting any positive identification or sightings of federally or state-listed species during any phase of fuel break treatment activities, such as species surveys and pretreatment surveys, and during treatment activities and monitoring. cease treatment until a qualified biologist determines that treatments would result in no potential for harm to a federally listed species.

Conservation Measure Listed Species 2: All staff, contractors, and practitioners involved in implementing on-the-ground fuel break treatments will be trained on and provided information on (e.g., maps, photo…) listed, proposed species and critical habitat that may occur in the project area.

2.12 MONITORING, MAINTENANCE, AND ADAPTIVE MANAGEMENT

All vegetation management actions should be organized around phases of inventory, assessment, planning, implementation, monitoring, and evaluation and reassessment as described in BLM's Manual H-1740-2 *Integrated Vegetation Management Handbook*; *Incorporating Assessment Inventory and Monitoring (AIM) for Monitoring Fuels Project Effectiveness Guidebook* (BLM 2018a); *Measuring and Monitoring Plant Populations* (Elzinga et al. 1998); *Sampling Vegetation Attributes* (USDA and USDOI 1999); local RMP guidance; and other applicable guidance documents or policy. *Using Resistance and Resilience Concepts to Reduce Impacts of Invasive Annual Grasses and Altered Fire Regimes on Sagebrush Ecosystem and Greater Sage-Grouse: A Strategic Multi-Scale Approach* (Chambers et al. 2014) should be used as a decision support tool to determine priority areas for management and to identify effective management strategies at a landscape scale. *Best Management Practices for Pollinators on Western Rangelands* (Xerces 2018) would be used to incorporate pollinator conservation into management decisions; the reference also describes associated monitoring practices for pollinator populations.

When constructing and maintaining fuel breaks, strategies should be determined by considering resilience to disturbance, resistance to invasive species, and the predominant threats to the sagebrush communities. The Landscape Cover of Sagebrush and Ecosystem Resilience and Resistance Matrix can be used as a decision support tool to provide better evaluation of risks and to decide where to focus specific activities to promote desired species and ecosystem conditions (Chambers et al. 2014, Tables 2 through 4). Contributions to vegetation management strategies should include all necessary agency program areas such as invasive plant management, fuels management, range management, and wildlife. When applicable, other landowners, fire response partners and agencies should be involved.

Monitoring is the key to adaptive management. When fuel breaks are not meeting objectives, modifications should be considered through adaptive management (per Chapter 5 of H-1740-2, Crist et al. 2019). Decommissioning of fuel breaks would be addressed in project objectives at the site-specific level. Monitoring would inform the need for maintenance on new fuel breaks. Maintenance may require re-treating certain areas, using the methods described in this chapter, to maintain effectiveness, minimize the presence of invasive plants, and to prevent tall shrubs from dominating treated areas. The BLM would manage invasive, nonnative, annual plants and noxious weeds in accordance with local weed program monitoring protocol, along with any additional RMP guidance, through manual and chemical methods. The BLM would do this to keep the invasive, nonnative, annual plants and noxious weeds from invading and dominating the fuel breaks or from spreading out of areas disturbed during fuel break construction. Noxious weeds and invasive plant monitoring and management would be incorporated into all soil disturbances, including pre-work evaluation and avoidance and post-work corrective action, where needed.

3.0 ENVIRONMENTAL BASELINE AND EFFECTS ANALYSIS

3.1 WILDLIFE SPECIES

3.1.1 Carson Wandering Skipper

Listing Status and Recovery Plan

In 2001, the USFWS published an emergency rule concurrent with a proposed rule to list the Carson wandering skipper as endangered under the ESA. The final rule listing it as an endangered species was published on August 7, 2002 (USFWS 2002). In the final rule, the USFWS found that it could not designate critical habitat for the species due to limited information on its biological needs (USFWS 2002). The USFWS released a recovery plan for the species in 2007 (USFWS 2007c).

Life History and Habitat Characteristics

The Carson wandering skipper is a small butterfly in the subfamily Hesperiinae (grass skippers) and has a life cycle similar to other species in this family. Larvae live in silked-leaf nests, and some species make their nests partially underground. Pupae generally rest in the nest, and larvae generally hibernate during winter. Some larvae may be able to extend their diapause for more than a year, depending on the individual and environmental conditions. The pupae emerge as adult butterflies in late spring/early summer. The life span of an adult Carson wandering skipper is about 1 to 2 weeks, but it may be longer where nectar sources are abundant and habitat disturbances are minimal (USFWS 2007c).

Carson wandering skippers likely produce only one brood per year during the late May to mid-July flight season (USFWS 200c7). They lay eggs on desert saltgrass (*Distichlis spicata*), which is the larval host plant for the subspecies. This is a common plant species in the saltbush-greasewood community of the intermountain west. Saltgrass usually occurs in areas where the water table is high enough to keep its roots saturated for most of the year (Black and Vaughan 2005).

Carson wandering skipper habitat is generally characterized as lowland grassland on alkaline substrates. Based on observations of known, occupied sites, suitable habitat for the Carson wandering skipper in any given year has the following characteristics: elevation of less than 5,000 feet, location east of the Sierra Nevada, and presence of green saltgrass cover with a flowering nectar source from March through June (USFWS 2007c).

Suitable larval habitat is likely related to water table depth. During wet years, larval survival likely depends on saltgrass areas being above standing water. In dry years, however, survival is probably related to the timing of the host plant senescence. Larval development may rely on the presence of good quality saltgrass cover provided by more permanent water sources (USFWS 2007c).

Known nectar sources for adults include thelypody (*Thelypodium crispum*), tumble mustard (*Sisymbrium altissimum)*, racemose golden-weed (*Pyrrocoma racemosus*), Canada thistle (*Cirsium arvense*), bull thistle (*C. vulgare*), bird's foot trefoil (*Lotus corniculatus*), slender cleomella (*Cleomella parviflora*), small-flowered cleomella (*C. plocasperma*), heliotrope (*Heliotropium curassavicum*), fiddleleaf hawksbeard (*Crepis runcinata*), western sea purslane (*Sesuvium verrucosum*), cinquefoil (*Potentilla* sp.), alkali weed (*Cressa truxillensis*), Douglas' milkvetch (*Astragalus douglasii*), and alkali mallow (*Malvella leprosa*) (USFWS 2012a). Alfalfa (*Sisymbrium altissimum* and *Medicago sativa*), cryptantha (*Cryptantha* sp.), and seepweed (*Suaeda* sp.) are potential nectar sources (USFWS 2012a).

If alkaline-tolerant plant species are not present but there is fresh water to support alkaline-intolerant nectar sources next to the larval host, the area may provide suitable habitat. Nectar sources depend on various environmental conditions and are likely to be transitory; thus, nectar sites used by the Carson wandering skipper may change from year to year (USFWS 2012a).

Status and Distribution

Currently, the Carson wandering skipper occupies areas in a small region east of the Sierra Nevada in northwestern Nevada and northeastern California, at elevations of less than 5,000 feet (USFWS 2007c). No information is available on historical population numbers of the Carson wandering skipper. It is possible that a fairly large historical population of the subspecies occurred from the Carson Hot Springs site to the Carson River, in Carson City County, Nevada; habitat in this area has been lost, as described below.

In the late 1990s, the Carson wandering skipper could be found at three locations: near Carson City, Nevada, at Warm Springs Valley in Washoe County, Nevada, and around Honey Lake in Lassen County, California. The butterfly was extirpated from the first site due to development and a misguided attempt at wetland restoration (Black and Vaughan 2005); thus, at the time of listing, the populations in Washoe and Lassen Counties were the only two extant populations known.

In 2004, one additional population was discovered, and two single sightings of individual Carson wandering skippers occurred in Nevada. The new population was found south of Carson City, in Douglas County along the Carson River. One of the single sightings occurred approximately 10 miles south of the previously known population in Washoe County. The second single sighting occurred south of Flanigan, Washoe County. The first single sighting was confirmed as a population in 2005. This population has been considered extirpated since 2016 (USFWS 2016). There are currently three extant populations.

It is possible that more appropriate habitat once existed for the Carson wandering skipper between the existing populations in Lassen County, California, and Washoe County, Nevada (USFWS 2007c). Over time, habitat between these populations has become unsuitable and fragmented due to natural drying and human activities, and the populations may have become isolated from one another. The population locations are approximately 75 miles apart (USFWS 2007c).

Of the 840,499 acres that comprise the Carson wandering skipper's range, 26 percent (215,979 acres) is in the action area and 8 percent (71,317 acres) is in the focused action area (**Figure A-8, Table 3-1;** USFWS BLM GIS 2018).

Table 3-1
Carson Wandering Skipper Range in the Action Area and Focused Action Area

Range	Total Acres Range-wide	Acres in Action Area	Percent in Action Area	Acres in Focused Action Area	Percent in Focused Action Area
Range	840,499	215,979	26	71,317	8

Source: USFWS BLM GIS 2018

Threats

Threats to the subspecies are habitat destruction, degradation, and fragmentation due to urban and residential development, wetland habitat modification, nonnative plant invasion, agricultural practices, such as excessive livestock grazing and trampling, gas and geothermal development, and nonnative plant invasion. Other threats are from collecting, excessive livestock trampling and grazing, water exportation projects, road construction, recreation, pesticide drift, inadequate regulatory mechanisms, and natural random events. The combination of limited distribution, small range, and restricted habitat makes the subspecies highly susceptible to extinction or extirpation from a significant portion of its range, due to such random events as fire, drought, or disease (USFWS 2007c).

Since the Carson wandering skipper was listed in 2002, the noxious weed tall whitetop (*Lepidium latifolium*) has become established and threatens the Warm Springs, Washoe County, population. The level of infestation is less than an acre (USFWS 2012a), but larval and nectar plant communities could be affected if the weed were to spread. Tall white top is also found on lands supporting the Carson River, Douglas County, population (USFWS 2012a).

Effects Analysis and Determinations

The following nonspecific design features from the PEIS are relevant to protect Carson wandering skippers:

- Design Feature 23—Manage targeted grazing to conserve suitable habitat conditions for special status species, while implementing rangeland health standards and guidelines (BLM 2014).
- Design Feature 42— If special status plant or animal populations or potential habitats occur in a proposed treatment area, a qualified biologist will assess the area for habitat suitability and balance need for treatment with the habitat needs of special status wildlife and plant species. Conduct appropriately timed surveys within suitable or potential habitats for federally listed, proposed, and BLM special status species prior to treatment. For plant species, appropriate timing may vary by species but is directly related to phenological stages (for example flowering or fruiting stages) that provide confidence in identification. Federally listed species with the potential to occur in the project area and the current BLM special status species list are found in the PEIS, Appendix J.
- Design Feature 43— Implement restrictions and conservation strategies for special status species, including federally listed, proposed, candidate, and BLM sensitive species, as contained in approved recovery and conservation plans, cooperative agreements, and other instruments in whose development the BLM has participated. If none are available, coordinate with the USFWS and/or state wildlife agencies to develop appropriate restrictions.

Conservation Measures

To avoid or minimize potential effects on the Carson wandering skipper from the proposed treatments, the BLM would be required to implement the conservation measures listed below.

- Conservation Measure Carson Wandering Skipper 1—No treatments would occur within 10 mi of known occupied Carson wandering skipper population sites during the adult flight season (late May to mid-July).
- Conservation Measure Carson Wandering Skipper 2— No treatments would occur within 5 mi of known Carson wandering skipper population sites at any time of year.

The PEIS would also adhere to the following conservation measures (Conservation Measure Carson Wandering Skipper 3), which are identified on the Vegetation Treatments on Bureau of Land Management Lands in 17 Western States Biological Assessment (BLM 2005, 6-15 to 6-16):

- Use an integrated pest management approach when designing programs for managing pest outbreaks.
- Survey treatment areas for threatened, endangered, or proposed (TEP) butterflies/moths and their host/nectar plants (suitable habitat) at the appropriate times of year.
- Minimize the disturbance area with a pre-treatment survey to determine the best access routes. Areas with butterfly/moth host plants and/or nectar plants should be avoided.
- Minimize mechanical treatments and OHV activities on sites that support host and/or nectar plants.
- In TEP butterfly/moth habitat, burn while butterflies and/or moths of concern are in the larval stage, when the organisms would receive some thermal protection.
- Wash equipment before it is brought into the treatment area.
- Use a seed mix that contains host and/or nectar plant seeds for road/site reclamation.
- To protect host and nectar plants from herbicide treatments, follow recommended buffer zones and other conservation measures for TEP plants species when conducting herbicide treatments in areas where populations of host and nectar plants occur.
- Do not broadcast spray herbicides in habitats occupied by TEP butterflies or moths; do not broadcast spray herbicides in areas adjacent to TEP butterfly/moth habitat under conditions when spray drift onto the habitat is likely.
- Do not use 2,4-D in TEP butterfly/moth habitat.
- When conducting herbicide treatments in or near habitat used by TEP butterflies or moths, avoid use of the following herbicides, where feasible: bromacil, clopyralid, diquat, diuron, glyphosate, hexazinone, imazapyr, picloram, tebuthiuron, and triclopyr.
- If conducting manual spot applications of diquat, diuron, glyphosate, hexazinone, tebuthiuron, or triclopyr to vegetation in TEP butterfly or moth habitat, utilize the typical, rather than the maximum, application rate.

General Effects

The focused action area overlaps 71,317 acres, or 8 percent, of total Carson wandering skipper range (**Figure A-8**). This is the area that would be available for fuel break creation and maintenance within the species range, with a half-mile buffer.

Fuel breaks would not be established within 10 mi of known sites during the adult flight season (Conservation Measures Carson Wandering Skipper 1). The implementation of this conservation measure would reduce the potential for adverse effects to Carson wandering skipper adults from the implementation of treatment methods for fuel break construction or maintenance. Potential effects to adult skippers would only occur on the off-chance that an individual were to travel beyond the 10 mi buffer around occupied sites into a treatment site. If a skipper were to occur in a treatment site, the use of tools, vehicles, livestock, and foot traffic associated with fuel break construction and maintenance would increase the risk of injury or mortality from trampling or crushing. Noise and human presence could also interfere with foraging by adults. In general, skippers seldom fly far (USFWS 2007c), so the chance of an adult encountering a treatment site would be rare and the probability of effects occurring would be so low as to be discountable.

Additionally, fuel breaks would not be established within 5 mi of known Carson wandering skipper population sites at any time or year (Conservation Measures Carson Wandering Skipper 2). This would reduce the potential for adverse effects to Carson wandering skipper eggs, larva, pupa, and their habitat. Potential effects would only occur if an undiscovered population existed more than 5 miles outside of a known population. In this case, eggs, larva, and pupa of the unknown population would be subject to trampling, crushing, and mortality from the use of tools, vehicles, and human presence. Potential skipper habitat would also be subject to impacts such as trampling. Although the dispersal capability of Carson wandering skippers is unknown, skippers seldom fly far (USFWS 2007c), it is unlikely that new populations would be established more than 5 miles outside of known sites. Therefore, the chance of effects to Carson wandering skipper eggs, larva, pupa, and their habitat would be so low as to be discountable.

Effects to potential Carson wandering skipper habitat and undiscovered populations would also be reduced or avoided because fuel breaks would not directly be established in Carson wandering skipper habitat. This is because fuel breaks are not being proposed in greasewood–saltgrass vegetation communities and saltgrass meadow habitat would be designated as an analysis exclusion area. Fuel breaks are not being proposed in riparian exclusion areas, which include perennial streams, seasonally flowing streams, streams in inner gorge, and special aquatic features.

Indirect effects could result, however, from the long-term influence of fuel breaks on wildfire behavior. Creating a regional fuel break system would increase fire suppression opportunities, potentially reducing loss of habitat and mortality to wildfire. Smoke from fires may influence flight patterns and foraging behavior if skippers mistake smoke for a cloudy day, which is when they appear to be less active (USFWS 2012a); therefore, reduced wildfire spread could have positive effects on behavior.

Altered wildfire behavior would also increase habitat suitability by reducing the likelihood for spread of invasive annual grasses and therefore conserving or maintaining the diversity and cover of native vegetation, such as saltgrass and nectar sources. Tall whitetop, a noxious weed, is a perennial plant native to Europe and Asia. It grows in disturbed sites, wet areas, ditches, roadsides, and cropland. Spreading roots and numerous seeds make this invasive plant difficult to control. It often grows in dense patches that become near monocultures and can affect saltgrass and nectar plant communities if it spreads. Therefore, reduced spread of this invasive plant due to improved wildfire suppression opportunities would improve habitat conditions for skippers over the long term.

Effects of Chemical Treatments

This PEIS tiers to the Vegetation Treatments Using Herbicides on Bureau of Land Management Lands in 17 Western States Programmatic Environmental Impact Statement (BLM 2007, pp. 4-118 to 4-124), the 2016 Final PEIS for Vegetation Treatments Using Aminopyralid, Fluroxypyr, and Rimsulfuron on BLM Lands in 17 Western States (BLM 2016, pp. 4-61 to 4-63), and the Vegetation Treatments on Bureau of Land Management Lands in 17 Western States Biological Assessment (BLM 2005, 6-5 to 6-16). Implementing the conservation measures described in those PEISs would avoid the potential that Carson wandering skippers, host plants, or nectar sources would be exposed to herbicides.

Applicable conservation measures are as follows:

- To protect host and nectar plants from herbicide treatments, follow recommended buffer zones and other conservation measures for TEP plants species when conducting herbicide treatments in areas where populations of host and nectar plants occur.
- Do not broadcast spray herbicides in habitats occupied by TEP butterflies or moths; do not broadcast spray herbicides in areas adjacent to TEP butterfly/moth habitat under conditions when spray drift onto the habitat is likely.
- Do not use 2,4-D in TEP butterfly/moth habitat.
- When conducting herbicide treatments in or near habitat used by TEP butterflies or moths, avoid use of the following herbicides, where feasible: bromacil, clopyralid, diquat, diuron, glyphosate, hexazinone, imazapyr, picloram, tebuthiuron, and triclopyr.
- If conducting manual spot applications of diquat, diuron, glyphosate, hexazinone, tebuthiuron, or triclopyr to vegetation in TEP butterfly or moth habitat, utilize the typical, rather than the maximum, application rate.

Chemical treatments would not be applied within 5 mi of known Carson wandering skipper population sites at any time or year or within 10 mi of known sites during the adult flight season (Conservation Measures Carson Wandering Skipper 1 and 2). Therefore, there would be no chance for direct spray of skipper eggs, larva, pupa, or known population sites. Broadcast spray would not be used in skipper habitat or adjacent areas under conditions when spray drift onto the habitat is likely and use of herbicides that would have adverse effects on skippers would be avoided in or near skipper habitat, the potential for harmful herbicides drifting into Carson wandering skipper habitat would be low. In the off-chance that herbicides used outside of skipper habitat were to drift into occupied areas, they may cause adverse effects to skipper eggs, larva, pupa, or adults and reduce larval or nectar plant cover.

There is also a small chance that an adult skipper could travel into a treatment area; if this were to occur, the individual could be exposed to herbicides through direct spray, contact with sprayed foliage, or ingestion of sprayed nectar sources (USFWS 2007c), which may lead to adverse health effects such as mortality, reduced reproductive output, behavioral modification, and/or increased susceptibility to environmental stresses (BLM 2005). Adults that travel into treatment areas could also be trampled during treatments.

After implementation of design features, conservation measures, and avoidance measures, the potential for adverse effects on skippers would be so rare as to be discountable. Therefore, chemical treatments ***may affect but are not likely to adversely affect*** Carson wandering skippers.

Effects of Manual Treatments

Manual treatments would not be applied within 5 mi of known Carson wandering skipper population sites at any time or year or within 10 mi of known sites during the adult flight season (Conservation Measures Carson Wandering Skipper 1 and 2), and the greasewood–saltgrass vegetation community and saltgrass meadows used by Carson wandering skippers would not be proposed for fuel break treatments. Therefore, no adverse effects to Carson wandering skipper eggs, larva, pupa, or their habitat would occur from manual treatments. If an adult skipper were to travel beyond the 10 mi buffer around occupied sites into a treatment site, there would be a small potential for effects such as increased risk of injury or mortality from trampling or crushing and behavioral disturbance from noise and human presence. However, the implementation of design features, conservation measures, and avoidance measures would make the potential for adverse effects so low as to be discountable. For these reasons, manual treatments ***may affect but are not likely to adversely affect*** Carson wandering skippers.

Effects of Mechanical Treatments

Mechanical treatments would not be applied within 5 mi of known Carson wandering skipper population sites at any time or year or within 10 mi of known sites during the adult flight season (Conservation Measures Carson Wandering Skipper 1 and 2), and the greasewood–saltgrass vegetation community and saltgrass meadows used by Carson wandering skippers would not be proposed for fuel break treatments. Therefore, no adverse effects to Carson wandering skipper eggs, larva, pupa, or their habitat would occur from mechanical treatments. If an adult skipper were to travel beyond the 10 mi buffer around occupied sites into a treatment site, effects such as increased risk of injury or mortality from trampling or crushing and behavioral disturbance from noise and human presence could occur. Use of large equipment could also generate dust, which may interfere with foraging by adults; however, the 10 mi buffer around occupied sites would avoid impacts to most skippers, and only those that travel outside this buffer would be affected. Because no treatments would occur within 10 mi of known occupied Cason wandering skipper sites during the adult flight season (Conservation Measure Carson Skipper 1), impacts, such as generation of noise or dust, would not occur at a distance close enough to affect skippers. The implementation of design features, conservation measures, and avoidance measures would make the potential for adverse effects so low as to be discountable. Therefore, mechanical treatments ***may affect but are not likely to adversely affect*** Carson wandering skippers.

Effects of Prescribed Fire

Prescribed fire treatments would not be applied within 5 mi of known Carson wandering skipper population sites at any time or year or within 10 mi of known sites during the adult flight season (Conservation Measures Carson Wandering Skipper 1 and 2), and the greasewood–saltgrass vegetation community and saltgrass meadows used by Carson wandering skippers would not be proposed for fuel break treatments. Therefore, there would be no adverse effects to Carson wandering skipper eggs, larva, pupa, or their habitat due to prescribed fire treatments. If an adult skipper were to travel beyond the 10 mi buffer around occupied sites into a treatment site, effects such as increased risk of injury or mortality from trampling or crushing and behavioral disturbance from noise and human presence could occur. Smoke generated from prescribed fire could also interfere with foraging activities, but this would only affect adults that travel outside of occupied sites. The implementation of design features, conservation measures, and avoidance measures would make the potential for adverse effects so low as to be discountable. Therefore, prescribed fire treatments ***may affect but are not likely to adversely affect*** Carson wandering skippers.

Effects of Revegetation

Planting or reseeding fuel breaks with native forbs or perennial grasses would improve conditions of areas adjacent to skipper habitat by replacing nonnative plant species with native species. This could decrease competition for larval host species and nectar sources, thus potentially increasing habitat availability and habitat quality for skippers.

In some cases, such as in areas with existing invasive annual grass cover or degraded soils, nonnative plant materials could be used for revegetation, provided conditions in BLM Handbook H-1740-2 (BLM 2008, p.

87) were met. Because non-native, non-invasive plant species would only be used rarely and if they would not jeopardize the natural biodiversity of an area, there would be no risk of invasion of Carson wandering skipper habitat or competition with native nectar sources or host plants.

Revegetation treatments would not be applied within 5 mi of known Carson wandering skipper population sites at any time or year or within 10 mi of known sites during the adult flight season (Conservation Measures Carson Wandering Skipper 1 and 2), and the greasewood–saltgrass vegetation community and saltgrass meadows used by Carson wandering skippers would not be proposed for fuel break treatments. Therefore, there would be no adverse effects to Carson wandering skipper eggs, larva, pupa, or their habitat due to revegetation treatments. If an adult skipper were to travel beyond the 10 mi buffer around occupied sites into a treatment site, effects such as increased risk of injury or mortality from trampling or crushing and behavioral disturbance from noise and human presence could occur. This would result from the use of tools and human presence required to carry out revegetation treatments. However, adherence to design features, conservation measures, and avoidance measures would make the potential for adverse effects so low as to be discountable. For these reasons, revegetation ***may affect but is not likely to adversely affect*** Carson wandering skippers.

Effects of Targeted Grazing

Targeted grazing would not occur within 5 mi of known Carson wandering skipper population sites at any time or year or within 10 mi of known sites during the adult flight season (Conservation Measures Carson Wandering Skipper 1 and 2) or in the greasewood–saltgrass vegetation community and saltgrass meadows used by Carson wandering skippers. Therefore, no adverse effects to Carson wandering skipper eggs, larva, pupa, or their habitat would occur due to targeted grazing. If an adult skipper were to travel beyond the 10 mi buffer around occupied sites into a treatment site, there would be a chance that it could be trampled by livestock. The BLM would adhere to a targeted grazing plan that optimizes successful reduction of the target species, while avoiding damaging desired plants (Design Feature 21); therefore, targeted grazing outside of but near skipper habitat would not cause adverse effects to habitat such as erosion. The implementation of design features, conservation measures, and avoidance measures would make the potential for adverse effects so low as to be discountable. Therefore, targeted grazing treatments ***may affect but are not likely to adversely affect*** Carson wandering skippers.

Interrelated and Interdependent Effects

Interrelated and interdependent actions are those that would not occur if not for the proposed action. No interrelated or interdependent effects on Carson wandering skipper have been identified for the proposed action.

Cumulative Effects

The cumulative effects analysis area for ESA-listed wildlife species is the focused action area. Future state, tribal, local, or private actions that are reasonably likely to occur and have effects on Carson wandering skippers are those such as development that causes loss and degradation of habitat, water table declines, invasive and exotic species, wildfires, and climate change. These actions are described in more detail below, followed by the cumulative contribution from the proposed action.

The loss and modification of saltgrass and nectar source habitats continues to be the primary threat to the Carson wandering skipper in Nevada and California. Land acquisitions and transfers have helped protect some habitat. For example, a cooperative agreement between the USFWS, Nevada Department of Transportation, the Federal Highway Administration, and the BLM in October 1999 has provided some protection to the skipper on public lands; however, developing surrounding lands could still affect these lands via recreation or fragmentation. These impacts could prevent dispersal of skippers between nectar source areas.

Habitat that has been protected may be subject to future changes in hydrological condition, water table declines, and invasion by nonnative plants, as well as other conditions, such as inappropriate grazing levels, that result in decreased habitat suitability. All of the three known extant populations are on federal, state, or city public lands (USFWS 2016).

The noxious weed tall whitetop is a perennial plant native to Europe and Asia that grows in disturbed sites, wet areas, ditches, roadsides, and cropland. It could reduce the suitability of Carson wandering skipper habitat. Tall whitetop often occurs in dense patches that become near-monocultures (USFWS 2012a) and may compete with saltgrass and nectar plant communities (USFWS 2012a). This noxious weed threatens at least two Carson wandering skipper populations in Nevada. In addition, cheatgrass was found at over half of the 24 occupied sites at Honey Lake; this invasive annual grass can create a fire hazard in the areas it colonizes and may otherwise affect nectar sites (USFWS 2012a).

Wildfire itself can affect Carson wandering skippers and habitat by removing vegetation and interfering with skipper behavior. Smoke from fires may influence flight patterns and nectaring behavior if skippers mistake smoke for a cloudy day, which is when they appear to be less active (USFWS 2012a).

While there are concerns related to potential climate change effects, impacts on the Carson wandering skipper under predicted future climate change are unclear. A warming trend in the mountains of western North America is expected to decrease snowpack, hasten spring runoff, and reduce summer stream flows. Increased summer temperatures may increase the frequency and intensity of wildfires (IPCC 2014). It is uncertain how and when climate change will affect Carson wandering skippers, but effects might include changes in drought conditions, which could adversely affect larval host plants and adult nectar sources. Recent literature on climate change includes predictions of hydrological changes, higher temperatures, and expansion of drought areas, resulting in a northward and upward elevation shift in range for many species (IPCC 2014).

Implementing a large-scale water diversion project, such as the proposal to export water from Honey Lake Valley to the Lemmon and Spanish Springs Valleys, Washoe County, Nevada, could lower the water table in Honey Lake Valley. Reduced groundwater supply may cause adverse changes to the *Distichlis* community. The Honey Lake diversion project has since been constructed but is not operational due to the ongoing local decline in residential development (USFWS 2012a).

3.1.2 Columbia Basin Pygmy Rabbit

Listing Status and Recovery Plan

The USFWS listed the Columbia Basin Distinct Population Segment (DPS) of the pygmy rabbit as an endangered species under an emergency regulation in 2001 (USFWS 2001); the agency fully listed it as endangered without critical habitat in 2003 (USFWS 2003a). The determination that this population is a DPS was based on its isolation in the unusual ecological setting of the Columbia Basin, the significant gap in its range that the loss of this population segment would represent, and the population's markedly different genetic characteristics, compared with the remainder of the taxon (USFWS 2012b).

The USFWS issued a recovery plan for the Columbia Basin DPS in 2013 (USFWS 2012b). It outlines a phased approach for recovery planning, consisting of the following (USFWS 2012b):

- Removal or abatement of imminent threats to the population and the potentially suitable shrub steppe habitats in the Columbia Basin
- Reestablishment of an appropriate number and distribution of free-ranging subpopulations over the near term
- Establishment and protection of a sufficiently resilient, free-ranging population that would be expected to withstand foreseeable long-term threats

Critical habitat has not been proposed or designated for the Columbia Basin DPS pygmy rabbit.

Life History and Habitat Characteristics

The pygmy rabbit is a member of the family Leporidae, which includes hares and rabbits. It is the smallest leporid in North America, with mean adult weights from 0.83 to 1.1 pounds and lengths from 9.3 to 11.6 inches (USFWS 2012b).

Pygmy rabbits begin breeding the year following their birth, typically from January through June. Females can produce from one to four litters per year. Kits emerge from their burrows at roughly 2 weeks of age, and average litter sizes in captivity are roughly 3.5 kits at the time of emergence. Breeding in a given area appears to be highly synchronous (USFWS 2012b).

The annual mortality rate of adult pygmy rabbits may be as high as 88 percent, and over 50 percent of juveniles may die within roughly 5 weeks of their emergence; however, the mortality rates of adult and juvenile pygmy rabbits can vary considerably between years, and even between juvenile cohorts within years. Predation is generally the main cause of mortality, but starvation and environmental stress are also likely causes. Potential predators are fossorial and terrestrial mammals, as well as a variety of avian predators (USFWS 2012b).

Pygmy rabbit population cycles are unknown, but local, rapid population declines have been observed (USFWS 2012b). After declining, pygmy rabbit populations may not have the same capacity for rapid increases in numbers as other leporids, due to the relatively limited availability of their preferred habitats (USFWS 2012b).

Pygmy rabbits dig their own burrows, often in areas with relatively deep (greater than 20 inches) loose soils. They occasionally use natural cavities, holes in volcanic rock, rock piles, sand dunes, artificial structures, or burrows abandoned by other small mammals; therefore, they also occur in areas with shallower, more compact, or sandy soils that support sufficient shrub cover. These atypical burrow sites may facilitate dispersal behavior and function as corridors between suitable habitats. During winter, pygmy rabbits use snow burrows to access sagebrush forage and to provide thermal cover, typically remaining within 100 feet of their burrows (USFWS 2012b). Home ranges are larger in spring and summer—about 7 acres for females and 50 acres for males. In Idaho, median dispersal distances of 0.7 miles for males and 1.9 miles for females, respectively (USFWS 2012b).

Pygmy rabbits are highly dependent on sagebrush to provide both food and shelter throughout the year. They are typically found in areas that include the tallest (36 inches) and most dense (greater than 25 percent cover) sagebrush stands (USFWS 2012b).

Nearly the entire historical distribution of the Columbia Basin pygmy rabbit is in the big sagebrush (*Artemisia tridentata*)-bluebunch wheatgrass (*Agropyron spicatum*) zonal habitat type. It consists of four well-defined vegetation layers: a prominent shrub lay, primarily consisting of big sagebrush; a layer of perennial grasses, primarily containing bluebunch wheatgrass; a layer of low perennial and annual grasses and forbs; and a fourth layer of thin, fragile soil crust, with various lichen, moss, and liverwort species (USFWS 2012b).

Status and Distribution

Pygmy rabbits were historically distributed across much of the semiarid shrub steppe ecosystem of the Great Basin and adjacent intermountain regions of the western United States, including portions of Montana, Idaho, Wyoming, Utah, Nevada, California, Oregon, and Washington. Pygmy rabbits now occur in a variety of semiarid shrub steppe habitat types that are found throughout their historical distribution (USFWS 2012b).

Columbia Basin pygmy rabbits were thought to be extirpated from Washington during the mid-twentieth century, until a possible sighting was documented in Benton County in 1979. Since the mid-twentieth century, several populations have been found in southern Douglas and northern Grant Counties (USFWS 2012b); however, since their rediscovery, all known natural populations are thought to have been extirpated from the wild (USFWS 2012b). Subsequently, individuals were released into historically occupied habitat; the status of any reintroduced and existing subpopulations of pygmy rabbits in the Columbia Basin will be assessed by ongoing surveys and monitoring (USFWS 2012b).

Recovery emphasis areas (REAs) are areas that are actively managed to help conserve the Columbia Basin pygmy rabbit in the wild and represent areas where long-term recovery objectives may be attained. The USFWS has identified three REAs: Sagebrush Flats Wildlife Area, Beezley Hills, and the Burton Draw sites (USFWS 2012b). All the REAs are occupied habitat. Recovery areas (RAs) refer to the REA polygon plus a 5-mile buffer. The rationale for this is based on the Recovery Plan, which states "Other properties managed by TNC and Federal (i.e. BLM) lands within 5 miles of the recovery emphasis areas total approximately 7,000 acres in the broader Moses Coulee area and approximately 12,000 acres in the broader Beezley Hills area. Management of these other lands will be consistent with recovery efforts for the Columbia Basin pygmy rabbit to the extent feasible" (USFWS 2012b).

The acres and percent of Columbia Basin pygmy rabbit range and habitat types on the action area and focused action area are shown in **Table 3-2**; a map of the habitats in the action area and focused action area is shown in **Figure A-9**.

Threats

Large-scale loss and fragmentation of native shrub-steppe habitats, primarily for agricultural development, likely played a primary role in the long-term decline of the Columbia Basin pygmy rabbit. At the time of its emergency listing in 2001, the Columbia Basin pygmy rabbit was imminently threatened by its small population size, loss of genetic diversity, inbreeding depression, and the lack of suitable protected habitats. All of these factors continue to affect the species to varying degrees (USFWS 2012b).

Table 3-2
Columbia Basin Pygmy Rabbit Habitat Types and Range in the Action Area and Focused Action Area

Habitat Type/Range	Total Acres Range-wide	Acres in Action Area	Percent in Action Area	Acres in Focused Action Area	Percent in Focused Action Area
Potentially occupied	209,571	2,996	1	2,417	1
Occupied	5,587	0	0	0	0
Recovery emphasis area	11,591	0.1	<1	0	0
Recovery area[1]	279,097	2,999	1	2,442	1
Range	7,625,487	61,924	1	53,248	1

Sources: USFS GIS 2018; USFWS BLM GIS 2018
[1]Refers to the REA polygon plus a 5-mile buffer

Effects Analysis and Determinations

Design features from the PEIS that would reduce impacts to Columbia Basin pygmy rabbits are as follows:

- Design Feature 23—Manage targeted grazing to conserve suitable habitat conditions for special status species, while implementing rangeland health standards and guidelines (BLM 2014).
- Design Feature 42— If special status plant or animal populations or potential habitats occur in a proposed treatment area, a qualified biologist will assess the area for habitat suitability and balance need for treatment with the habitat needs of special status wildlife and plant species. Conduct appropriately timed surveys within suitable or potential habitats for federally listed, proposed, and BLM special status species prior to treatment. For plant species, appropriate timing may vary by species but is directly related to phenological stages (for example flowering or fruiting stages) that provide confidence in identification. Federally listed species with the potential to occur in the project area and the current BLM special status species list are found in the PEIS, Appendix J.
- Design Feature 43— Implement restrictions and conservation strategies for special status species, including federally listed, proposed, candidate, and BLM sensitive species, as contained in approved recovery and conservation plans, cooperative agreements, and other instruments in whose development the BLM has participated. If none are available, coordinate with the USFWS and/or state wildlife agencies to develop appropriate restrictions.
- Design Feature 55—Surveys would take place in potential known pygmy rabbit habitats (non-listed populations). Select fuel break routes with the least density of active burrows.

In addition, to avoid or minimize potential effects on the pygmy rabbit from the proposed treatments, the BLM would be required to implement the following conservation measures:

- Conservation Measure Pygmy Rabbit 1—Survey all potential Columbia Basin pygmy rabbit habitat in areas considered for fuel break routes. Surveys will follow state survey protocols for establishing presence of pygmy rabbits and will be coordinated with the Washington Department of Fish and Wildlife (WDFW). No fuel breaks will be located within Recovery Areas (REAs plus a 5-mile buffer). Surveys will be conducted by a qualified biologist.
- Conservation Measure Pygmy Rabbit 2—Use of prescribed fire would not occur within 1 mile of RAs or occupied pygmy rabbit habitat outside of RAs.

- Conservation Measure Pygmy Rabbit 3—Do not create fuel breaks within Columbia Basin pygmy rabbit Recovery Areas (REA buffered by 5 mi)
- Conservation Measure Pygmy Rabbit 4—Have a qualified biologist conduct pre-treatment surveys for burrows within 14 days of treatment within potentially occupied habitat and in the range of Columbia Basin pygmy rabbits. If a burrow is discovered, an avoidance buffer of 1 mile will be established around the burrow.
- Conservation Measure Pygmy Rabbit 5—Solicit and consider expertise and ideas from local landowners, working groups, and other federal, state, county, and private organizations during development of fuel break projects
- Conservation Measure Pygmy Rabbit 6—Where applicable, incorporate roads and natural fuel breaks into fuel break design to minimize loss of or impacts on shrub steppe habitat
- Conservation Measure Pygmy Rabbit 7—Incorporate key habitats or important restoration areas (such as where investments in habitat restoration have already been made or protection of the Columbia Basin pygmy rabbit Recovery Emphasis Area) into fuel break project design
- Conservation Measure Pygmy Rabbit 8—Where applicable, design fuel break treatment objectives to protect sagebrush ecosystems, modify fire behavior, restore/maintain native plants, and create landscape patterns that most benefit pygmy rabbits
- Conservation Measure Pygmy Rabbit 9—Protect pygmy rabbit RAs, restoration areas, and previously restored areas by strategically placing and maintaining treated strips/areas by mowing and herbicide treatments
- Conservation Measure Pygmy Rabbit 10—Do not create fuel breaks within 1 mile of occupied burrows
- Conservation Measure Pygmy Rabbit 11—Locate on-site work/project camps and staging areas 0.25 miles away from REAs and occupied burrows. Establish a temporary "no entry" zone to protect rabbits from human disturbance. Do not allow dogs in the camps. Monitor workers on-site to keep them out of occupied habitat
- Conservation Measure Pygmy Rabbit 12—Power wash all vehicles and equipment, including dozers, discs, engines, water tenders, personnel vehicles, and all-terrain vehicles (ATVs) before deploying them in or near pygmy rabbit habitat areas, to minimize spread of noxious weeds
- Conservation Measure Pygmy Rabbit 13—Use vegetation management prescriptions in fuel breaks that minimize undesirable effects on vegetation or soils; for example. minimize destruction of desirable perennial plant species and reduce risk of annual grass invasion by retaining biological crusts
- Conservation Measure Pygmy Rabbit 14—In restoration projects, emphasize the use of native plant species
- Conservation Measure Pygmy Rabbit 15—Use post-treatment control of annual grass and other invasive species

The BLM would also adhere to conservation measures adapted from the BA for the Vegetation Treatments on Bureau of Land Management Lands in 17 Western States Programmatic Environmental Impact Statement (BLM 2005, 2007). These are as follows (Conservation Measure Pygmy Rabbit 16):

- Address pygmy rabbits in all management plans prepared for treatments within the range of the species' historical habitat

- Do not burn, graze, or conduct mechanical treatments within 1 mile of occupied Columbia Basin pygmy rabbit habitat
- Do not use 2,4-D, diquat, or diuron in occupied pygmy rabbit habitats; do not broadcast-spray these herbicides within a quarter-mile of occupied Columbia Basin pygmy rabbit habitat
- Where feasible, avoid use of the following herbicides in occupied pygmy rabbit habitat: bromacil, clopyralid, fluoridone, glyphosate, hexazinone, imazapyr, metsulfuron methyl, picloram, tebuthiuron, and triclopyr
- Where feasible, spot treat vegetation in occupied Columbia Basin pygmy rabbit habitat, rather than broadcast-spraying
- Do not broadcast-spray clopyralid, glyphosate, hexazinone, picloram, or triclopyr in occupied Columbia Basin pygmy rabbit habitat; do not broadcast-spray these herbicides within 0.25 miles of occupied habitat
- If broadcast-spraying bromacil, imazapyr, fluoridone, metsulfuron methyl, or tebuthiuron in or within 0.25 mi of occupied Columbia Basin pygmy rabbit habitat, apply at the typical, rather than the maximum, rate
- If conducting manual spot applications of bromacil, glyphosate, hexazinone, tebuthiuron, or triclopyr to vegetation in occupied Columbia Basin pygmy rabbit habitat, use the typical, rather than the maximum, application rate

General Effects

The focused action area overlaps approximately 1 percent (53,248 acres) of the Columbia Basin pygmy rabbit's total range and 1 percent (2,417 acres) of total potentially occupied habitat (**Table 3-2**, **Figure A-9**). The acres represent the area (buffered by a half mile) that would be available for fuel break creation and maintenance in the Columbia Basin pygmy rabbit's range and habitats; not all of these acres would be affected, because only 667,000 acres of fuel breaks would be constructed under the proposed action and they would be spread out across the entire project area. Although the focused action area overlaps 1 percent (2,442 acres) of RAs, no fuel breaks would be constructed within RAs (REAs plus 5-mile buffer; Conservation Measure Pygmy Rabbit 1), so no effects to pygmy rabbits or their habitat would occur in these areas. Additionally, the focused action area does overlap any occupied habitat, and no fuel breaks would be created within 1 mile of occupied burrows.

Although no treatments would occur in occupied habitat, REAs, or RAs, and occupied burrows would be buffered, there would be a small chance that a pygmy rabbit could travel into a treatment area. This would only apply to rabbits residing in newly discovered or undiscovered burrows within 1 percent of the Columbia Basin pygmy rabbit's range and 1 percent of potentially occupied habitat. If a rabbit were to enter a treatment area, it could experience direct effects associated with human presence and the use of tools. Disturbances from treatment activities could have temporary behavioral effects on pygmy rabbits and interfere with foraging or movement (USFWS 2012b). There would be a small chance that a rabbit could be injured or killed from trampling. However, given the small proportion of range and potentially occupied habitat in the focused action area in addition to conservation measures that would require surveys and buffers around occupied burrows, it is unlikely that any individuals would be present in treatment areas. Therefore, the potential for these effects would be so low as to be discountable.

If the case that pretreatment surveys fail to detect an occupied burrow, humans and vehicles may cause damage to undetected burrows (USFWS 2012b), which could injure or kill animals inside. The focused action area does not overlap occupied habitat or REAs and no treatments would occur in RAs; furthermore, potential habitat would be surveyed and all newly discovered or known occupied burrows would be buffered from treatments. Therefore, only undiscovered burrows, which would likely be a very small percent of all burrows, would be at risk of damage.

Pygmy rabbits are highly dependent on sagebrush for food and cover throughout the year (USFWS 2013d); therefore, any treatment that removes vegetation from pygmy rabbit habitat is likely to have adverse indirect effects on the species. Removing dense sagebrush stands would have the greatest effect on pygmy rabbits, but removing sagebrush stands in marginal condition could also have adverse effects. This is because these stands may act as dispersal corridors for the species. Conservation measures would require use of vegetation management prescriptions in fuel breaks that minimize undesirable effects on vegetation or soils. Following these measures would ensure that vegetation thinning associated with fuel break construction would not reduce the suitability of surrounding pygmy rabbit habitat and burrows, and there would be no adverse effects from habitat alterations.

Given the small size of the pygmy rabbit population, a single wildfire could extirpate the species if it were to burn through occupied habitat. The species' recovery plan cites fire management as a recovery action (Action 5.2.2) to help reduce the risk of catastrophic loss of important shrub steppe habitat, which is a major threat to the species (USFWS 2012db). When appropriately located, therefore, fuel breaks can aid in pygmy rabbit recovery.

Fuel breaks would improve wildfire suppression opportunities by providing anchor points for wildland fire suppression, helping to decrease the spread of wildfire. Establishing fuel breaks in and around unoccupied pygmy rabbit habitat would likely have a long-term, benefit for the species by potentially reducing wildfire spread, thereby decreasing the potential for direct mortality from wildfires. In addition, pygmy rabbits cannot occupy frequently burned sites due to their reliance on tall, dense stands of sagebrush and associated shrub steppe vegetation, and they tend to avoid areas with dense cover of cheatgrass (USFWS 2013d). Since invasive annual grasses often recolonize burned areas, reduced wildfire spread would decrease the chance for the establishment of non-native vegetation. Because of this, fuel breaks would also benefit the DPS by maintaining habitat availability over the long term and decreasing the spread of invasive grasses, which make habitat unsuitable for pygmy rabbits (USFWS 2013d).

The USFWS recommends strategically placing and maintaining pretreated strips and areas to aid in controlling wildfire, should wildfire occur near priority restoration areas or REAs. Fuel breaks currently exist in the Sagebrush Flats and Dormaier REAs and new fuel breaks could be created outside of RAs. Reducing the potential for wildfire in these areas would contribute to recovery objectives that extend beyond 10 years.

Design Feature 43 requires implementation of restrictions and conservation strategies for federally listed species, as contained in approved recovery and conservation plans. The Recovery Plan for the Columbia Basin DPS of the Pygmy Rabbit (*Brachylagus idahoensis*) (USFWS 2013d) outlines several actions to help achieve recovery goals for the species. Action 4 includes several elements to protect free-ranging Columbia Basin pygmy rabbits from the effects of human activities, and Action 5 focuses on habitat protection (USFWS 2013d). Adhering to these actions during project implementation would minimize the potential for adverse impacts on pygmy rabbits from project activities and would increase the opportunity for long-term benefits, such as habitat protection.

Effects of Chemical Treatments

No chemical treatments would occur within RAs because no fuel breaks will be located within RAs (Conservation Measure Pygmy Rabbit 1) or 1 mile from occupied pygmy rabbit habitat (Conservation Measure Pygmy Rabbit 4). Although it is unlikely that pygmy rabbits would be present in treatment areas, it is possible that some animals would be unintentionally exposed to chemicals. This could happen if an individual were to travel into a treatment area, where it could come in contact with or consume sprayed foliage after the application. If exposed, they could experience adverse health effects, such as sickness. However, adverse effects would likely be insignificant because use of herbicides known to be harmful to pygmy rabbits would be avoided in their occupied habitat.

Use of chemical treatments could also cause temporary adverse effects on habitat, such as the removal of vegetation and reduction in food items; however, it is unlikely that chemical treatments would be conducted in occupied pygmy rabbit habitat. This is because the treatments would mainly be used to clear the seedbed before reseeding in areas with nonnative grass cover and would not target the native grasses and forbs consumed by pygmy rabbits. Potential treatment sites would be surveyed before treatments and should any pygmy rabbit burrows be present near proposed treatment areas, buffers would be applied around the burrows, as mandated by design features and conservation measures.

Effects of chemical treatments are further described in BA for Vegetation Treatments on Bureau of Land Management Lands in 17 Western States (BLM 2005), the Vegetation Treatments Using Herbicides on Bureau of Land Management Lands in 17 Western States Programmatic Environmental Impact Statement (BLM 2007), and the Final PEIS for Vegetation Treatments Using Aminopyralid, Fluroxypyr, and Rimsulfuron on BLM Lands in 17 Western States (BLM 2016). Potential impacts would be reduced through the implementation of SOPs and conservation measures described in these documents (Conservation Measure Pygmy Rabbit 16).

Because of the small chance of chemical treatments occurring in pygmy rabbit habitat, and the small probability of exposure, the risk of adverse effects would be discountable. If exposure were to occur, the implementation of design features and conservation measures would make effects insignificant. Therefore, the BLM determines that chemical treatments ***may affect but are not likely to adversely affect*** Columbia Basin pygmy rabbits.

Effects of Manual Treatments

No manual treatments would occur within RAs (Conservation Measure Pygmy Rabbit 1) or 1 mile from occupied pygmy rabbit habitat (Conservation Measure Pygmy Rabbit 4). If a pygmy rabbit were to travel into a treatment area, it could experience disturbances from human presence and the use of hand tools and hand-operated power tools to cut, clear, or prune herbaceous and woody species. As described under *General Effects*, disturbances could temporarily interfere with foraging activities and movement. This would only apply to rabbits residing in newly discovered or undiscovered burrows within 1 percent of potentially occupied habitat.

With the implementation of design features and conservation measures, the risk of adverse effects to pygmy rabbits would be discountable. Therefore, the BLM determines that manual treatments ***may affect but are not likely to adversely affect*** Columbia Basin pygmy rabbits.

Effects of Mechanical Treatments

No mechanical treatments would occur within RAs (Conservation Measure Pygmy Rabbit 1) or 1 mile from occupied pygmy rabbit habitat (Conservation Measure Pygmy Rabbit 4). If a pygmy rabbit were to travel into a treatment area, it would experience increased risk of injury or mortality from the use of heavy equipment, such as agricultural mowers, masticators, and seedbed preparation equipment. Audial and visual disturbance from heavy equipment could also interfere with foraging activities. Effects would only apply to rabbits residing in newly discovered or undiscovered burrows within 1 percent of potentially occupied habitat.

Chances of encounters would be further reduced by surveying in Columbia Basin pygmy rabbit habitats (Conservation Measure Pygmy Rabbit 1) and avoiding fuel break creation within 1 mile of occupied burrows (Conservation Measure Pygmy Rabbit 4).

The use of mechanical equipment in unoccupied and unsurveyed pygmy rabbit habitat could have long-term impacts on habitat from compaction. Vehicles and other heavy equipment could cause widespread damage to undetected pygmy rabbit burrows, which are relatively shallow and may collapse even under the weight of a human or a large animal (USFWS 2001). Only undiscovered burrows, which would likely be a very small percent of all burrows, would be at risk of damage.

Conservation measures would require use of vegetation management prescriptions in fuel breaks that minimize undesirable effects on vegetation or soils within pygmy rabbit habitat. Following these measures would ensure that soil compaction and disturbance from heavy equipment would not reduce the suitability of pygmy rabbit habitat surrounding burrows and there would be no adverse effects from habitat alterations.

With the implementation of design features and conservation measures, the risk of adverse effects to pygmy rabbits would be discountable. Therefore, the BLM determines that mechanical treatments ***may affect but are not likely to adversely affect*** Columbia Basin pygmy rabbits.

Effects of Prescribed Fire

Use of prescribed fire would not occur within 1 mile of RAs or occupied pygmy rabbit habitat outside of RAs (Conservation Measure Pygmy Rabbit 2). If a pygmy rabbit were to travel into a treatment area, it would experience risk of injury from prescribed fires. However, the risk would be low and would only apply to rabbits that travel out of buffers around newly discovered burrows or those residing in undiscovered burrows within 1 percent of potentially occupied habitat.

Prescribed fire would not adversely affect pygmy rabbit habitat because conservation measures would prohibit use of prescribed fire within 1 mile of RAs and occupied burrows and would require vegetation management prescriptions in fuel breaks that minimize undesirable effects on vegetation or soils. Burns would be contained within fuel breaks, and follow-up chemical treatments or seeding would prevent invasive annual grasses from dominating treatment areas, thereby conserving suitable habitat. These measures would ensure that the suitability of habitat surrounding burrows is not reduced and would indirectly conserve dispersal habitat.

By implementing design features and conservation measures, the risk of adverse effects to pygmy rabbits would be discountable. Therefore, the BLM determines that prescribed fire treatments ***may affect but are not likely to adversely affect*** Columbia Basin pygmy rabbits.

Effects of Revegetation

No revegetation treatments would occur within RAs (Conservation Measure Pygmy Rabbit 1), and newly discovered occupied burrows would be buffered by 1 mile (Conservation Measure Pygmy Rabbit 4). Direct effects from revegetation treatments on pygmy rabbits would only apply to rabbits residing in newly discovered or undiscovered burrows within 1 percent of potentially occupied habitat. Effects would be due to the use of treatment tools and methods; these impacts would be as described under the treatment-specific sections above.

Overall, revegetation would have long-term benefits to pygmy rabbits by improving habitat. Treatments that reduce the presence of nonnative species, such as seeding perennial plant species for fuel break construction, would be expected to improve pygmy rabbit habitats. This is because pygmy rabbits avoid areas with dense cheatgrass cover (USFWS 2012b). As pygmy rabbits are unlikely to be present in areas with a high coverage of nonnative species, treatments that restore these areas to more native conditions could improve the availability of habitat for future occupation by pygmy rabbits; however, regular maintenance may still limit the suitability of these areas.

Due to the implementation of design features and conservation measures, the risk of adverse effects to pygmy rabbits would be discountable. Therefore, the BLM determines that revegetation treatments ***may affect but are not likely to adversely affect*** Columbia Basin pygmy rabbits.

Effects of Targeted Grazing

Injury or mortality of pygmy rabbits due to trampling by livestock or damage to burrows would be unlikely because targeted grazing would not occur within RAs (Conservation Measure Pygmy Rabbit 1) or 1 mile of occupied burrows (Conservation Measure Pygmy Rabbit 4). The presence of livestock could interfere with movement and behavioral patterns of individuals that travel outside the buffer into treatment areas. Only undiscovered burrows and individuals that travel into treatment areas would be subject to trampling. This would likely be only a few individuals and a small percent of all burrows.

Targeted grazing would be managed to conserve suitable habitat conditions (Design Feature 23), so the quantity and nutritional quality of forage species in grazed areas would remain adequate (USFWS 2013d). Furthermore, it is unlikely that targeted grazing would be used in areas with heavy shrub cover, which provide suitable habitat for pygmy rabbits. Vegetation within 1 mile of known burrows would remain unaltered.

With the application of design features and conservation measures, targeted grazing treatments ***may affect but are not likely to adversely affect*** Columbia Basin pygmy rabbits.

Interrelated and Interdependent Effects

Interrelated and interdependent actions are those that would not occur if not for the proposed action. The BLM has identified no interrelated or interdependent effects on Columbia Basin pygmy rabbits from the proposed action.

Cumulative Effects

The cumulative effects analysis area for ESA-listed wildlife species is the focused action area. The cumulative effects assessment considers the potential for effects on Columbia Basin pygmy rabbits from future uses and activities on state and private lands that are reasonably certain to occur in this area. Cumulative impacts would arise from actions that reduce the availability and suitability of pygmy rabbit habitat. These include altered fire frequencies, establishment of invasive plant species, recreation, and livestock grazing.

Fire frequency has increased over portions of the shrub-steppe habitats in the Columbia Basin. This has been a result of various influences, including the establishment of invasive plant species, unimproved road access, and certain recreation activities. Due to their reliance on tall, dense stands of sagebrush and associated shrub-steppe vegetation, Columbia Basin pygmy rabbits cannot occupy frequently burned sites. Various nonnative, invasive plant species, such as cheatgrass and knapweed (*Centaurea* spp.) have become well established throughout the Columbia Basin (USFWS 2013d). Combined with widespread unimproved road access and informal recreation that can provide multiple sources of ignition, the establishment of nonnative, invasive plant species increases the risk of fire. It also reduces the security and suitability of areas that could support the Columbia Basin pygmy rabbit (USFWS 2013d).

Potential future invasive species and fire management plans will help to reduce impacts from wildfire. The Columbia Basin pygmy rabbit recovery plan recommends fire management as a recovery action, so it is expected that other fire management or fuel break programs will be implemented.

Ongoing permitted livestock grazing will contribute to cumulative impacts through disturbance, trampling of burrows or individuals, and vegetation reduction. Likewise, recreation in the area contributes to disturbance and habitat alterations. It is possible that human-altered densities and distributions or behaviors of other native or introduced species may also contribute to adverse cumulative impacts on pygmy rabbits. For example, range management measures for deer (*Odocoileus* spp.) could concentrate their habitat use patterns, and providing water sources for various game bird species could indirectly affect predator densities (USFWS 2013d).

Other factors that may contribute to cumulative impacts are accidental shooting, disease, predation, and extreme environmental events, such as severe storms or wildfire (USFWS 2013d). As the population's extremely small size makes it highly susceptible to random events, mortality from these threats may threaten the species' existence.

3.1.3 Gray Wolf

Listing Status and Recovery Plan

Gray wolves were originally listed as subspecies or as regional populations of subspecies in the contiguous US and Mexico. In 1978, the USFWS reclassified the gray wolf as an endangered species under the ESA throughout the contiguous US and Mexico, except for the Minnesota gray wolf population, which was classified as threatened. The 1978 rule also designated critical habitat in Michigan and Minnesota and stipulated that subspecies would be managed as separate entities (USFWS 1978a). Recovery plans exist for the wolf populations in the northern Rocky Mountains, the Great Lakes, and the Southwest (USFWS 2018a). Three experimental populations, Yellowstone Experimental Population Area, Central Idaho Experimental Population Area, and the Mexican Wolf Experimental Population, have since been added. There is no nationwide recovery plan.

Gray wolf populations in the northern Rocky Mountains were identified as a DPS and, with the exception of Wyoming, were delisted due to recovery in 2011. On April 26, 2017, the US Court of Appeals issued a final mandate delisting the wolf in Wyoming (USFWS 2017a). In 2012, the USFWS identified what was previously listed as the Minnesota population of the gray wolf as the Western Great Lakes DPS (including all of Minnesota, Wisconsin, and Michigan and portions of the adjacent states) and removed that DPS from listing under the ESA. This action became effective in January 2012 (USFWS 2012b).

Currently, the gray wolf is listed as an endangered species in 39 states statewide and portions of Arizona, New Mexico, Oregon, Utah, and Washington. This BA focuses only on listed populations that occur within the action area, i.e., the Great Basin portions of California, Nevada, Oregon, Utah, and Washington. The population in Idaho is part of the Northern Rocky Mountains DPS, which has been delisted. For populations in Oregon, Utah, and Washington, the gray wolf is listed only in the following portions of the states (USFWS 2018a):

- Western Oregon, west of the centerline of Highway 395 and Highway 78, north of Burns Junction, and the portion west of the centerline of Highway 95 south of Burns Junction
- Most of Utah, south and west of the centerline of Highway 84 and the portion south of Highway 80 from Echo to the Utah/Wyoming Stateline
- Western Washington, west of the centerline of Highway 97 and Highway 17 north of Mesa and the portion west of the centerline of Highway 395 south of Mesa

As of March 15, 2019, the USFWS has proposed to delist the gray wolf remove the gray wolf from the List of Endangered and Threatened Wildlife. If finalized, this decision would remove the gray wolf from ESA protections (USFWS 2019).

Critical habitat has not been designated or proposed for gray wolf DPSs considered in this BA.

Life History and Habitat Characteristics

Most gray wolves are highly gregarious and live in packs with complex social structures. Packs are usually comprised of a breeding pair and their offspring of the previous 1 to 3 years, or occasionally two or three such families. Wolf packs defend their territories from other wolves. Territory size is a function of prey density and can range from 25 to 1,500 square miles. Wolves have been known to disperse over 600 miles (USFWS 2018a).

Wolves mate from January to April, depending on latitude. Within a pack, the dominant pair are typically the only individuals to breed. Young are born in the spring after a 62 to 63 day gestation period. Litter size averages 6 pups, but ranges from 1 to 11 and may be correlated with the carrying capacity of the environment (UDWR 2005). Pups normally stay with the pack until they are over a year old (USFWS 2018a).

Population dynamics are driven by habitat limitations and environmental variations that cause fluctuations in reproduction, dispersal, age structure, social systems, and genetics. Natural causes of mortality in wolf populations are starvation, disease, interspecific conflicts, and accidents (UDWR 2005).

Wolves are able to disperse long distances. They opportunistically forage on a variety of prey species and thus are capable of using a variety of habitats. In general, they require an abundance of natural prey (ungulates), suitable and somewhat secluded denning and rendezvous sites, and sufficient space with minimal exposure to humans (USFWS 1987). Habitat preferences by wolves appear to depend more on the availability of desired prey than on cover type. Although wolves are considered habitat generalists as a species, populations can be highly adapted to local conditions in relation to prey selection, den site use, foraging habitat, and physiography (UDWR 2005). General key characteristics of wolf habitat types are wolf denning sites for reproduction, ungulate habitat and populations for prey, wolf rendezvous sites for resting and gathering, riparian habitat for beaver prey, cover secure from human disturbance, and large spaces, but specific features vary between region (USFWS 1987).

Status and Distribution

Gray wolves were abundant in Washington and Oregon at the time of Euro-American settlement, but they were extirpated soon after the 1940s due to intense human persecution. The adaptability of wolves and early first-hand accounts of wolves in California suggest that they likely occurred in northern California, the Sierra Nevada, and southern California mountains. In Nevada, wolves may have always been scarce, but probably occurred in the forested regions of the state. There have been no confirmed reports of wolves in Nevada since their extirpation, which likely occurred in the 1940s (USFWS 2012b). Wolves were historically found throughout Utah, except the Great Salt Lake Desert, but government sponsored extermination of wolves led to their extirpation in 1930 (UDWR 2005). In 2002, verified wolf occurrences were documented in Utah for the first time since their extirpation (UDWR 2005).

Wolves have recently begun to recolonize the Pacific Northwest as a result of dispersal from British Columbia and reintroduced wolves in the northern Rocky Mountains (USFWS 2012b). Surveys in Oregon have documented a statewide minimum of 137 wolves, including 16 packs and 15 breeding pairs (ODFW 2019). In Washington, the wolf population has increased every year since 2008, to a minimum total of 126 in 2018, with 27 packs state-wide and 5 in the listed portion of the state (WDFW & UWWG 2018). Two gray wolf packs, the Shasta pack and the Lassen pack, have been established in the northern part of California since the extirpation of gray wolves in California in the 1920s (Kovacs 2016). Most forested, mountainous habitat in Utah has the potential to support wolves (UDWR 2002); although several sightings have been confirmed, there are no known established packs in the state (UDWR 2019). The first wolf sighting in Nevada in nearly over a century was confirmed in 2017 (Wildlife Society 2017).

The acres and percent of the listed gray wolf population's range as well as known packs/territories in the action are and focused action area are shown in **Table 3-3** and **Figure A-10**.

Table 3-3
Gray Wolf Range in the Action Area and Focused Action Area (Listed Population Only)

Range	Total Acres Range-wide	Acres in Action Area	Percent in Action Area	Acres in Focused Action Area	Percent in Focused Action Area
Range	149,608,433	1,276,710	1	702,753	<1
Packs/Territories	33,709,557	685,117	2	480,801	1

Source: USFWS BLM GIS 2018

Threats

Most wolf populations face significant human-related mortality factors, including harvest, poaching, vehicle collision, and introduced disease, such as parvovirus (UDWS 2005). Humans often kill wolves in response to livestock losses, and they are commonly targeted by hunters in areas where they are not protected under the ESA. Human encroachment into wolf habitat leads to habitat fragmentation and impedes expansion into areas of suitable habitat (DOW 2018).

Effects Analysis and Determinations

Conservation Measure Gray Wolf 1 is: Vegetation treatments would be designed and implemented to minimize noise disturbance or habitat modifications within one mile of wolf dens or rendezvous sites from March 15 until the June 30.

Design features from the PEIS that would reduce impacts to gray wolves are as follows:

- Design Feature 23—Manage targeted grazing to conserve suitable habitat conditions for special status species, while implementing rangeland health standards and guidelines (BLM 2014).
- Design Feature 42— If special status plant or animal populations or potential habitats occur in a proposed treatment area, a qualified biologist will assess the area for habitat suitability and balance need for treatment with the habitat needs of special status wildlife and plant species. Conduct appropriately timed surveys within suitable or potential habitats for federally listed, proposed, and BLM special status species prior to treatment. For plant species, appropriate timing may vary by species but is directly related to phenological stages (for example flowering or fruiting stages) that provide confidence in identification. Federally listed species with the potential to occur in the project area and the current BLM special status species list are found in the PEIS, Appendix J.
- Design Feature 43— Implement restrictions and conservation strategies for special status species, including federally listed, proposed, candidate, and BLM sensitive species, as contained in approved recovery and conservation plans, cooperative agreements, and other instruments in whose development the BLM has participated. If none are available, coordinate with the USFWS and/or state wildlife agencies to develop appropriate restrictions.

Conservation Measures

The BLM would also follow additional conservation measures specific to wolves adapted from the Vegetation Treatments BA (BLM 2005); they are listed below (Conservation Measure Gray Wolf 2).

- Avoid human disturbance or associated activities within 1 mile of a den site during the breeding period (as determined by a qualified biologist or by know den site information from state agencies and USFWS)
- Avoid human disturbance or associated activities within 1 mile of a rendezvous site during the breeding period (as determined by a qualified biologist or by know den site information from state agencies and USFWS)
- Do not use 2,4-D in dens and rendezvous sites; do not broadcast-spray within a quarter-mile of dens and rendezvous sites
- Where feasible, avoid use of the following herbicides in dens and rendezvous sites: bromacil, clopyralid, diquat, diuron, glyphosate, hexazinone, imazapyr, metsulfuron methyl, picloram, and triclopyr
- Do not broadcast-spray clopyralid, diuron, glyphosate, hexazinone, picloram, or triclopyr in dens and rendezvous sites; do not broadcast-spray these herbicides next to dens and rendezvous sites under conditions when spray drift into the habitat is likely

- If broadcast-spraying bromacil, diquat, imazapyr, or metsulfuron methyl in or near dens and rendezvous sites, apply at the typical, rather than the maximum rate
- If conducting manual spot applications of glyphosate, hexazinone, or triclopyr to vegetation in dens and rendezvous sites, use the typical, rather than the maximum, application rate

General Effects

The focused action area overlaps approximately 702,753 acres or <1 percent of the total listed gray wolf range and 480,801 acres or 1 percent of known packs/territories (**Table 3-3**, **Figure A-10**). The acres presented represent the area that would be available for fuel break creation and maintenance within the gray wolf's range within a half-mile buffer. Not all of these acres would be affected, because only 667,000 acres of fuel breaks would be constructed under the proposed action.

Because wolves are highly mobile, treatment activities are not expected to directly cause their injury or mortality. Wolves require minimal exposure to humans (USFWS 1987). If treatments encroach on wolf habitat, human presence, vehicles, and the use of tools associated with treatment activities would disturb wolves and may cause them to avoid these areas. Although some wolves may have adapted to use roads or other linear features for ease of travel and hunting, they exhibit a cryptic behavior to avoid human encounters (Zimmerman et al. 2014). Increased human presence during fuel break construction and maintenance along roads, ROWs, and primitive roads may temporarily interfere with wolves' ability to access prey and travel.

Wolves are particularly sensitive to human activity near den sites and may abandon them if disturbed (USFWS 1987). They are also sensitive to prolonged or substantial human disturbances at the initial rendezvous site (USFWS 1987). Disturbances to wolves in these sensitive sites would be avoided because treatments would minimize noise disturbance or habitat modifications within a mile of wolf dens or rendezvous sites from March 15 until the June 30 (Conservation Measure Gray Wolf 1).

Human presence, vehicles, and the use of tools associated with treatment would cause disturbances that may lead to behavioral alterations to prey species, such as fleeing or habitat avoidance. This could interfere with wolves' ability to find and hunt prey, which they might otherwise encounter along linear features (Zimmerman et al. 2014).

Because project activities would be temporary and <1 percent of the gray wolf's range and 1 percent of known packs/territories fall within the focused action area, disturbances to gray wolves and their prey would not be of a magnitude that would interfere with a wolf's ability to complete life history phases. If a wolf or its prey did avoid a particular area due to project activities, it would be a temporary and small inconvenience; the wolf would have a large area of undisturbed habitat to retreat to and other opportunities to encounter prey.

Although fuel break treatment methods would result in some modification of wolf habitat, changes in the habitats of prey species are more important in terms of effects on wolves. This is because wolf habitat selection appears to depend more on prey availability than cover. Since some prey species prefer open habitat and others prefer dense habitat, fuel break treatments would benefit some species, while adversely affecting others. Direct habitat alterations would be limited to the footprint of the fuel break, which would be relatively small, considering the wolf's large range and dispersal ability.

Over the long term, fuel breaks would indirectly improve fire suppression opportunities and reduce the risk of future wildfire spread. This could protect habitat for wolves and their prey from loss due to wildfire. In addition, reduced risk of nonnative annual grass invasions, which are typically promoted by wildfires, would help conserve native plant communities in wolf habitats. This could increase the diversity of forage for prey and ultimately increase food sources for wolves.

Effects of Chemical Treatments

Because wolves would likely avoid treatment sites and those applying herbicide would be able to avoid them, there is no chance that wolves would be directly exposed to herbicides (BLM 2005). However, wolves could be adversely affected following an herbicide treatment from dermal contact with foliage treated with 2,4-D at the typical application rate or with glyphosate, hexazinone, or triclopyr at the maximum application rate (see BLM 2005, Vegetation Treatments BA, Table 6-2).

It is unlikely that the prey items of wolves would themselves be directly exposed to herbicides during chemical treatments, so it is improbable that wolves would be indirectly exposed to herbicides via prey; however, adverse health effects could occur if a wolf consumed prey that had been sprayed by 2,4-D or diuron at the typical application rate or by bromacil, diquat, or triclopyr at the maximum application rate. The potential for adverse effects on wolves from exposure to hexazinone via ingestion of contaminated prey cannot be determined (BLM 2005).

Because conservation measures stipulate that use of herbicides that could be harmful to gray wolves be avoided in gray wolf habitat, adverse effect to wolves from indirect contact or ingestion of herbicides would only occur if a wolf were present outside its typical habitat or if a prey species were to travel from outside wolf habitat into wolf habitat. Similarly, contact with herbicides via drift would be unlikely because herbicides harmful to wolves would not be broadcast next to gray wolf habitat under conditions when spray drift into the habitat is likely to occur.

Effects of chemical treatments are further described in the Vegetation Treatments Using Herbicides on Bureau of Land Management Lands in 17 Western States Programmatic Environmental Impact Statement (BLM 2007, pp. 4-118 to 4-124) and the 2016 Final PEIS for Vegetation Treatments Using Aminopyralid, Fluroxypyr, and Rimsulfuron on BLM Lands in 17 Western States (BLM 2016, pp. 4-61 to 4-63). Potential impacts would be reduced through the implementation of SOPs described in those PEISs. The BLM would also follow additional conservation measures specific to wolves as identified in the Vegetation Treatments BA (BLM 2005); those relevant to chemical treatments are listed below (Conservation Measure Gray Wolf 2).

- Do not use 2,4-D in areas where gray wolves are known to occur; do not broadcast-spray within a quarter-mile of areas where gray wolves are known to occur
- Where feasible, avoid use of the following herbicides in gray wolf habitat: bromacil, clopyralid, diquat, diuron, glyphosate, hexazinone, imazapyr, metsulfuron methyl, picloram, and triclopyr
- Do not broadcast-spray clopyralid, diuron, glyphosate, hexazinone, picloram, or triclopyr in gray wolf habitat; do not broadcast-spray these herbicides next to gray wolf habitat under conditions when spray drift into the habitat is likely
- If broadcast-spraying bromacil, diquat, imazapyr, or metsulfuron methyl in or near gray wolf habitat, apply at the typical, rather than the maximum rate

- If conducting manual spot applications of glyphosate, hexazinone, or triclopyr to vegetation in gray wolf habitat, use the typical, rather than the maximum, application rate

Given the gray wolf's high mobility and large range and with the implementation of design features and conservation measures that would substantially reduce the risk of impacts and make them discountable, the BLM determines that chemical treatments ***may affect but are not likely to adversely affect*** gray wolves.

Effects of Manual Treatments

The use of tools and human presence associated with manual treatment methods could cause some disturbances to foraging wolves or prey species. Effects would likely be minor; this is because manual treatments would generally be small in scale and because the wolf's high mobility and large range would allow it to easily seek prey elsewhere. Effects would be limited to the time of fuel break construction and maintenance.

Manual vegetation removal or alterations would be unlikely to affect habitat features for wolves because manual treatments would generally be small in scale. Such treatments could alter habitat for prey species; however, the extent to which this reduces food sources for wolves would be insignificant, given that wolves have a large range and flexibility in habitat use; therefore, the BLM determines that manual treatments ***may affect but are not likely to adversely affect*** gray wolves.

Effects of Mechanical Treatments

Noise associated with heavy machinery would disturb foraging wolves and their prey, which may interfere with foraging and movement, as described under *General Effects*. Effects would be limited to the time of fuel break construction and maintenance. Additionally, use of heavy equipment for mechanical treatments could cause mortality of small mammals and other animals on which wolves prey. Large-scale removal of vegetation would eliminate habitat or forage for certain prey species, but it may favor habitat for other prey species by increasing herbaceous cover and thus forage. The extent to which this alters food sources for wolves would be insignificant, given that wolves have a large range and flexibility in habitat use.

Effects would likely be minor, due to the wolf's high mobility and large range and because the focused action area overlaps only a small proportion of wolf range and known packs/territories (<1 percent and 1 percent, respectively). With the implementation of design features and conservation measures that would substantially reduce the risk of impacts and make them discountable, the BLM determines that mechanical treatments ***may affect but are not likely to adversely affect*** gray wolves.

Effects of Prescribed Fire

Noise and human presence associated with the implementation of prescribed fire, as well as the activities themselves, would disturb wolves and their prey. This may interfere with foraging, as described under *General Effects*. These effects would occur during fuel break construction and maintenance. Impacts would likely be minor, due to the wolf's high mobility and large range.

Prescribed fire could cause mortality of small mammals and other animals on which wolves prey. Habitat alterations within the footprint of the fuel break would eliminate habitat or forage for certain prey species but may favor other fire-dependent species. The extent to which this would alter food sources for wolves would be insignificant given that the area altered would be small relative to the total wolf range (<1 percent) and area of known packs/territories (1 percent) and because wolves have a large range and flexibility in habitat use.

Given the gray wolf's high mobility and large range and with the implementation of design features and conservation measures that would substantially reduce the risk of impacts and make them discountable, the BLM determines that prescribed fire treatments ***may affect but are not likely to adversely affect*** gray wolves.

Effects of Revegetation

Direct impacts would occur from disturbances associated with the use of tools to implement revegetation. This may include drill seeding, manual digging, and the use of tilling, harrowing, or chaining to prepare the seedbed. Human presence and noise during the implementation of these treatments could disturb both wolves and their prey. This may interfere with foraging, as described under *General Effects*. Impacts would likely be minor due to the wolf's high mobility and large range.

Reseeding and planting would not occur over an area large enough to significantly affect forage availability or quality for prey. This is because the focused action area overlaps <1 percent of total gray wolf range and 1 percent of known packs/territories.

Given the gray wolf's high mobility and large range and with the implementation of design features and conservation measures that would substantially reduce the risk of impacts and make them discountable, the BLM determines that revegetation treatments ***may affect but are not likely to adversely affect*** gray wolves.

Effects of Targeted Grazing

It is possible that the presence of livestock could directly displace ungulate prey species from treated areas; however, competition for forage would be unlikely because BLM Standards for Rangeland Health and Guidelines for Livestock Grazing Management are in place to prevent these effects (BLM 2014). Any effects on prey species from livestock presence would be insignificant or discountable. This is because the area of wolf habitat open to potential treatment would be small (<1 percent of the total listed gray wolf range and 1 percent of known packs/territories on the focused action area). Moreover, the area treated would likely be smaller because not all fuel breaks would be built in wolf habitat; therefore, targeted grazing treatments ***may affect but are not likely to adversely affect*** gray wolves.

Interrelated and Interdependent Effects

Interrelated and interdependent actions are those that would not occur if not for the proposed action. No interrelated or interdependent effects on gray wolves have been identified.

Cumulative Effects

The cumulative effects analysis area for ESA-listed wildlife species is the focused action area. Future state, tribal, local, or private actions that are reasonably likely to occur and affect gray wolves and their habitat include human encroachment into wolf habitat and actions, such as livestock grazing, that may lead to depredation by humans. These actions are described in more detail below, followed by the cumulative contribution from the proposed action.

Human encroachment into wolf habitat leads to habitat degradation and fragmentation. Since wolves generally avoid humans, human encroachment makes habitat less suitable for wolves. Habitat fragmentation may force wolves to travel across lands with varying degrees of protection, across highways, through developed areas, and across large portions of private land, potentially containing livestock. All of these increase risks to wolves and makes it difficult for them to adequately expand into all areas of suitable habitat (DOW 2018).

Livestock graze on state lands throughout the action area and focused action area. Domestic animals are a source of prey to wolves, which often follow herds. The presence of livestock often attracts wolves and has led to livestock conflicts that result in lethal control of wolves. Hunting and trapping of delisted wolves on state and tribal lands is also a source of mortality for wolves. Although, where listed under the ESA, wolves are provided protection from unregulated killing, illegal poaching still occurs, and wolves outside of the ESA protection area have been killed in the region (DOW 2018; USFWS 2012b).

Local and state level fire management is likely to occur throughout the action area and focused action area. Departures from natural fire regimes due to suppression and subsequent cheatgrass invasion may decrease habitat for some prey species, such as mule deer (Cox 2008). This may affect prey availability for wolves.

3.1.4 Grizzly Bear

Listing Status and Recovery Plan

The USFWS listed the grizzly bear as a threatened species under the ESA in the lower 48 states in 1975 (USFWS 1975) and proposed critical habitat in 1976 (USFWS 1976). Critical habitat was never finalized; instead, the Interagency Grizzly Bear Committee (IGBC) issued habitat management guidelines in all occupied grizzly bear habitat.

The Grizzly Bear Recovery Plan was established in 1982 and revised in 1993 (USFWS 1993a). The 1993 revised recovery plan delineates grizzly bear recovery zones in six mountainous ecosystems in the US. The recovery plan details recovery objectives and strategies for the grizzly bear recovery zones in the ecosystems where grizzly bear populations still persist: the Northern Continental Divide Ecosystem, Greater Yellowstone Ecosystem, Cabinet-Yaak Ecosystem, and the Selkirk Ecosystem. The recovery plan also includes recovery strategies for the North Cascades Ecosystem in Washington, where only a very few grizzly bears are believed to remain, and for the Bitterroot Ecosystem of Idaho and Montana, where suitable habitat remains but no grizzly bears have been documented for more than 50 years (USFWS 2018b).

Today, grizzly bears throughout the lower 48 states remain listed as threatened, except where designated as an experimental population. In the Bitterroot Grizzly Bear Nonessential Experimental Population Area (Idaho), the subspecies *horribilis* is listed as an experimental population, nonessential. In the North Cascades Ecosystem Recovery Zone (Washington), grizzly bears are currently listed as threatened and have been determined to be warranted but precluded for uplisting to endangered. The status of population in the Cabinet-Yaak Recovery Zone (Idaho, Montana) is under review. The Greater Yellowstone Ecosystem DPS (Idaho, Wyoming, Montana) was delisted in 2017, but the final rule was vacated and remanded by the court in 2018; the current status is still under review (USFWS 2018c).

Life History and Habitat Characteristics

Grizzly bears are large and long-lived mammals. Adults are typically solitary wanderers, except when caring for young or breeding. Individuals probably react from learned experiences. Home range sizes vary in relation to season, food availability, weather conditions, and interactions with other bears (USFWS 2018b).

Mating typically occurs from late May through mid-July. The age at first reproduction is about 5.5 years in areas studied in the lower 48 States. Litter size varies from one to four cubs, with an average of two. Variation in reproductive age and litter size may be related to nutritional state. Females reproduce on approximately 3-year intervals. Grizzly bears have one of the lowest reproductive rates among terrestrial mammals, resulting primarily from the late age of first reproduction, small average litter size, and the long interval between litters (USFWS 1993a).

The causes of natural mortality for grizzly bears or other bears are not well known. Parasites and disease do not appear to be significant causes of natural mortality but may hasten the demise of weakened bears. Intraspecific competition for home ranges may force individuals to reside in areas dangerous to survival, such as near humans (USFWS 1993a).

Human-caused mortality can occur due to direct human/bear confrontations with, for example, hikers, backpackers, photographers, and hunters; attraction of grizzly bears to improperly stored food and garbage; livestock protection or careless livestock husbandry; degradation of grizzly bear habitat for economic values; and hunting, both lawful and illegal (USFWS 1993a).

Grizzly bears have a broad range of habitat tolerance, which suggests adaptive flexibility in food habits of different populations. Basic habitat requirements include the availability of food and water, security from humans and other bears, and den sites. Contiguous, relatively undisturbed mountainous habitat having a high level of topographic and vegetation diversity characterizes most areas where the species remains. Grizzly bears prefer areas of dense forest cover for use as beds and possibly to avoid humans (USFWS 1993a). The Conservation Strategy for the Northern Continental Divide Ecosystem (NCDE) defines secure core habitat as "an area of the NCDE primary conservation area more than 0.31 miles from a route open to wheeled motorized use during the grizzly bear non-denning season, or a gated route, and that is greater than or equal to 2,500 acres in size" (NCDE Subcommittee 2018).

In the winter, grizzly bears retreat to dens for 3 to 6 months in an adaptive behavior that increases survival during periods of deep snow, low temperatures, and food unavailability. Bears start excavating dens as early as September but may do this just before entry in early winter. Dens are typically on steep slopes, where deep snow accumulates and is unlikely to melt during warm periods. Dens are generally found at higher elevations, well away from development or human activity (USFWS 1993a).

Food availability has a strong influence on grizzly bear movements. Most vegetation preferred by grizzly bears grows in early seral communities, where forest cover is absent or relatively sparse; therefore, upon emergence from dens, bears typically seek lower elevations, drainage bottoms, avalanche chutes, and ungulate winter ranges, where their food requirements can be met. Throughout late spring and early summer, they follow plant phenology back to higher elevations. In late summer and fall, there is a transition to fruit and nut sources, as well as herbaceous materials (USFWS 1993a).

Status and Distribution

Before Euro-American settlement, grizzly bears ranged throughout western North America, from central Mexico to Alaska, with an estimated 50,000 individuals in the lower 48 states alone; however, due to western expansion of settlers and bounty programs aimed at eradication, grizzly bears were reduced to 2 percent of their former range by the 1930s. In 1975, the total number of bears in the Greater Yellowstone Ecosystem was estimated at 136 to 312 (US District Court 2018).

Since 1982, the USFWS has focused on fostering recovery in six geographically isolated ecosystems in the lower 48 states, as follows (USFWS 2018c):

- Greater Yellowstone Ecosystem, covering portions of Wyoming, Montana, and Idaho
- Northern Continental Divide Ecosystem of north-central Montana
- Cabinet-Yaak area, extending from northwest Montana to northern Idaho
- Selkirk Mountains in northern Idaho, northeast Washington, and southeast British Columbia
- North-central Washington's North Cascades area
- Bitterroot Mountains of western Montana and central Idaho

Most grizzly bears are found in the Greater Yellowstone region, with an estimated 700-plus bears, and the Northern Continental region, with an estimated 900-plus bears. There are an estimated 48 bears in the Cabinet-Yaak and 88 bears in the Selkirks. The last documented sighting in the North Cascades was in 1996, and the estimated population is fewer than 20. No bears are known to inhabit the Bitterroots (US District Court 2018).

The action area overlaps 408,341 acres or 1 percent and of the grizzly bear's current range and 29,611 acres or less than 1 percent of its occupied range. The focused action area overlaps 490,389 acres or 1 percent of the grizzly bear's current range and 64,421 acres or less than 1 percent of its occupied range (**Figure A-11**; **Table 3-4**).

Table 3-4
Grizzly Bear Range and Occupied Range on the Action Area and Focused Action Area

Range	Total Acres Range-wide	Acres in Action Area	Percent in Action Area	Acres in Focused Action Area	Percent in Focused Action Area
Total Range	72,038,321	669,256	1	489,023	1
Grizzly Bear Occupied Range	3,100,767	75,568	2	66,370	2

Sources: USFS GIS 2018; USFWS GIS 2018

Threats

Habitat loss and fragmentation and human-induced mortality were the main causes of historical declines. The current primary threats to grizzly bears are habitat degradation and loss, increased access to wilderness, and legal and illegal hunting. Increased access increases human-bear contacts, some of which result in killing of bears. Nonnative species threaten food resources in some areas; for example, white pine blister rust has killed whitebark pines in Montana, and knapweed infestations have displaced native plants that serve as food for bears and their prey (USFWS 1993a; NatureServe 2018).

Effects Analysis and Determinations

Conservation Measure Grizzly Bear 1 is no targeted grazing would be allowed within grizzly bear habitat.

Design features from the PEIS that would reduce impacts on grizzly bears are as follows:

- Design Feature 42— If special status plant or animal populations or potential habitats occur in a proposed treatment area, a qualified biologist will assess the area for habitat suitability and balance need for treatment with the habitat needs of special status wildlife and plant species. Conduct appropriately timed surveys within suitable or potential habitats for federally listed, proposed, and BLM special status species prior to treatment. For plant species, appropriate timing may vary by species but is directly related to phenological stages (for example flowering or fruiting stages) that provide confidence in identification. Federally listed species with the potential to occur in the project area and the current BLM special status species list are found in the PEIS, Appendix J.
- Design Feature 43— Implement restrictions and conservation strategies for special status species, including federally listed, proposed, candidate, and BLM sensitive species, as contained in approved recovery and conservation plans, cooperative agreements, and other instruments in whose development the BLM has participated. If none are available, coordinate with the USFWS and/or state wildlife agencies to develop appropriate restrictions.

The BLM would also follow additional conservation measures specific to grizzly bears as identified in the Vegetation Treatments BA (BLM 2005); these are listed below (Conservation Measure Grizzly Bear 2).

- Ensure that all treatment activities adhere to interagency grizzly bear guidelines or local interagency grizzly bear standards for sanitation measures and storage of potential attractants
- Do not plant or seed highly palatable forage species near roads or facilities used by humans

Take the following measures in recovery zones to minimize the likelihood that grizzly bears would suffer adverse health effects as a result of exposure to herbicides:

- Do not use 2,4-D in the zone, and do not broadcast-spray 2,4-D within a quarter-mile of the zone
- Where feasible, avoid use of bromacil, clopyralid, diquat, diuron, glyphosate, hexazinone, imazapyr, metsulfuron methyl, Overdrive, picloram, tebuthiuron, and triclopyr
- Do not broadcast-spray bromacil, clopyralid, diquat, diuron, glyphosate, hexazinone, Overdrive, picloram, or triclopyr in the recovery zone; do not broadcast-spray these herbicides in areas next to the recovery zone under conditions when spray drift into zone is likely
- If broadcast-spraying imazapyr, metsulfuron methyl, or tebuthiuron in or near the recovery zone, apply at the typical, rather than the maximum, application rate
- If conducting manual spot applications of glyphosate, hexazinone, imazapyr, metsulfuron methyl, tebuthiuron, or triclopyr to vegetation in the recovery zone, use the typical, rather than the maximum, application rate

General Effects

The focused action area overlaps 489,023 acres or 1 percent of the grizzly bear's current range and 66,370 acres or 2 percent of its occupied range (**Table 3-4**, **Figure A-11**). The acres represent the area that would be available for fuel break creation and maintenance within the grizzly bear's range and occupied range within a half-mile buffer. Not all of these acres would be affected, because only 667,000 acres of fuel breaks would be constructed under the proposed action. Fuel breaks would be constructed along roads and right of ways; therefore, secure core habitat, which is defined as being 0.31 mi or more from a route open to motorized use, would not be used for project activities.

It is also very unlikely that fuel break treatments would occur in denning habitat, which is typically on forested, steep, north slopes. This is because BLM-managed lands are outside the primary areas where denning occurs. Furthermore, denning habitat would likely be an analysis exclusion area, as it shares similar characteristics with lynx and wolverine habitat, which would be avoided; therefore, disturbances to denning bears would not occur. Other habitat, such as areas used for foraging, may be affected, as discussed below.

Given the grizzly bear's large size and mobility, treatment activities are not expected to directly cause injury or mortality. Grizzly bears typically occur in remote areas, away from human disturbance. However, if bears were to travel outside of remote areas into treatment areas, project activities could cause disturbances, interference with foraging, and alterations of habitat elements used for foraging. Disturbances to foraging bears may increase energetic costs through, for example, increased activity (USFWS 2011a), but the level would be insignificant because project activities would occur on only a small percent (less than 1) of grizzly bear occupied range and outside of denning and secure core habitat.

The removal or alteration of vegetation within the fuel break footprint would modify habitat characteristics within the fuel break footprint. However, vegetation alterations would not affect habitat for grizzly bears because the area modified would not consist of secure core habitat or denning habitat.

Given the grizzly bears' wide range of habitat tolerance, the modification of habitat for fuel break construction is not expected to interfere with their ability to find suitable habitat.

A regional system of fuel breaks would have a positive effect on grizzly bear habitat by reducing the likelihood of habitat loss to wildfire. Although grizzly bears generally benefit from periodic burns that promote growth of herbaceous vegetation and thus increase food, a very large burn could destroy a large percentage of available habitat and result in fragmentation of habitat. There is also some indication that invasive species have displaced some food plants for grizzly bears. Reduced wildfire spread could reduce the cover of nonnative species, leading to increased foraging opportunities over the long term.

Effects of Chemical Treatments

During treatments, human activity and use of vehicles could cause disturbances to bears, but treatments would not occur in denning or secure core habitat. Therefore, only bears foraging away from core habitat would be disturbed, and even then, the level of disturbance would be insignificant.

The herbicides themselves are unlikely to directly affect grizzly bears (BLM 2005). Inadvertent spray of a bear during herbicide application would not occur because grizzly bears would avoid these sites during treatments, and such a large animal is not likely to be overlooked by operators of herbicide application equipment.

As summarized in the BA for the Vegetation Treatments on Bureau of Land Management Lands in 17 Western States PEIS (BLM 2005, pp. 6-134 to 6-135), ingestion of or contact with plant materials or prey items sprayed with certain herbicides could lead to adverse health effects (BLM 2005). However, because

use of herbicides that could be harmful to grizzly bears would be avoided in grizzly bear habitat (see conservation measures below), adverse effects from indirect contact or ingestion of herbicides would only occur if a bear were present outside its typical habitat or if a prey species were to travel from outside grizzly bear habitat into foraging habitat. Similarly, contact with herbicides via drift would be unlikely because herbicides harmful to grizzly bears would not be broadcast next to recovery zones under conditions when spray drift into the habitat is likely to occur.

Effects of chemical treatments are further described in the Vegetation Treatments Using Herbicides on Bureau of Land Management Lands in 17 Western States Programmatic Environmental Impact Statement (BLM 2007, pp. 4-118 to 4-124) and the 2016 Final PEIS for Vegetation Treatments Using Aminopyralid, Fluroxypyr, and Rimsulfuron on BLM Lands in 17 Western States (BLM 2016, pp. 4-61 to 4-63). Potential impacts would be reduced by implementing SOPs described in those PEISs. Additional conservation measures specific to grizzly bears as identified in the Vegetation Treatments BA (BLM 2005) would also be followed; those relevant to chemical treatments are listed below and are applicable within recovery zones (Conservation Measure Grizzly Bear 2).

- Do not use 2,4-D in the zone, and do not broadcast-spray 2,4-D within a quarter-mile of the zone
- Where feasible, avoid use of bromacil, clopyralid, diquat, diuron, glyphosate, hexazinone, imazapyr, metsulfuron methyl, Overdrive, picloram, tebuthiuron, and triclopyr
- Do not broadcast-spray bromacil, clopyralid, diquat, diuron, glyphosate, hexazinone, Overdrive, picloram, or triclopyr in the recovery zone; do not broadcast-spray these herbicides in areas next to the recovery zone under conditions when spray drift into zone is likely
- If broadcast-spraying imazapyr, metsulfuron methyl, or tebuthiuron in or near the recovery zone, apply at the typical, rather than the maximum, application rate
- If conducting manual spot applications of glyphosate, hexazinone, imazapyr, metsulfuron methyl, tebuthiuron, or triclopyr to vegetation in the recovery zone, use the typical, rather than the maximum, application rate

Herbicide treatments could affect habitat for grizzly bear and prey by reducing vegetation and possibly decreasing forage availability. The area of habitat affected would be limited to a maximum of 1 percent of the grizzly bear's current range and less than 1 percent of its occupied range.

Given the grizzly bear's high mobility and large range and with the implementation of design features and conservation measures that would substantially reduce the risk of impacts and make them discountable, the BLM determines that chemical treatments ***may affect but are not likely to adversely affect*** grizzly bears.

Effects of Manual Treatments

Manual treatment methods would not have substantial effects on grizzly bears or their habitat. Human activity associated with treatments could disturb foraging bears outside of secure core habitat and denning habitat, but these effects would be minor and temporary. The level of vegetation removed would also be small and would not affect overall foraging opportunities for grizzly bears or their prey; therefore, manual treatments ***may affect but are not likely to adversely affect*** grizzly bears.

Effects of Mechanical Treatments

Loud noises and human activities associated with mechanical treatments for fuel break construction and maintenance would cause disturbances that interfere with foraging and movement of bears outside secure core habitat and denning habitat. Human presence and attractants may increase human-bear conflicts, as described under *General Effects*.

Large-scale vegetation removal could reduce forage availability to bears and their prey on maximum of 1 percent of the grizzly bear's current range and 2 percent of its occupied range; however, reseeding or planting following mechanical treatments in areas such as green strips may increase forage availability for both bears and their prey, to some extent.

Given the grizzly bear's high mobility and large range, and with the implementation of design features and conservation measures that would substantially reduce the risk of impacts and make them discountable, the BLM determines that mechanical treatments ***may affect but are not likely to adversely affect*** grizzly bears.

Effects of Prescribed Fire

Direct effects include disturbance from the presence of humans and vehicles associated with the prescribed burns. Disturbances and the prescribed burn itself could cause bears to avoid habitat and could interfere with foraging and movement. Only bears using areas outside secure core habitat and denning habitat would be affected.

Prescribed burns would not lead to direct injury or mortality of grizzly bears; this is because activities would be highly controlled and limited to the fuel break footprint. fires were found to have no apparent effects on bears' home range sizes, mean rates of movement, or choice of den sites (USFWS 2003b).

Vegetation removal from prescribed fire treatments could reduce forage for grizzly bears and for their prey; however, only the treated area would be impacted and this would be too small to noticeably alter food resources for grizzly bears, which have a broad habitat tolerance and may occupy a large area of suitable habitat.

Given the grizzly bear's high mobility and large range, and with the implementation of design features and conservation measures that would substantially reduce the risk of impacts and make them discountable, the BLM determines that prescribed fire treatments ***may affect but are not likely to adversely affect*** grizzly bears.

Effects of Revegetation

Direct effects could occur from the use of tools to implement revegetation. This may include drill seeding, manual digging, and the use of tilling, harrowing, or chaining to prepare the seedbed. Human presence and noise during these treatments could disturb grizzly bears and may alter foraging and movement of bears outside of secure core and denning habitat.

Reseeding and planting could increase herbaceous cover, which may improve habitat conditions for grizzly bear prey. The effect of changes in vegetation distributions on prey distributions would be insignificant because the focused action area overlaps only a small proportion (1 percent and 2 percent, respectively) of grizzly bear range and occupied range and no treatments would occur in secure core and denning habitat.

Given the grizzly bear's high mobility and large range and with the implementation of design features and conservation measures that would substantially reduce the risk of impacts and make them discountable, the BLM determines that revegetation treatments ***may affect but are not likely to adversely affect*** grizzly bears.

Effects of Targeted Grazing

No targeted grazing would be allowed in grizzly bear habitat (Conservation Measure Grizzly Bear 1), so this treatment method would have no direct effects, such as disturbance and immediate habitat alterations, on grizzly bears. Over the long term, targeted grazing in fuel breaks outside grizzly bear habitat areas would reduce the dominance of invasive species; this could benefit grizzly bears by limiting the spread of invasive plants to their habitat. Targeted grazing may maintain vegetation species diversity and thus forage availability for grizzly bear prey, such as ungulates that may later travel into grizzly bear habitat and provide food; therefore, targeted grazing treatments ***may affect but are not likely to adversely affect*** grizzly bears.

Interrelated and Interdependent Effects

Interrelated and interdependent actions are those that would not occur if not for the proposed action. No interrelated or interdependent effects on grizzly bears have been identified for the proposed action.

Cumulative Effects

The cumulative effects analysis area for ESA-listed wildlife species is the focused action area. The cumulative effects assessment considers the potential for effects on grizzly bears from future uses and activities on state and private lands that are reasonably likely to occur in this area. Cumulative impacts would arise from actions that alter the availability and suitability of grizzly bear habitat as well as actions that increase bear–human interactions.

Human development can affect bears through temporary or permanent habitat loss, displacement, and disturbance to surrounding areas. Examples are campgrounds, residential developments, oil and gas exploratory wells, and mining. Increased human presence associated with development can also increase the availability of unsecured bear attractants. This could lead to food conditioning, habituation to humans, and direct mortality from bear-human encounters. The number of such encounters is expected to increase with human population growth, due to more people recreating in grizzly bear habitat and more developments. This may result in more human-caused grizzly bear mortality (USFWS 2011a). Roads increase human presence in grizzly bear habitat, and future road construction may have detrimental impacts by increasing the accessibility of remote areas to humans.

Livestock graze on private lands throughout the action area and focused action area and are expected to continue doing so. Grazing may cause competition for forage, displacement due to livestock-related activity, and direct mortality of bears due to their attraction to livestock and subsequent control (USFWS 2018d).

Grizzly bears generally prefer to forage in areas with hiding cover nearby, particularly when feeding during the day. State and local vegetation is likely to be treated throughout the action area and focused action area and may alter the amount and composition of cover and forage in grizzly bear habitat. Vegetation management would likely vary throughout the action area and focused action area and may include timber harvest, thinning, and fire suppression. Some types of vegetation management, such as pinyon-juniper removal projects, may increase grizzly bear forage through improved growth of grasses, forbs, and berry-producing shrubs.

Although grizzly bears use mature forests for escape cover, production and canopy cover of important food plants, especially fruiting shrubs, is relatively low in these sites (Zager et al. 1983). Conifer removal would allow for increased shrub and herbaceous plant growth, which would increase forage for grizzly bears. Fuels reduction and restoration treatments may alter wildfire continuity to create a mosaic of successional stages, which is suitable habitat for grizzly bears; however, the roads and human activity associated with these activities can negatively affect grizzly bears by disturbing or temporarily displacing bears while operations are ongoing and by increasing the chance of conflict with humans (USFWS 2018d).

Natural fires will continue throughout the action area and focused action area and can improve grizzly bear habitat by creating a mosaic of successional stages of vegetation. Because bears are highly mobile and opportunistic, they move to unburned areas in search of food and cover and return to burned areas in search of carrion after revegetation. Over the long term, wildfire increases diversity of habitats and maintains resilience and vigor in ecosystems, which is beneficial to grizzly bears (USFWS 2003b).

Local and state level fire management is likely to occur throughout the action area and focused action area and may affect grizzly bear habitat. Fire suppression can reduce food availability and reduce habitat quality (USFWS 1993a). This is because suppression allows unimpeded plant succession and reduces food production, especially on mesic sites (Zager et al. 1983).

Climate trends will be important to grizzly bears and may affect denning behavior, foraging habitat availability, and fire regimes. Earlier snowpack melt may shorten the denning season and make food available later in the fall and earlier in the spring. This may increase human-bear encounters in spring and fall and increase the mortality risk to bears during these times. An additional effect of climate change is changes in the availability and distribution of foraging areas due to increasing temperatures and seasonal changes in precipitation. The extent and rate to which plant species and communities would be affected is difficult to predict. Changes in vegetation distributions may also influence other mammal distributions, including prey species, such as ungulates (USFWS 2011a).

3.1.5 Mexican Spotted Owl

Listing Status and Recovery Plan

The Mexican spotted owl is listed as a threatened species under the ESA (USFWS 1993). The 1995 final rule designating critical habitat for the species was successfully challenged in court; consequently, in 2004, the USFWS published a new final rule designating over 8.6 million acres of critical habitat on federal lands in Arizona, Colorado, New Mexico, and Utah (USFWS 2004). The USFWS published a final recovery plan for the Mexican spotted owl in 2012 (USFWS 2012).

Life History and Habitat Characteristics

Mexican spotted owls breed sporadically and do not nest every year (USFWS 2012). Courtship begins in March, and females usually lay one to three eggs in early April. Eggs typically hatch in early May and nestlings leave the nests, often before they can fly, from 4 to 5 weeks after hatching in early to mid-June. Parents provide young with food throughout the summer, and young leave the nesting area in the fall (USFWS 2012).

Mexican spotted owls are territorial, and mated pairs defend a breeding territory within a larger home range. Home-range size varies among geographic areas and habitats. Although most adult Mexican spotted owls are thought to remain on or near their breeding territory throughout the year, some migrate to lower elevations during winter (USFWS 2012).

Mexican spotted owls use a variety of habitats to meet different life-history needs. Key habitat variables are nesting, roosting, and foraging habitat patches with structural, compositional, and successional diversity, as well as connectivity among suitable patches. Mexican spotted owls typically roost and nest in late seral forests or rocky canyon habitats. Forests used for roosting and nesting often contain mature or old-growth stands with complex structure, whereas rocky canyon habitats are characterized by vertical, rocky cliffs in complex watersheds, including many tributary side canyons and a variety of desert scrub and riparian vegetation communities. Owls nest and roost in protected caves, on rocky ledges, and in trees, relying on existing structures such as stick nests built by other birds, debris platforms in trees, and tree cavities (USFWS 2012).

Mexican spotted owls use a greater diversity of habitats for foraging than for nesting or roosting, including managed and unmanaged forests, pinyon-juniper woodlands, mixed-conifer and ponderosa pine forests, cliff faces and terraces between cliffs, and riparian zones (USFWS 2012). Their diet varies by location but typically includes small- and medium-sized rodents such as woodrats (*Neotoma lepida*), mice (*Mus* sp.), voles (*Microtus* sp.), rabbits (*Sylvilagus* sp.), gophers (family Geomyidae), bats, birds, reptiles, and insects (USFWS 2012). Riparian habitats provide productive foraging habitats for Mexican spotted owls and can act as refuges for small mammals, the primary prey, during droughts (USFWS 2012).

Status and Distribution

This owl species inhabits forested mountains and canyon lands throughout the southwestern US, including Arizona, Colorado, New Mexico, Utah, and western Texas; it also ranges south into several states of Mexico (USFWS 2012). The Mexican spotted owl's range covers approximately 164,212,480 acres.

Two GIS-based models for predicting Mexican spotted owl habitat were used to map Mexican spotted owl habitat (Willey and Spotskey 1997; Willey and Spotskey 2000). According to the models, the total predicted distribution of four habitat classes in the canyonlands of southern Utah is approximately 3,150,999 acres and the predicted distribution of inner canyon breeding habitat in Grand Canyon National Park, Arizona is approximately 286,009 acres. The acres and percent of Mexican spotted owl habitat types and range that occur on action area and on the focused action area are shown in **Table 3-5** and **Figure A-12**. There are no protected activity centers (PACs) on the action area or focused action area (BLM GIS 2018).

Table 3-5
Mexican Spotted Owl Range and Habitats on the Action Area and Focused Action Area

Habitat Type/Range	Total Acres Range-wide	Acres in Action Area	Percent in Action Area	Acres in Focused Action Area	Percent in Focused Action Area
Range	164,212,480	3,150,310	2	1,614,639	1
Predicted Habitat	3,150,999	165,418	5	69,005	2
Utah Canyon Habitat	286,009	13,725	5	4,452	2
Critical Habitat	9,875,453	104,164	1	41,997	<1
Habitat sites	570,326	7,276	1	3,468	1

Source: BLM GIS 2018; USFWS GIS 2018; Willey and Spotskey 1997; Willey and Spotskey 2000

Mexican spotted owl population trends remain unclear due to lack of data and inconsistency in sampling methods. Data on trends in populations or occupancy rates are few, and methods and sample sizes differ among studies, making comparisons difficult. Results from some studies indicate that study populations have declined in the recent past (USFWS 2012).

Threats

At the time of listing, the main threats to the Mexican spotted owl were destruction and modification of habitat caused by timber harvest and fires, increased predation associated with habitat fragmentation, and lack of adequate protective regulations (USFWS 1993). The most recent 5-year review suggests that threats to the United States population have transitioned from commercial-based timber harvest to the risk of stand-replacing wildland fire (USFWS 2013). Uncharacteristic, high-severity, stand-replacing wildland fire is thought to be the greatest threat to the Mexican spotted owl. Fire severity and size have been increasing within the range of the owl, causing large-scale loss of occupied and potential nest/roost habitat (USFWS 2013).

Other threats with the potential to reduce habitat quality or cause disturbance include domestic and wild ungulate grazing, recreation, fuels reduction treatments, resource extraction (e.g., timber, oil, gas), and development. In addition, predation, starvation, accidents, disease, and parasites have been identified as detrimental to the Mexican spotted owls (USFWS 2013).

Critical Habitat

The USFWS designated approximately critical habitat for the Mexican spotted owl in Arizona, Colorado, New Mexico, and Utah. Within the critical habitat boundaries, critical habitat includes protected and restricted habitats as defined in the original Mexican Spotted Owl Recovery Plan. Less than 1 percent (41,997 acres) of Mexican spotted owl critical habitat lies within the focused action area (USFWS BLM GIS 2018; **Table 3-5**).

The PCEs of critical habitat are listed in **Table 3-6**, below.

Table 3-6
Primary Constituent Elements of Mexican Spotted Owl Critical Habitat

Feature	Description
Forest structure	a. A range of tree species, including mixed-conifer, pine-oak, and riparian forest types, composed of different tree sizes, reflecting different ages of trees, 30 to 45 percent of which are large, with a trunk diameter of 12 inches or greater, when measured at 4.5 feet from the ground b. A shaded canopy created by the tree branches and foliage covering 40 or greater of the ground Large, dead trees (snags) with a trunk diameter of at least 12 inches, when c. measured at 4.5 feet from the ground
Maintenance of adequate prey species	a. High volumes of fallen trees and other woody debris b. A wide range of tree and plant species, including hardwoods c. Adequate levels of residual plant cover to maintain fruits and seeds and to allow plant regeneration
Canyon habitats	a. Presence of water (often providing cooler air temperature and often higher humidity than the surrounding areas) b. Clumps or stringers of mixed-conifer, pine-oak, pinyon-juniper, or riparian vegetation c. Canyon walls containing crevices, ledges, or caves d. High percentage of ground litter and woody debris

Source: USFWS 2004

Effects Analysis and Determinations

Relevant design features from the PEIS that would aide in the protection of Mexican spotted owls include:

- Design Feature 23: Manage targeted grazing to conserve suitable habitat conditions for special status species, while implementing rangeland health standards and guidelines (BLM 2014).
- Design Feature 42: If special status plant or animal populations or potential habitats occur in a proposed treatment area, a qualified biologist will assess the area for habitat suitability and balance need for treatment with the habitat needs of special status wildlife and plant species. Conduct appropriately timed surveys within suitable or potential habitats for federally listed, proposed, and BLM special status species prior to treatment. For plant species, appropriate timing may vary by species but is directly related to phenological stages (for example flowering or fruiting stages) that provide confidence in identification. Federally listed species with the potential to occur in the project area and the current BLM special status species list are found in the PEIS, Appendix J.
- Design Feature 43: Implement restrictions and conservation strategies for special status species, including federally listed, proposed, candidate, and BLM sensitive species, as contained in approved recovery and conservation plans, cooperative agreements, and other instruments in whose development the BLM has participated. If none are available, coordinate with the USFWS and/or state wildlife agencies to develop appropriate restrictions.

Additionally, the following conservation measures would reduce impacts to Mexican spotted owls:

- Conservation Measure Spotted Owl 1—Within 0.5 mile of project activity, habitat suitability will be assessed for nesting and foraging using accepted habitat models in conjunction with field reviews.
- Conservation Measure Spotted Owl 2—Protocol level surveys will be required prior to activity unless species occupancy and distribution information is complete and available. All surveys must be conducted by qualified individual(s).
- Conservation Measure Spotted Owl 3—Activities will be monitored for compliance with conservation measures throughout the duration of the project.
- Conservation Measure Spotted Owl 4—All Mexican spotted owl final critical habitat will be avoided and buffered as determined by local conditions, a qualified biologist, and treatment method.
- Conservation Measure Spotted Owl 5—Activity will not occur within 0.5 mile of an identified nest site or within a designated Protected Activity Center (PAC).
- Conservation Measure Spotted Owl 6—Avoid noise-generating activity and permanent structures within 0.5 mi of suitable habitat unless surveyed and not occupied.
- Conservation Measure Spotted Owl 7—Reduce noise emissions (e.g., use hospital-grade mufflers, electric pump motors) to 45 dBA at 0.5 mile from suitable habitat, including canyon rims. Placement of permanent noise-generating facilities should be determined by a noise analysis to ensure noise does not encroach upon a 0.5 mile buffer for suitable habitat, including canyon rims.
- Conservation Measure Spotted Owl 8—Limit disturbances to suitable habitat by staying on approved routes.
- Conservation Measure Spotted Owl 9—Limit new access routes created by the project.

- Conservation Measure Spotted Owl 10—Limit habitat loss by locating new facilities within existing rights-of-way.
- Conservation Measure Spotted Owl 11—Additional measures to avoid or minimize effects to the Mexican spotted owl may be developed and implemented in consultation with the U.S. Fish and Wildlife Service.

General Effects

Approximately 1 percent of the Mexican spotted owl's range falls within the focused action area. In addition, 2 percent of total predicted nesting habitat, 2 percent of total Utah canyon habitat, 1 percent of known habitat sites, and <1 percent of final critical habitat falls within the focused action area (**Figure A-12, Table 3-5**). The acres presented represent the area that would be available for fuel break creation and maintenance within the Mexican spotted owl's range and final critical habitat with a ½ mile buffer; not all of these acres would be affected because only 667,000 acres of fuel breaks would be constructed under the proposed action. No PACs fall within the focused action area.

The Recovery Plan recommends three levels of management for Mexican spotted owl habitats (USFWS 2012):

1. **Protected Activity Centers.** These encompass a minimum of 600 acres surrounding known owl nest/roost sites and are the only form of protected habitat identified in the revised plan.
2. **Recovery habitat.** This primarily consists of ponderosa pine-Gambel oak, mixed-conifer, and riparian forest that is or has the potential to become, nest/roost habitat or foraging, dispersal, or wintering habitats. The plan recommends that 10 to 25 percent of forested recovery habitat be managed to replace nest/roost habitat lost due to disturbance (e.g., fire) or senescence and to provide additional nest/roost habitat to facilitate recovery of the owl. The remainder of forested recovery habitat should be managed for other needs (such as foraging, dispersing, or wintering) provided that key habitat elements are retained across the landscape.
3. **Other forest and woodland types, such as ponderosa pine forest, spruce-fir forest, and pinyon-juniper woodland.** No specific management is suggested for these habitat types; current emphasis for sustainable and resilient forests should be compatible with needs of the owl.

According to these management recommendations, management of pinyon-juniper is not a limiting factor for the Mexican spotted owl's recovery. Since fuel breaks would only be built within sagebrush and pinyon-juniper areas, and the focused action area does not overlap PACs, activities would not have substantial effects on nesting owls. In the off-chance that a fuel break treatment were proposed in an area used for nesting, buffering nest sites (Conservation Measure Spotted Owl 5) would avoid effects to nesting owls.

However, effects to foraging owls could potentially occur. The presence of humans and vehicles and the use of tools associated with fuel break construction and maintenance could cause audio and visual disturbances that interfere with foraging owls. Noise pollution may be more detrimental at night when owls are active and rely on audio communication for communication and to capture prey. Conservation measures would avoid noise-generating activity within 0.5 mi of suitable habitat unless surveyed and not occupied (Conservation Measure Mexican Spotted Owl 6) and reduce noise pollution (Conservation Measure Mexican Spotted Owl 7), so the effect of disturbances would be insignificant. Further, noises from fuel break construction and maintenance activities would likely be infrequent, and thus less disruptive relative to persistent noises (USFWS 2012).

Alterations such as pinyon-juniper removal and clearing of ground litter and woody debris could reduce habitat conditions for prey species. However, because of the small chance of treatments being implemented in owl habitats and the small area of habitat potentially affected (1 percent of the Mexican spotted owl's range, 2 percent of total predicted nesting habitat, 2 percent of total Utah canyon habitat, 1 percent of known habitat sites, and less than 1 percent of final critical habitat fall within the focused action area), effects would be discountable or insignificant.

Fuel breaks would improve wildfire suppression opportunities by providing anchor points for wildland fire suppression, helping to decrease the spread of wildfire. As habitat loss from high-severity, stand-replacing wildland fire is a main threat to Mexican spotted owls (USFWS 2013), establishing fuel breaks within the subspecies' range would likely have a long-term, benefit by potentially reducing wildfire spread, thereby decreasing the potential for habitat loss and direct mortality from wildfires.

With application of design features and conservation measures, we determine the proposed action, including all treatment methods ***may affect, but is not likely to adversely affect*** Mexican spotted owls.

Conservation Measure Spotted Owl 4 would avoid treatment in all Mexican spotted owl final critical habitat, so no impacts would occur. With implementation of conservation measures and design features the BLM determines all treatment methods are ***not likely to destroy or adversely modify*** Mexican spotted owl final critical habitat.

Cumulative Effects

The cumulative effects analysis area for ESA-listed wildlife species is the focused action area. Future state, tribal, local, or private actions that are reasonably likely to occur and affect Mexican spotted owls are habitat alterations due to anthropogenic and natural causes. These actions are described in more detail below, followed by the cumulative contribution from the proposed action.

Human-induced alteration of forests in the southwestern U.S. has increased the vulnerability of Mexican spotted owl to the effects of stand-replacing wildland fires. Current forest conditions have the potential to sustain landscape-scale stand-replacing fires that would alter owl habitat. Conditions will likely be exacerbated by climate-change, which is predicted to result in hotter and drier conditions in future decades.

Fire-suppression, emergency stabilization and rehabilitation activities will influence the condition of owl habitat, and may improve conditions by protecting or restoring habitat. However, large blocks of land are scheduled to be treated to reduce fire risk and protect human communities throughout the Mexican spotted owl's range within the U.S., and the intensity of many of these treatments may have adverse effects on owls and their habitat (USFWS 2012).

Grazing by domestic and wild ungulates is prevalent and recurring within most Mexican spotted owl habitat types. When improperly managed, it can adversely affect prey species' habitat (e.g., reducing herbaceous ground cover), nest/roost habitat (e.g., limiting regeneration of important tree species, especially in riparian areas), and the capacity for resource managers to restore and maintain conditions supporting natural fire regimes within an array of habitat types (USFWS 2012).

Land development is occurring or has the potential to occur through the subspecies' range but the magnitude is highly variable due. Development causes habitat fragmentation, alteration of ecological processes (e.g., predation, fire regimes), and increased potential for disturbance. Similarly, water development can cause loss or degradation of habitat, habitat fragmentation, disruption of migration corridors, inhibited gene flow, and altered grazing patterns by wild and domestic ungulates (USFWS 2012).

3.1.6 Sierra Nevada Bighorn Sheep

Listing Status and Recovery Plan

On April 20, 1999, the USFWS granted emergency endangered status to bighorn sheep inhabiting the central and southern Sierra Nevada of California as a DPS. It simultaneously, published a proposed rule to list the species as endangered. The final rule granting endangered status to that population segment was published on January 3, 2000 (USFWS 2000). In 2008, the USFWS published the final rule designating critical habitat and finalizing the revision of taxonomy of the listed entity from a DPS of California bighorn sheep, *Ovis canadensis californiana*, to subspecies, *O. c. sierrae*, based on recent published information (USFWS 2008a). Final critical habitat was designated in 2008 (USFWS 2008a).

Life History and Habitat Characteristics

The USFWS listed the Sierra Nevada bighorn sheep as a DPS, *O. c. californiana*, which was the recognized taxonomic classification at the time of listing (USFWS 2008a). Based on new genetic and morphological data, the Sierra Nevada bighorn sheep was recognized as a unique subspecies of *O. canadensis*; as a result, the USFWS modified the nomenclature for this taxon from *O. c. californiana* to *O. c. sierrae* (USFWS 2008a).

Bighorn sheep are ungulates with a large rumen and reticulum relative to body weight, which allows them to digest grasses, sedges, and rushes in all phenological stages. This flexibility in food consumption, in turn, allows flexibility in feeding habitats (USFWS 2007a).

The breeding (rutting) season in the Sierra Nevada occurs mainly in November and December, when bighorn sheep are usually still at high elevations. The gestation period for bighorn sheep is approximately 174 days, and birthing can occur from mid-April to early July. Bighorn sheep generally give birth to single young, but there is a low incidence of twins. Birth rates and survivorship of lambs can vary with environmental and nutritional factors (USFWS 2007a).

The main causes of mortality are diseases, predation, and accidents. Bighorn sheep are susceptible to numerous diseases, including pneumonia and psoroptic scabies, which have had the greatest population-level effects. Predators are wolves, mountain lions, coyotes, bears, bobcats, wolverines, and eagles, with mountain lions as the primary predator in the Sierra Nevada (USFWS 2007a).

Bighorn sheep exhibit a variety of adaptations to avoid predation, such as group living and primarily diurnal activity. Groups provide more eyes and ears, allowing members to spend less time surveying for predators and more time feeding, while diurnal behavior minimizes predation risks. In addition, keen eyesight and agility on precipitous rocky slopes allow them to detect and outrun predators (USFWS 2007a). Consequently, bighorn sheep select open habitats that allow detection of predators at sufficient distances and adequate lead time to reach the safety of precipitous terrain.

Optimal bighorn sheep habitat is open and contains steep, generally rocky, slopes. Sierra Nevada bighorn sheep avoid forests and thick brush but will use open woodland habitats on rocky slopes. Habitats range from the highest elevations along the crest of the Sierra Nevada (over 13,120 feet) to winter ranges at the eastern base of the range as low as 4,760 feet. These habitats range from alpine to Great Basin sagebrush scrub.

In the Sierra Nevada, both sexes may share common winter ranges but use different habitats during summer. Females are restricted largely to alpine environments along the crest and males often at somewhat lower elevations in subalpine habitats west of the crest. Males again join females during the breeding season in late fall (USFWS 2007a).

Forage resources vary greatly across habitats used by Sierra Nevada bighorn sheep, and its diet varies accordingly. Of particular importance to population parameters is the nutrient content of forage. Nutrient quality varies greatly with season and elevation and is limited primarily by the effects of temperature and soil moisture on plant growth and population density. Because of the relationship between elevation and temperature, low elevation winter ranges provide an important source of high-quality forage early in the growing season (USFWS 2007a).

Status and Distribution

Sierra Nevada bighorn sheep herds once occupied numerous locations along and east of the alpine crest of the Sierra Nevada, from the Sonora Pass south to Olancha Peak. They also occurred in similar habitat west of the Kern River, as far south as Maggie Mountain, with concentrated use in the regions of Mineral King, Big Arroyo, and Red Spur (USFWS 2007a).

Of the 16 areas in the Sierra Nevada that likely had separate herds (excluding the southernmost non-alpine region), only nine persisted to the beginning of the twentieth century. By 1948, the number of areas thought to support this species had dropped to five: Convict Creek, Birch Mountain (Taboose Creek), Mount Baxter, Mount Williamson, and Mount Langley (USFWS 2007a).

As of April 30, 2017, Sierra bighorn were distributed among14 herds: Warren, Gibbs, Cathedral, Convict, Wheeler, Taboose, Sawmill, Baxter, Bubbs, Williamson, Big Arroyo, Laurel, Langley, and Olancha. This meets the downlisting criteria for distribution, although numeric goals have not yet been achieved (Greene et al. 2017).

When bighorn were listed as an endangered species in 1999, their range-wide population was estimated to consist of 95-129 adults including at least 49 adult females. The estimated population size in 2016 was 675, including 317 yearling and adult ewes, 120 lambs, and an estimated 238 rams (Greene et al. 2017). However, the population suffered a major loss in the winter of 2016–2017, which was the second wettest year on record for the central Sierra Nevada. Over 100 females (about 30% of the known female population) were estimated to have died. Sierra bighorn are still distributed across 14 herds, but some are small (<7 females) and may require augmentation to persist. Losses will extend the timeline for achieving downlisting goals. After accounting for winter mortalities, the best estimate of adult and yearling ewes is a total of 273 from minimum counts (Greene et al. 2017).

The Sierra Nevada bighorn sheep's range covers 2,542,623 acres. Of this range, 1 percent (23,874 acres) is in the action area and less than one percent (11,690 acres) is in the focused action area (**Figure A-13, Table 3-7**). No critical habitat is in the focused action area (USFWS BLM GIS 2018).

Table 3-7
Sierra Nevada Bighorn Sheep Range on the Action Area and Focused Action Area

Range	Total Acres Range-wide	Acres in Action Area	Percent in Action Area	Acres in Focused Action Area	Percent in Focused Action Area
Critical habitat	416,903	184	<1	0	0
Range	2,542,623	23,874	1	11,690	<1

Sources: USFS GIS 2018; USFWS GIS 2018

Threats

Factors limiting Sierra Nevada bighorn sheep recovery are disease, predation, low population numbers and limited distribution, availability of open habitat, and potential further loss of genetic diversity due to small population sizes and inadequate migration between them. Of particular importance is the threat of disease transmission between domestic sheep and bighorn sheep through contact (USFWS 2008b). Since most Sierra Nevada bighorn sheep habitat is public land, the loss of habitat has not been a limiting factor; however, management, such as fire suppression, of bighorn sheep habitat can result in habitat alterations and loss of key dispersal corridors connecting herds, which could be limiting factors (USFWS 2008b).

Effects Analysis and Determinations

Design features specific to Sierra Nevada bighorn sheep from the PEIS are as follows:

- Design Feature 21 (bullet 5)—Use of domestic sheep or goats for targeted grazing would not occur within 30 miles of Sierra Nevada bighorn sheep Critical Habitat.
- Design Feature 59 No activities would occur in Sierra Nevada bighorn sheep critical habitat during lambing periods (April – July).

Other relevant design features are as follows:

- Design Feature 23—Manage targeted grazing to conserve suitable habitat conditions for special status species, while implementing rangeland health standards and guidelines (BLM 2014)
- Design Feature 42—If special status plant or animal populations or potential habitats occur in a proposed treatment area, a qualified biologist will assess the area for habitat suitability and balance need for treatment with the habitat needs of special status wildlife and plant species. Conduct appropriately timed surveys within suitable or potential habitats for federally listed, proposed, and BLM special status species prior to treatment. For plant species, appropriate timing may vary by species but is directly related to phenological stages (for example flowering or fruiting stages) that provide confidence in identification. Federally listed species with the potential to occur in the project area and the current BLM special status species list are found in the PEIS, Appendix J.
- Design Feature 43—Implement restrictions and conservation strategies for special status species, including federally listed, proposed, candidate, and BLM sensitive species, as contained in approved recovery and conservation plans, cooperative agreements, and other instruments in whose development the BLM has participated. If none are available, coordinate with the USFWS and/or state wildlife agencies to develop appropriate restrictions.

Additional conservation measures applicable to Sierra Nevada bighorn sheep as identified in the Vegetation Treatments BA (BLM 2005) would also be followed and are listed below (Conservation Measure Bighorn Sheep 1).

- Before treatment, survey suitable habitat for evidence of use by bighorn sheep
- Do not use domestic animals as a vegetation treatment in bighorn sheep habitat
- When planning vegetation treatments, minimize the creation of linear openings that could result in permanent travel ways for competitors and humans
- Obliterate any linear openings constructed in bighorn sheep habitat in order to deter uses by humans and competitive species
- Where feasible, time vegetation treatments such that they do not coincide with seasonal use of the treatment area by bighorn sheep
- Do not broadcast-spray herbicides in key bighorn sheep foraging habitats
- Do not use 2,4-D in bighorn sheep habitat; do not broadcast-spray 2,4-D within a quarter-mile of bighorn sheep habitat
- Where feasible, avoid use of the following herbicides in bighorn sheep habitat: bromacil, clopyralid, diquat, diuron, glyphosate, hexazinone, imazapyr, metsulfuron methyl, Overdrive, picloram, and tebuthiuron, and triclopyr
- Do not broadcast-spray bromacil, clopyralid, diquat, diuron, glyphosate, hexazinone, Overdrive, picloram, or triclopyr in bighorn sheep habitat; do not broadcast-spray these herbicides in areas next to bighorn sheep habitat under conditions when spray is likely to drift onto the habitat
- If broadcast-spraying imazapyr, metsulfuron methyl, or tebuthiuron in or near bighorn sheep habitat, apply at the typical, rather than the maximum, application rate
- If conducting manual spot applications of glyphosate, hexazinone, imazapyr, metsulfuron methyl, tebuthiuron, or triclopyr to vegetation in bighorn sheep habitat, use the typical, rather than the maximum, application rate

General Effects

Less than one percent (11,690 acres) of the Sierra Nevada bighorn sheep's range is in the focused action area (**Figure A-13**). These acres represent the area that would be available for fuel break creation and maintenance in the Sierra Nevada bighorn sheep's range, with a half-mile buffer. Not all of these acres would be affected, because only 667,000 acres of fuel breaks would be constructed under the proposed action. The focused action area does not overlap any critical habitat (USFWS BLM GIS 2018), so there would be no direct or indirect effects from fuel break treatments on critical habitat.

Human presence and the use of tools for fuel break treatment implementation could have direct effects on bighorn sheep, due to disturbances associated with noise and the presence of humans. Disturbances could cause habitat avoidance or interfere with foraging. Disturbance would only be harmful to bighorn sheep if nutrient intake of a herd is compromised by avoiding key foraging areas; this would not be the case because only a small proportion (less than one percent) of the Sierra Nevada bighorn sheep's range is within the focused action area, so the chances of sheep being present in or near a treatment area would be low. Likewise, vegetation alterations within fuel breaks would not have noticeable effects on bighorn sheep habitat use or forage because of the small area of bighorn sheep range within the focused action area.

Treatments would not interfere with lambing, because activities in bighorn sheep habitat would be restricted during the lambing season (Design Feature 48); additionally, interferences would not prevent bighorn sheep from obtaining adequate nutrition before lambing because only a small proportion (less than one percent) of the Sierra Nevada bighorn sheep's range is within the focused action area.

Over the long term, the construction of a regional system of fuel breaks would increase fire suppression opportunities. This would have a positive indirect effect on bighorn sheep habitat by returning conditions to a more natural fire regime and reducing the threat of future wildfire spread. This would also reduce the potential spread of invasive annual grasses, leading to a greater diversity of plant species and improved forage conditions (Huntsinger et al. 2012; Wagner and Peek 2006).

The Recovery Plan for the Sierra Nevada Bighorn Sheep (USFWS 2007a) identifies maintaining or enhancing the integrity of bighorn sheep habitat as Recovery Action 1.2. Task 2.2.3 further states "Policies to let fires burn in bighorn sheep habitat, coupled with prescribed fire or other methods of habitat manipulation, should be used to enhance winter ranges where visibility for bighorn sheep needs to be increased" (USFWS 2007a, p. 50). The proposed action would adhere to recovery actions identified in the recovery plan (Design Feature 43). Fuel break treatments would be carried out concurrently with vegetation treatments intended to bring vegetation conditions back to historical levels (Fuels Reduction and Restoration PEIS); in the context of concurrent implementation of the two PEISs, fuel breaks are not expected to reduce habitat conditions for bighorn sheep.

Effects of Chemical Treatments

Because bighorn sheep are large, mobile animals, it is unlikely that they would be sprayed inadvertently during herbicide treatments; however, adverse health effects on sheep, such as sickness, could occur from ingesting contaminated plant materials or by coming in contact with sprayed foliage or drift (BLM 2005, Table 6-2). However, the chances of this would be small because conservation measures stipulate that use of herbicides that could be harmful to bighorn sheep be avoided in bighorn sheep habitat (Conservation Measure Bighorn Sheep 1). Adverse effect from indirect contact or ingestion of herbicides would only occur if an individual were present outside its typical habitat. Similarly, contact with herbicides via drift would be unlikely because herbicides harmful to bighorn sheep would not be broadcast next to habitat under conditions when spray drift into the habitat is likely to occur.

Any chemical treatments would be used in accordance with the Vegetation Treatments Using Herbicides on Bureau of Land Management Lands in 17 Western States Programmatic Environmental Impact Statements and the Final PEIS on using Aminopyralid, Fluroxypyr, and Rimsulfuron (BLM 2007, 2016) and existing local guidance. Following existing SOPs and conservation measures would minimize and avoid the potential for exposure (Conservation Measure Bighorn Sheep 1).

Chemical treatments could affect bighorn sheep habitat by reducing the amount of forage available in treatment areas. Impacts would likely be insignificant because vegetation reductions would occur only within the footprint of the fuel break (a maximum of less than 1 percent of total Sierra Nevada bighorn sheep range). Treatments would be temporary in some areas that are reseeded to create green strips. Furthermore, chemical treatments would be used primarily in areas dominated by noxious weeds and invasive plants, which do not provide optimal forage. Over the long term, chemical treatments would alter habitat by decreasing the cover and spread of annual invasive grasses. A reduction of nonnative species would improve plant diversity and forage conditions in treated fuel breaks (Huntsinger et al. 2012; Wagner and Peek 2006).

With the implementation of design features and conservation measures that would substantially reduce the risk of impacts and make them discountable, the BLM determines that chemical treatments ***may affect but are not likely to adversely affect*** Sierra Nevada bighorn sheep.

Effects of Manual Treatments

There could be some disturbances associated with noise and the presence of humans; however, these effects would likely be minor, because of the small scale of most manual treatments and because bighorn sheep would be able to avoid the work areas. The effects would last only for the duration of the treatment.

Hand removal of vegetation would not have substantial direct effects on bighorn sheep habitat. The amounts of vegetation removed by this method would be small, and the area affected would be less than 1 percent of the Sierra Nevada bighorn sheep's range. Thus, the level of effects would be insignificant and manual treatments ***may affect but are not likely to adversely affect*** Sierra Nevada bighorn sheep.

Effects of Mechanical Treatments

Impacts from mechanical treatments could occur due to noise and human presence associated with the use of mechanical tools. Direct impacts from disturbances are described under *General Effects* and include habitat avoidance and interference with foraging.

Removing trees would have positive effects on bighorn sheep habitat by increasing visibility and potentially forage. This is because opening the understory may increase herbaceous growth. Large-scale removal of vegetation from an area used by sheep would have negative effects, if the coverage of shrubs and herbs used for forage were to decrease and if temporary hiding and thermal cover refuges were eliminated. Because less than 1 percent of the Sierra Nevada bighorn sheep's range is in the focused action area, impacts would be insignificant; therefore, mechanical treatments ***may affect but are not likely to adversely affect*** Sierra Nevada bighorn sheep.

Effects of Prescribed Fire

Direct effects on bighorn sheep from fire would be unlikely, since these large, mobile animals would be able to move out of the burn area during the fire; however, smoke inhalation could have some adverse effects. Prescribed fire would mainly be used in areas dominated by invasive grasses and thus are not expected to occur in bighorn sheep habitat.

Prescribed fire could have positive impacts on bighorn sheep by opening the canopy. This would improve winter range by increasing visibility, allowing improved detection of predators (USFWS 2007a). Shrub reduction would also increase grass and forb cover, and thus forage. However, habitat alterations would not noticeably alter conditions for bighorn sheep because only less than 1 percent of the Sierra Nevada bighorn sheep's range is in the focused action area, so levels would be insignificant.

Because less than 1 percent of the Sierra Nevada bighorn sheep's range is in the focused action area, the level of effects would be insignificant. Therefore, the BLM determines that prescribed fire treatments ***may affect but are not likely to adversely affect*** Sierra Nevada bighorn sheep.

Effects of Revegetation

Direct impacts would occur from the use of tools to implement revegetation. This may include drill seeding, manual digging and tilling, harrowing, or chaining to prepare the seedbed. Human presence and noise during the implementation of these treatments would disturb sheep, as described under *General Effects*; however, impacts would likely be insignificant because less than 1 percent of the Sierra Nevada bighorn sheep's range is in the focused action area.

Reseeding and planting could increase shrub and herbaceous cover, which would increase the amount of forage available to bighorn sheep. Nutrient quality varies greatly with season and elevation and is limited primarily by the effects of temperature and soil moisture on plant growth and population density. Having a diversity of plant species in all forage categories is important to bighorn sheep. Where revegetation treatments increase plant community diversity, forage quality would increase (Wagner and Peek 2006). However, habitat alterations would not noticeably alter conditions for bighorn sheep because only less than 1 percent of the Sierra Nevada bighorn sheep's range is in the focused action area.

Because less than 1 percent of the Sierra Nevada bighorn sheep's range is in the focused action area, the level of effects would be insignificant. Therefore, the BLM determines that revegetation treatments ***may affect but are not likely to adversely affect*** Sierra Nevada bighorn sheep.

Effects of Targeted Grazing

The recovery plan (USFWS 2007a) identifies preventing contact between Sierra Nevada bighorn sheep and domestic sheep or goats (Recovery Action 2.3) as a necessary action for recovery. It provides a recommended strategy for implementing this action (USFWS 2007a, pp. 61–71). Adhering to measures identified in the recovery plan (Design Feature 43) would avoid or minimize contact between domestic and wild sheep. Design features would also minimize the risk of encounters between domestic and wild sheep by not grazing domestic sheep within 30 miles of bighorn sheep habitat (Design Feature 21) and by using the currently accepted, peer-reviewed, modeling techniques and best available data to manage domestic sheep grazing (Design Feature 49). Therefore, although contact with domestic sheep could have adverse effects on bighorn sheep populations due to transfer viruses, parasites, and bacteria (USFWS 2007a), the chance of interactions would be so low as to be discountable.

Targeted grazing by domestic sheep and other livestock would not increase competition for preferred forage plants to a noticeable level or undermine bighorn sheep's ability to obtain adequate forage. This is because less than 1 percent of the Sierra Nevada bighorn sheep's range is in the focused action area and not all of this area would be open to targeted grazing. Following a targeted grazing plan and managing targeted grazing to conserve suitable habitat for special status species (Design Features 21, 23, and 59) would prevent adverse impacts on bighorn sheep habitat.

The implementation of design features and conservation measures would substantially reduce the risk of impacts from contact with domestic sheep to a discountable level and reduce habitat alterations to an insignificant level. Therefore, the BLM determines that targeted grazing treatments ***may affect but are not likely to adversely affect*** Sierra Nevada bighorn sheep.

Interrelated and Interdependent Effects

Interrelated and interdependent actions would not occur if not for the proposed action. No interrelated or interdependent effects on Sierra Nevada bighorn sheep have been identified for the proposed action.

Cumulative Effects

The cumulative effects analysis area for ESA-listed wildlife species is the focused action area. Future state, tribal, local, or private actions that are reasonably likely to occur and affect Sierra Nevada bighorn sheep are disease transmission from domestic sheep disease, predation, habitat alterations, and wildfire. These actions are described in more detail below, followed by the cumulative contribution from the proposed action.

Livestock grazing increases the risk of transferring virulent disease organisms from domestic sheep to Sierra Nevada bighorn sheep. Currently, domestic sheep grazing on private lands continues to pose a disease risk (USFWS 2008b). Modeling indicates that bighorn sheep are likely to occupy areas in allotments that are open to domestic sheep grazing; wandering bighorn sheep have been observed on domestic sheep grazing allotments (USFWS 2008b). Domestic goats can also transmit diseases to bighorn sheep and may occur on private lands in areas that have a high risk of contact (USFWS 2008b). Efforts to minimize the potential for introduced disease from domestic sheep and goats are still ongoing and are essential to protect existing herds. The Final Recovery Plan for the Sierra Nevada Bighorn Sheep (USFWS 2007a) provides a strategy for preventing contact between domestic sheep and goats and Sierra Nevada bighorn sheep.

Since listing of the Sierra Nevada bighorn sheep, the California Department of Fish and Wildlife has selectively controlled mountain lions on winter ranges, to reduce predation and increase the use of these ranges by Sierra Nevada bighorn sheep (USFWS 2008b). Future predation control projects would likely continue to reduce predation and increase the use of these ranges by Sierra Nevada bighorn sheep (USFWS 2008b). Selective removal of mountain lions is ongoing and likely contributing to the increased use of winter range by some bighorn populations (USFWS 2008b).

Translocations are necessary to increase herd unit populations because movement barriers make natural colonization unlikely. The Sierra Nevada Bighorn Sheep Recovery Program plans for future reintroductions by translocating at least 40 bighorn sheep. These actions are expected to maximize genetic diversity and to generate group sizes for optimal survival and reproduction (Stephenson et al. 2011).

State and local vegetation treatments are likely to occur throughout the focused action area, which would contribute to effects on bighorn sheep. Although habitat for Sierra Nevada bighorn sheep has not suffered from fragmentation, pinyon pine encroachment on some winter ranges has reduced winter habitat suitability; therefore, pinyon-juniper removal projects would improve habitat conditions. The Sierra Nevada Bighorn Sheep Recovery Program has carried out habitat enhancement projects with successful results, and it is feasible that further treatments will be implemented (Stephenson et al. 2011).

Wildfires will continue to occur and may contribute to cumulative impacts on bighorn sheep. Wildfires may reduce forage and potentially cause bighorn sheep to stay at higher elevations during the winter following a fire (USFWS 2008b). Despite the potential effects of wildfire on habitat quality and use of low-elevation winter range, fire suppression can result in habitat alterations that reduce visual openness in some winter range habitat and loss of key dispersal corridors connecting herds (USFWS 2007a); therefore, future fire suppression projects will have conflicting impacts.

3.1.7 Utah Prairie Dog

Listing Status and Recovery Plan

The Utah prairie dog was listed as an endangered species on June 4, 1973, pursuant to the Endangered Species Conservation Act of 1969. On January 4, 1974, the species was listed as endangered under the ESA of 1973 (USFWS 1973). At the time of listing, the species was threatened with extinction due to habitat destruction and modification, over-exploitation, disease, and predation. No critical habitat rules have been published for the Utah prairie dog.

By 1984, Utah prairie dog populations had expanded in portions of their range, and the USFWS reclassified the species to threatened status, with a special rule to allow regulated take of the species (USFWS 1984). Under the 1984 special rule, taking of up to 5,000 animals was authorized from June 1 through December 31. This special rule was amended on June 14, 1991, to increase the amount of regulated take throughout the species' range to 6,000 animals (USFWS 1991). In practice, take of Utah prairie dogs in association with this special rule is permitted only in cases where Utah prairie dogs are damaging irrigated agriculture or pasture lands, as implemented by the Utah Division of Wildlife Resources (UDWR) permitting process under authority of UDWR Rule R657-19, Taking Nongame Mammals.

The initial recovery plan for the Utah prairie dog was approved in 1991 and revised in 2012 (USFWS 2012c). Recovery criteria include establishing and maintaining the species as a self-sustaining, viable unit with retention of 90 percent of its genetic diversity for 200 years. Recovery actions include determining and continually updating the species' historical range and distribution, determining factors that influence the viability of prairie dog colonies, conducting a translocation program, ensuring the protection and management of prairie dogs and their habitat, and conducting an information and education program (USFWS 2012c).

Life History and Habitat Characteristics

Utah prairie dogs, found only in southwestern and central Utah, comprise the western-most member of the genus *Cynomys* and have the most restricted range of the four prairie dog species in the United States. The Utah prairie dog is a member of the white-tailed group, subgenus *leucocrossuromys*. It is recognized as a distinct species but is most closely related to the white-tailed prairie dog (*C. leucurus*) (USFWS 2012c).

Utah prairie dogs typically spend 4 to 6 months underground each year during winter. Adult males cease surface activity during August and September, and females follow several weeks later. Juvenile prairie dogs remain above ground 1 to 2 months longer than adults and usually hibernate by late November. Utah prairie dogs emerge from hibernation in late February or early March, with males emerging 2 to 3 weeks before females (USFWS 2012c).

The breeding season is generally mid-March through early April. An average of 97 percent of adult females successfully produce a litter of 1 to 7 pups each year. Reproduction and survival are influenced by the availability of food and other resources. Fewer than 50 percent of Utah prairie dogs survive to breeding age (USFWS 2012c).

Young male Utah prairie dogs disperse in the late summer, with average dispersal of 0.35 miles and long-distance dispersals of 1.1 miles. Adult dispersal may be up to 3.1 miles. Most dispersers move to adjacent territories. Daily movement distances within social groups or clans for foraging or other activities average 730 feet.

Utah prairie dogs are predominantly herbivores, consuming mainly grasses and other plants, such as flowering shrubs, forbs, and alfalfa. Vegetation quality and quantity are important in helping Utah prairie dogs survive hibernation, lactation, and other high nutrient demand times. Plant species richness is correlated with increased weight gain, higher juvenile to adult ratios, and higher animal densities (USFWS 2012c).

Utah prairie dog populations exhibit large annual variations due to various environmental and human factors, including disease outbreaks, such as epizootic plague, climate cycles, forage competition with other herbivores, habitat loss, alteration, and fragmentation from environmental or human activities, and unlawful lethal take (USFWS 2012c). Utah prairie dogs are subject to natural predation by other mammals, raptors, and snakes, but in established colonies, predators probably do not exert a controlling influence on numbers of prairie dogs (USFWS 2012c).

Utah prairie dogs occur in semiarid shrub steppe and grassland habitats. In these habitats, they prefer swales, where moist herbaceous vegetation is available even during drought periods. Well-drained soils are required for burrows, which must be at least 3.3 feet deep to protect the prairie dogs from predators and environmental extremes. Utah prairie dogs generally avoid areas dominated by brushy species and prefer areas with shorter vegetation to allow visibility, which is necessary for predator avoidance and communication among colony members (USFWS 2012c).

Status and Distribution

Historically, the species' distribution included portions of Beaver, Garfield, Iron, Kane, Juab, Millard, Piute, Sanpete, Sevier, Washington, and Wayne Counties in Utah. The historical abundance was estimated at approximately 95,000 animals; however, estimates are not considered reliable because they were derived largely from informal interviews (USFWS 2012c).

Populations began to decline when control programs were initiated in the 1920s, and by the 1960s the species' distribution was greatly reduced as a result of poisoning, sylvatic plague (a nonnative disease), drought, and habitat alteration induced by agriculture and grazing. By the early 1970s, the Utah prairie dog was eliminated from major portions of its historical range and had declined to an estimated 3,300 individuals, distributed among 37 Utah prairie dog colonies (USFWS 2012c).

Today, Utah prairie dogs are limited to the central and southwestern quarter of Utah in Beaver, Garfield, Iron, Kane, Piute, Sevier, and Wayne Counties, at elevations of 6,200 to 9,180 feet. Significant concentrations of Utah prairie dogs occur in three areas, designated as recovery units (RUs): the Awapa Plateau (Garfield, Piute, Sevier, and Wayne Counties), the Paunsaugunt (primarily in Garfield County, with small areas in Piute and Kane Counties), and the West Desert (primarily in Iron County, but extends into southern Beaver County and northern Washington County) (USFWS 2012c).

Spring counts from the past 30 years show considerable annual fluctuations but stable to increasing long-term trends (USFWS 2012c). Colonies are scattered across the landscape, with some functioning as metapopulations, while others function as isolated colonies (USFWS 2012c). The action area overlaps approximately 22 percent of the Utah prairie dog's total range, and the focused action area overlaps approximately 13 percent (**Figure A-14**, **Table 3-8**).

Table 3-8
Utah Prairie Dog Range in the Action Area and Focused Action Area

Range	Total Acres Range-wide	Acres in Action Area	Percent in Action Area	Acres in Focused Action Area	Percent in Focused Action Area
Range	5,617,267	1,560,745	28	750,581	13

Source: USFWS GIS 2018

Threats

Urban expansion and plague comprise the most serious threats to Utah prairie dog populations. Either of these threats could lead to extirpation of entire complexes and significantly increase extinction probabilities; however, the effects of plague could be felt more gradually, allowing for some Utah prairie dogs to adapt to changing environmental conditions (USFWS 2012c).

Other threats include habitat loss or modification due to over-grazing, Off Highway Vehicle (OHV)/recreational land uses, agriculture, energy resource exploration and development, vegetation community changes, invasive plants, fire management, climate change, poaching, and predation (USFWS 2012c).

Effects Analysis and Determinations

Conservation Measures specific to the Utah prairie dog are as follows:

- Conservation Measure Prairie Dog 1—Proposed treatments in suitable Utah prairie dog habitat would be surveyed by certified individuals in accordance with USFWS protocols and in coordination with BLM and USFWS before implementation.
- Conservation Measure Prairie Dog 2—All staging areas for vehicles, trailers, and materials would be outside of a 350-foot disturbance buffer of Utah prairie dog habitat.
- Conservation Measure Prairie Dog 3—Project-related vehicles would not exceed 15 miles per hour in occupied Utah prairie dog habitat.
- Conservation Measure Prairie Dog 4—A qualified Utah prairie dog biologist, approved by the BLM and USFWS, would be required to be on-site during all work in occupied Utah prairie dog habitat. The biologist would document compliance with design features and any take that may occur and would have the authority to halt activities that may be in violation of these stipulations.
- Conservation Measure Prairie Dog 5—All vehicles would be maintained in maintenance facilities or, in the event of emergency, at least 350 feet from mapped Utah prairie dog habitat in previously disturbed areas. Precautions would be taken to ensure that contamination of maintenance sites by fuels, motor oils, and grease does not occur and that such materials are contained and properly disposed of off-site. Inadvertent spills of petroleum-based or other toxic materials would be cleaned up and removed immediately or on completion of the project. In coordination with USFWS and Utah Division of Wildlife Resources, habitat treatments in occupied Utah prairie dog habitat would occur during the extended active season (April 1 to September 30).
- Conservation Measure Prairie Dog 6—All project employees would be informed of any Utah prairie dogs in the general area and the threatened status of the species. Employees would be advised of the definition of take and the potential penalties (up to $200,000 in fines and 1 year in prison) for taking a species listed under the ESA. Project personnel would not be permitted to

have firearms or pets in their possession while on the project site. The rules on firearms and pets would be explained to all personnel involved with the project.

- Conservation Measure Prairie Dog 7—If a dead or injured Utah prairie dog is located, initial notification must be made to the USFWS Division of Law Enforcement, Salt Lake City, Utah, at (801) 975-3330; to the Utah Division of Wildlife Resources at (435) 865-6100; and to the BLM Authorized Officer at (435) 865-3000. Instruction for proper handling and disposition of such specimens would be issued by the Division of Law Enforcement. Care must be taken in handling sick or injured animals to ensure effective treatment and care and in handling dead specimens to preserve biological material in the best possible state.
- Conservation Measure Prairie Dog 8—Spot applications would be used to apply herbicides in Utah prairie dog habitat, where possible, to limit the probability of contaminating nontarget food and water sources and the elimination of vegetation necessary to support the species, especially vegetation over large areas.

Relevant design features from the PEIS that would reduce effects on Utah prairie dogs are as follows:

- Design Feature 23—Manage targeted grazing to conserve suitable habitat conditions for special status species, while implementing rangeland health standards and guidelines (BLM 2014)
- Design Feature 42—If special status plant or animal populations or potential habitats occur in a proposed treatment area, a qualified biologist will assess the area for habitat suitability and balance need for treatment with the habitat needs of special status wildlife and plant species. Conduct appropriately timed surveys within suitable or potential habitats for federally listed, proposed, and BLM special status species prior to treatment. For plant species, appropriate timing may vary by species but is directly related to phenological stages (for example flowering or fruiting stages) that provide confidence in identification. Federally listed species with the potential to occur in the project area and the current BLM special status species list are found in the PEIS, Appendix J.
- Design Feature 43—Implement restrictions and conservation strategies for special status species, including federally listed, proposed, candidate, and BLM sensitive species, as contained in approved recovery and conservation plans, cooperative agreements, and other instruments in whose development the BLM has participated. If none are available, coordinate with the USFWS and/or state wildlife agencies to develop appropriate restrictions.

General Effects

The focused action area overlaps approximately 13 percent of the Utah prairie dog's total range (**Figure A-14**, **Table 3-8**). The acres represent the area that would be available for fuel break creation and maintenance in the Utah prairie dog's range, with a half-mile buffer. Not all of these acres would be affected, because only 667,000 acres of fuel breaks would be constructed under the proposed action.

It is unlikely that fuel breaks would be established in Utah prairie dog habitat. This is because they prefer swales, where moist herbaceous vegetation is available, and areas with low levels of brush and shorter vegetation (USFWS 2012c). These areas would likely be classified as analysis exclusion areas. Fuel breaks are not being proposed in riparian exclusion areas, which include perennial streams, seasonally flowing streams, streams in inner gorges, and special aquatic features. Native, sparsely vegetated areas would also be avoided. Therefore, effects on prairie dogs within colonies or burrows would be unlikely.

There would, however, be potential for effects to Utah prairie dogs outside of colonies and burrows (e.g., while individuals are moving between colonies). These potential effects include disturbance from people, vehicles, or equipment, which may cause behavioral alterations. Use of tools and vehicles would also increase the potential for injury or mortality. The effects would be minimized by surveying treatment areas in suitable Utah prairie dog habitat (Conservation Measure Prairie Dog 1), locating staging areas and vehicle maintenance outside of habitat (Conservation Measure Prairie Dog 2 and 5), limiting vehicle speeds in mapped habitat (Conservation Measure Prairie Dog 3), and having a qualified biologist on-site during all work in mapped habitat (Conservation Measure Prairie Dog 4). The application of design features and avoidance measures would substantially reduce the risk of impacts and make them discountable.

Removing vegetation to construct fuel breaks could create burrowing habitat by softening the ground and increasing visibility. However, the potential for habitat alterations would be low, because fuel breaks would not be constructed in the swale-type formations and areas of low cover preferred by Utah prairie dogs.

Over the long term, the creation of a regional system of fuel breaks would reduce wildfire frequency and wildfire spread and thereby decrease the potential for habitat loss due to wildfire. Reduced wildfire spread may also decrease the chance for spread of invasive annual grasses. This would help maintain plant community diversity, which may increase forage for prairie dogs.

Effects of Chemical Treatments

Potential effects of chemical treatments on Utah prairie dogs would only occur if an individual were to encounter a treatment area while traveling. Direct spray of an individual would be unlikely because prairie dogs would avoid treatment areas due to human presence and activity. If an individual was unintentionally exposed to chemicals, directly or indirectly through contact or ingestion of sprayed foliage, exposure or ingestion of chemicals could cause sickness or mortality.

Spot applications of herbicides in Utah prairie dog habitat (Conservation Measure Prairie Dog 8) would limit the likelihood of contamination, while spatial buffers would reduce the potential for disturbance. Further, treatments would not target the native grasses and forbs consumed by Utah prairie dogs, so the risk of ingestion or reductions in forage would be low.

The effects of chemical treatments are further described in the Vegetation Treatments Using Herbicides on Bureau of Land Management Lands in 17 Western States Programmatic Environmental Impact Statement (BLM 2007) and the 2016 Final PEIS for Vegetation Treatments Using Aminopyralid, Fluroxypyr, and Rimsulfuron on BLM Lands in 17 Western States (BLM 2016). Potential impacts would be reduced by implementing the following SOPs described in those PEISs:

- Survey for special status wildlife species before treating an area; consider effects on these species when designing treatment programs
- Use drift reduction agents to reduce the risk of drift hazard
- Select herbicide products carefully to minimize additional impacts from degradates, adjuvants, inert ingredients, and tank mixtures
- Avoid treating vegetation during time-sensitive periods, such as nesting and migration, for species of concern in the area to be treated

Utah prairie dog habitat would not be proposed for fuel break treatments. The implementation of design features, SOPs, and avoidance measures would make the risk of adverse effects to Utah prairie dogs so low as to be discountable. Because of this, chemical treatments ***may affect but are not likely to adversely affect*** Utah prairie dogs.

Effects of Manual Treatments

Manual treatments would not take place in Utah prairie dog habitat. The use of hand tools and hand-operated power tools to cut, clear, or prune herbaceous and woody species in areas adjacent to prairie dog habitat could disturb animals travelling between areas. However, with the application of design features and avoidance measures, the risk of adverse effects to Utah prairie dogs so low as to be discountable. Therefore, manual treatments ***may affect but are not likely to adversely affect*** Utah prairie dogs.

Effects of Mechanical Treatments

Mechanical treatments would not take place in Utah prairie dog habitat. The use of heavy equipment, such as agricultural mowers, masticators, and seedbed preparation equipment in areas adjacent to habitat could cause audial and visual disturbances to individuals during travel between habitats. However, with the application of design features and avoidance measures, the risk of adverse effects to Utah prairie dogs so low as to be discountable. Because of this, mechanical treatments ***may affect but are not likely to adversely affect*** Utah prairie dogs.

Effects of Prescribed Fire

Prescribed fire treatments would not take place in Utah prairie dog habitat. The use of prescribed fire in areas adjacent to habitat could cause some injury, and possibly mortality, to Utah prairie dogs if they were to travel into a treatment site. This would be unlikely because animals would likely avoid human presence, activity, and the fire itself. With the application of design features and avoidance measures, the risk of adverse effects to Utah prairie dogs so low as to be discountable. Because of this, prescribed fire treatments ***may affect, not likely to adversely affect*** Utah prairie dogs.

Effects of Revegetation

Revegetation treatments would not take place in Utah prairie dog habitat. Effects from treatments in areas adjacent to prairie dog habitat would mainly be due to treatment tools and methods; these impacts are described under *General Effects* and treatment-specific sections.

Seeding perennial plant species for fuel break construction would change the condition of the vegetation community within the treatment footprint by replacing annual grasses and forbs with low stature, competitive, fire-resilient, perennial species. This would have long-term benefits on Utah prairie dogs by increasing plant species diversity from pretreatment levels, and thus forage availability, and allowing greater visibility (USFWS 2012c). Invasive plants can decrease plant diversity, which can affect weight gain and survival of prairie dogs, particularly during drought conditions (USFWS 2012c).

With the application of design features and avoidance measures, the risk of adverse effects to Utah prairie dogs so low as to be discountable. Because of this, revegetation treatments ***may affect but are not likely to adversely affect*** Utah prairie dogs.

Effects of Targeted Grazing

Targeted grazing would not take place in Utah prairie dog habitat. The use of targeted grazing in areas adjacent to habitat could cause some injury (i.e., from trampling), to Utah prairie dogs if they were to travel into a treatment site. This would be unlikely because prairie dogs would likely avoid livestock.

With the application of design features and avoidance measures, the risk of adverse effects to Utah prairie dogs so low as to be discountable. Therefore, targeted grazing treatments ***may affect but are not likely to adversely affect*** Utah prairie dogs.

Interrelated and Interdependent Effects

Interrelated and interdependent actions would not occur if not for the proposed action. No interrelated or interdependent effects on Utah prairie dogs have been identified for the proposed action.

Cumulative Effects

The cumulative effects analysis area for ESA-listed wildlife species is the focused action area. Future state, tribal, local, or private actions that are reasonably likely to occur and affect the Utah prairie dog are urban expansion, disease, overgrazing, recreation, cultivated agriculture, vegetation community changes, invasive plants, climate change, and fire management. These actions are described in more detail below, followed by the cumulative contribution from the proposed action.

Urban expansion across the range of the Utah prairie dog was one of the factors that resulted in listing the species under the ESA; it continues to be a primary threat. Approximately 70 percent of all known Utah prairie dogs occur on private lands, which are prioritized for residential and industrial development (USFWS 2012c). Urban expansion causes permanent habitat loss and fragmentation. Urban expansion also increases prairie dog exposure to domestic and feral dogs and cats, which prey on them and introduce fleas that act as a vector for plague (USFWS 2012c). The distance at which disturbance from urban expansion or other human activities (including cultivated agriculture, recreation, energy resource exploration and development) affects a prairie dog's normal behavior is approximately 350 feet (USFWS 2012c). Future growth projections in the West Desert Recovery Unit (RU) include the loss of approximately 3,040 acres of occupied Utah prairie dog habitat (USFWS 2012c), whereas Garfield, Piute, and Wayne Counties, which make up the other two Utah prairie dog RUs (Paunsaugunt and Awapa Plateau), have much smaller human populations and are experiencing much slower growth rates (USFWS 2012c).

Agriculture can also reduce and alter Utah prairie dog habitat, and many of the non-federal lands on which Utah prairie dog habitats occur are in agricultural production (USFWS 2012c). Agricultural crops can benefit prairie dogs by providing highly nutritious forage; however, prairie dogs in agricultural fields are subject to negative effects, due to unregulated lethal control to protect crops, habitat fragmentation from fences and roads, and urban predators (USFWS 2012c).

Grazing occurs in almost all mapped and occupied Utah prairie dog habitat, including private and state lands (USFWS 2012c). Although Utah prairie dogs can likely coexist with properly managed grazing systems, overgrazing can decrease habitat quality resulting from increases in invasive plants and decreased vegetation diversity. Conflicts between ranchers and prairie dogs can lead to lethal removal of prairie dogs.

Plague occurs across the entire range of the Utah prairie dog and is considered to be a primary threat to the species' survival and conservation. Plague will likely continue to be a threat throughout the range of western prairie dog species for the foreseeable future (USFWS 2012c). The disease has the potential to result in complete loss or severe reduction in colonies across the landscape (epizootics) and to create chronic problems that could limit growth rates of Utah prairie dog populations (enzootics). Management measures to control plague, such as vaccines and insecticides, are being developed, and their success may influence long-term prairie dog conservation (USFWS 2012c).

Various types of vegetation management are likely to occur throughout the action area and focused action area, and some can be beneficial to Utah prairie dogs. This would come about by providing more open habitats for foraging, for visual surveillance to escape predators, and for intraspecific interactions. Changes also may occur to the vegetation community from a lack or suppression of naturally ignited fires. Wildfires were important historically in maintaining open or grassy areas in the shrub steppe ecosystem and in controlling pinyon-juniper expansion. Fire suppression on a landscape level can lead to the encroachment of trees and shrubs into grasslands, which decreases habitat quality and can eventually render it unsuitable for prairie dog occupation (USFWS 2012c).

3.1.8 Yellow-Billed Cuckoo

Listing Status and Recovery Plan

The USFWS categorized the western DPS of the yellow-billed cuckoo as a candidate species for listing under the ESA and proposed it to be listed as threatened in 2013. The USFWS published the final rule for listing the western DPS of the yellow-billed cuckoo as threatened on November 3, 2014 (USFWS 2014b) and proposed critical habitat for it on November 12, 2014 (USFWS 2014c). Critical habitat remains proposed.

Life History and Habitat Characteristics

The western yellow-billed cuckoo is a neotropical migrant bird that breeds along river systems west of the Rocky Mountains, which generally separate this population from the eastern yellow-billed cuckoo (*Coccyzus americanus americanus*). Based on the best scientific and commercial data available on distribution, as well as on the behavioral and morphological characteristics of the western yellow-billed cuckoo, the USFWS considers the western population segment of the yellow-billed cuckoo to be a DPS for conservation purposes (USFWS 2014b).

Yellow-billed cuckoos may be found in a variety of vegetation types during migration, including coastal scrub, secondary growth woodland, hedgerows, humid lowland forests, and forest edges from sea level to 8,125 feet (Hughes 2015). Additionally, during migration they may be found in smaller riparian patches than those in which they typically nest. The average home range of yellow-billed cuckoos is 225 acres on the Rio Grande in New Mexico (Sechrist et al., 2013) and 126 acres on the San Pedro River of Arizona.

During the nesting season, the western yellow-billed cuckoo occupies large patches of multilayered riparian habitats in the western United States. Cottonwood-willow forests (*Populus* spp.-*Salix* spp.) are most often used and provide relatively cooler and more humid streamside conditions; however, other riparian tree species can be important components of breeding habitat as well, such as alder (*Alnus* spp.), box elder (*Acer negundo*), mesquite (*Prosopis* spp.), Arizona walnut (*Juglans major*), Arizona sycamore (*Platanus wrightii*), oak (*Quercus* spp.), netleaf hackberry (*Celtis reticulata*), velvet ash (*Fraxinus velutina*), Mexican elderberry (*Sambuccus mexicanus*), seepwillow (*Baccharis glutinosa*), and occasionally, tamarisk

(*Tamarix* spp.) (NPS 2018). Dense understory foliage is an important factor in nest site selection, while cottonwood trees are an important foraging habitat (USFWS 2011b).

Yellow-billed cuckoos typically arrive on their breeding grounds in early to mid-June. Females typically lay clutches of 2 to 3 eggs, and young develop in approximately 17 days, from egg-laying to fledging. After fledging, the young depend on the parents for another 3 weeks. By late August, most western yellow-billed cuckoos have begun their southward migration for the winter (USFWS 2011b).

Yellow-billed cuckoos are primarily foliage gleaners, although they can catch flying and ground-dwelling prey, such as grasshoppers or tree frogs. The species' diet during the nesting season consists primarily of large insects, such as grasshoppers and caterpillars, and the species often times the onset of breeding to coincide with an abundance of large insects. Foraging habitat is similar to that used for nesting, but it may include upland areas away from riparian woodlands, especially before nesting (Wiggins 2005).

Status and Distribution

Western yellow-billed cuckoos winter in South America and breed in western North America. The winter range and migration routes of the western yellow-billed cuckoo are poorly known, but Sechrist et al. (2012) reported migrations from New Mexico to Mexico, Central America, and South America, as far south as Argentina.

The geographical breeding range of the yellow-billed cuckoo in western North America includes suitable habitat within the low- to moderate-elevation areas west of the crest of the Rocky Mountains in Canada, Mexico, and the United States, including the upper and middle Rio Grande, the Colorado River Basin, the Sacramento and San Joaquin River systems, the Columbia River system, and the Fraser River (USFWS 2014b).

Based on historical accounts, western yellow-billed cuckoos were widespread and locally common in California and Arizona, in a few river reaches in New Mexico, in Oregon and Washington; generally local and uncommon in scattered drainages of the arid and semiarid portions of western Colorado, western Wyoming, Idaho, Nevada, and Utah; and probably uncommon and local in British Columbia (USFWS 2011b). The acres and percent of the yellow-billed cuckoo's proposed critical habitat that fall within the action area and focused action area are shown in **Table 3-9 and Figure A-15**. The Fish and Wildlife service anticipates publishing revised proposed critical habitat for yellow-billed cuckoo in the Federal Register in February 2020.

Table 3-9
Yellow-Billed Cuckoo Range and Proposed Critical Habitat in the Action Area and Focused Action Area

Habitat Type/Range	Total Acres Range-wide	Acres in Action Area	Percent in Action Area	Acres in Focused Action Area	Percent in Focused Action Area
Proposed critical habitat	489,271	1,135	<1	1,079	<1

Source: USFWS GIS 2018

Threats

Range-wide threats to the western yellow-billed cuckoo are the present or threatened destruction, modification, or curtailment of its habitat or range due to riparian habitat loss and degradation. Principal causes of riparian habitat destruction, modification, and degradation are alteration of hydrology from dams, water diversions, management of river flow that differs from natural hydrological patterns, channelization, and levees and other forms of bank stabilization that encroach onto the floodplain. These losses are further exacerbated by converting floodplains for agriculture, such as crops and livestock grazing. In combination with altered hydrology, these threats promote the conversion of primarily native habitats to monotypic stands of nonnative vegetation, which reduces the suitability of riparian habitat for the western yellow-billed cuckoo. Other threats to riparian habitat are long-term drought and climate change (USFWS 2014b).

Proposed Critical Habitat

Critical habitat for the western yellow-billed cuckoo is proposed on 546,335 acres in 80 separate units in Arizona, California, Colorado, Idaho, Nevada, New Mexico, Texas, Utah, and Wyoming (USFWS 2014c). The proposed critical habitat sites are all occupied, but may include both currently suitable habitat and adjacent habitat that will become suitable in the near future. The focused action area overlaps 1,079 acres of proposed critical habitat; however, all critical habitat would be in analysis exclusion areas (**Figure A-15**).

The PCEs for yellow-billed cuckoo proposed critical habitat are listed in **Table 3-10** below.

Table 3-10
Primary Constituent Elements of Yellow-Billed Cuckoo Proposed Critical Habitat

Feature	Description
1. Riparian woodlands	Riparian woodlands with mixed willow-cottonwood vegetation, mesquite-thorn forest vegetation, or a combination of these, that contain habitat for nesting and foraging in contiguous or nearly contiguous patches that are greater than 325 feet wide and 200 acres or more in extent; these habitat patches contain one or more nesting groves, which are generally willow dominated, have above-average canopy closure (greater than 70 percent), and have a cooler, more humid environment than the surrounding riparian and upland habitats
2. Adequate prey base	Presence of a prey base, consisting of large insects, such as cicadas, caterpillars, katydids, grasshoppers, large beetles, and dragonflies, and tree frogs for adults and young in breeding areas during the nesting season and in post-breeding dispersal areas
3. Dynamic riverine processes	River systems that are dynamic and provide hydrologic processes that encourage sediment movement and deposits that allow seedling germination and promote plant growth, maintenance, health, and vigor, for example lower gradient streams and broad floodplains, elevated subsurface groundwater table, and perennial rivers and streams); this allows habitat to regenerate at regular intervals, leading to riparian vegetation with variously aged patches from young to old

Source: USFWS 2014c

Effects Analysis and Determinations

Fuel break treatments would not be conducted within 150 ft to 300 ft of yellow-billed cuckoo nesting habitat because riparian exclusion areas would be classified as analysis exclusion areas. Yellow billed cuckoos typically nest in large patches of multilayered riparian habitats, which would quality as riparian exclusion areas. These include perennial streams, seasonally flowing streams, streams in inner gorge, and special aquatic features. Similarly, all proposed critical habitat would qualify as an analysis exclusion area. Additionally, no treatments will occur within 0.5 mile of proposed yellow-billed cuckoo critical habitat (Conservation Measure Cuckoo 1). Therefore, the proposed action would have no effect on proposed critical habitat, and it is excluded from the analysis below.

In addition to avoiding treatments in riparian habitat, the following conservation measures were designed to provide further protections to yellow-billed cuckoo proposed critical habitat as well as yellow-billed cuckoo occupied suitable habitat. Occupied suitable habitat refers to areas that meet the habitat requirements based on the Utah Field Office August 2017 Guidelines for the identification and evaluation of suitable habitat for the western yellow-billed cuckoo. These areas include suitable cuckoo breeding, nesting, and foraging habitat.

- Conservation Measure Cuckoo 1—No treatments would occur within 0.5 mile of proposed yellow-billed cuckoo critical habitat.
- Conservation Measure Cuckoo 2—Mechanical, chemical, or manual treatments would not occur during the yellow-billed cuckoo nesting season (June 1- August 31) within 0.5 mile of occupied suitable critical yellow-billed cuckoo habitat. Specific dates and buffer distances for the seasonal restrictions may be determined in coordination with the local USFWS Ecological Field Services Office, and should be based on species, variations in nesting chronology of particular species locally, topographic considerations, such as an intervening ridge between the treatment activities and a nest, or other factors that are biologically reasonable. Further, occupied suitable yellow-billed cuckoo habitat will be determined using the Utah Field Office August 2017 Guidelines for the identification and evaluation of suitable habitat for the western yellow-billed cuckoo.
- Conservation Measure Cuckoo 3—Prescribed fire would not be used within 0.5 mile of suitable yellow-billed cuckoo habitat. Suitable yellow-billed cuckoo habitat will be determined using the Utah Field Office August 2017 Guidelines for the identification of suitable habitat for the western yellow-billed cuckoo.

Design features from the PEIS that would reduce impacts to yellow-billed cuckoos are as follows:

- Design Feature 23—Manage targeted grazing to conserve suitable habitat conditions for special status species, while implementing rangeland health standards and guidelines (BLM 2014).
- Design Feature 42—If special status plant or animal populations or potential habitats occur in a proposed treatment area, a qualified biologist will assess the area for habitat suitability and balance need for treatment with the habitat needs of special status wildlife and plant species. Conduct appropriately timed surveys within suitable or potential habitats for federally listed, proposed, and BLM special status species prior to treatment. For plant species, appropriate timing may vary by species but is directly related to phenological stages (for example flowering or fruiting stages) that provide confidence in identification. Federally listed species with the potential to occur in the project area and the current BLM special status species list are found in the PEIS, Appendix J.
- Design Feature 43—Implement restrictions and conservation strategies for special status species, including federally listed, proposed, candidate, and BLM sensitive species, as contained in approved recovery and conservation plans, cooperative agreements, and other instruments in whose development the BLM has participated. If none are available, coordinate with the USFWS and/or state wildlife agencies to develop appropriate restrictions.

Additional conservation measures specific to yellow-billed cuckoos adapted from conservation measures for riparian bird species identified in the Vegetation Treatments BA (BLM 2005) would also be followed. They are listed below (Conservation Measure Cuckoo 4).

- Closely follow all application instructions and use restrictions on herbicide labels.

- Do not use 2,4-D adjacent to yellow-billed cuckoo habitat; do not broadcast spray 2,4-D within ¼ mile of suitable yellow-billed cuckoo habitat.
- Avoid use of the following herbicides adjacent to suitable yellow-billed cuckoo habitat: bromacil, clopyralid, diquat, diuron, glyphosate, hexazinone, imazapyr, metsulfuron methyl, picloram, tebuthiuron, and triclopyr.
- Do not broadcast spray clopyralid, diquat, diuron, glyphosate, hexazinone, picloram, or triclopyr adjacent to suitable yellow-billed cuckoo habitat.
- If broadcast spraying imazapyr or metsulfuron methyl adjacent to suitable yellow-billed cuckoo habitat, apply at the typical, rather than the maximum, application rate.
- If conducting manual spot applications of glyphosate, hexazinone, or triclopyr to vegetation adjacent to suitable yellow-billed cuckoo habitat, utilize the typical, rather than the maximum, application rate.

General Effects

Less than 1 percent of the total yellow-billed cuckoo's proposed critical habitat is in the focused action area (**Figure A-15**, **Table 3-9**). The acres represent the area that would be available for fuel break creation and maintenance in yellow-billed cuckoo proposed critical habitat, with a half-mile buffer. Not all of these acres would be affected, because only 667,000 acres of fuel breaks would be constructed under the proposed action.

Yellow-billed cuckoos occur in the focused action area only during the breeding season, during which they occupy large patches of multilayered riparian habitats. As discussed above, fuel breaks would not be established in yellow-billed cuckoo nesting habitat during any time of year because riparian areas would be classified as an analysis exclusion area and would be buffered by 300 ft. Additionally, no treatments would occur within 0.5 mile of proposed yellow-billed cuckoo critical habitat (Conservation Measure Cuckoo 1). Therefore no treatments would occur in or near the majority of habitat used by yellow-billed cuckoos in the focused action area.

Suitable occupied habitat, which may include upland foraging areas away from riparian woodlands (Wiggins 2005), would also be protected from effects because suitable occupied habitat for yellow-billed cuckoos would be buffered from mechanical, chemical, and manual treatments during the nesting season (Conservation Measure Cuckoo 2) and from prescribed fire year-round (Conservation Measure Cuckoo 3).

After application of conservation measures, residual effects would be effects on insect prey populations in upland foraging areas outside of the nesting season. Fuel break treatments could have indirect effects on yellow-billed cuckoo due to physical disturbance of habitat used by upland prey; prey in riparian areas would not be affected because no treatments would occur in riparian areas. Physical disturbance, including trampling, could also lead to injury or mortality of less mobile prey species. The localized loss of prey could reduce the availability of yellow-billed cuckoo food. Fuel break treatments could also alter habitat for upland prey species through vegetation removal or reduction, reseeding, and other treatments used to achieve the desired vegetation state. This could shift the assemblage of prey species, which would influence food availability for the yellow-billed cuckoo. However, effects on prey species and prey habitat would be insignificant. This is because the area of yellow-billed cuckoo critical habitat that overlaps the focused action area would be small, and the area affected would be even smaller because riparian areas would be avoided.

Over the long term, the proposed action would increase fire suppression opportunities, which would assist in the conservation of the yellow-billed cuckoo by reducing future habitat loss and fragmentation due to wildfires.

Effects of Chemical Treatments

Chemical treatments would have minimal effects on yellow-billed cuckoo. This is because no treatments would occur in riparian nesting habitat or within 0.5 mile of proposed critical habitat (Conservation Measure Cuckoo 1). Suitable occupied yellow-billed cuckoo habitat would be further protected from chemical treatments during the yellow-billed cuckoo nesting season (June 1 to August 31) by a 0.5-mile buffer (Conservation Measure Cuckoo 2).

Chemical treatments could occur outside of the nesting season in upland habitats used by yellow-billed cuckoos for foraging, dispersal, and exploratory movements. The temporary presence of humans and vehicles in the area associated with chemical treatments in upland habitat could affect insect prey species as described under *General Effects*.

Use of chemical treatments could also injure or kill upland prey species, due to direct or indirect exposure or from trampling by workers performing spot treatments. This could result in a slight reduction in the type and abundance of all prey in yellow-billed cuckoo habitat. Anticipated changes in upland prey populations would be negligible and would not affect the cuckoo's ability to obtain food. This is because treatments would be small in scale and would only occur along roads and ROWs, which are previously disturbed and probably do not contribute much to the yellow-billed cuckoos' prey base.

The application of design features, conservation measures, and SOPs would avoid or minimize adverse effects on yellow-billed cuckoos and habitat. Because of this, chemical treatments ***may affect but are not likely to adversely affect*** yellow-billed cuckoos. Additionally, because no treatments would occur within 0.5 mile of proposed yellow-billed cuckoo critical habitat, chemical treatments would have ***no effect*** on proposed critical habitat.

Effects of Manual Treatments

Manual treatments would have minimal effects on yellow-billed cuckoos. This is because no manual treatments would occur in riparian nesting habitat or within 0.5 mile of proposed critical habitat (Conservation Measure Cuckoo 1). Suitable occupied yellow-billed cuckoo habitat would be further protected from manual treatments during the yellow-billed cuckoo nesting season (June 1 to August 31) by a 0.5-mile buffer (Conservation Measure Cuckoo 2).

Manual treatments could occur outside of the nesting season in upland habitats used by yellow-billed cuckoos for foraging, dispersal, and exploratory movements. Manual treatments would involve the use of hand tools and hand-operated power tools to cut, clear, or prune herbaceous and woody species. Physical disturbance from manual treatments could alter habitat and damage or destroy upland prey species. However, manual treatments are normally precise, focused efforts that would allow damage to native insect host plants to be avoided. Because of this, the change in prey availability and the level of disturbance would be insignificant.

Due to the focused nature of manual treatments and with the application of design features, conservation measures, and SOPs that would avoid or minimize adverse effects on yellow-billed cuckoos and habitat, manual treatments ***may affect but are not likely to adversely affect*** yellow-billed cuckoos. Additionally, because no treatments would occur within 0.5 mile of proposed yellow-billed cuckoo critical habitat, manual treatments would have ***no effect*** on proposed critical habitat.

Effects of Mechanical Treatments

Mechanical treatments would have minimal direct effects on yellow-billed cuckoo. This is because no treatments would occur in riparian nesting habitat or within 0.5 mile of proposed critical habitat (Conservation Measure Cuckoo 1). Furthermore, mechanical treatments would not occur within 0.5 mile of suitable occupied yellow-billed cuckoo habitat during the yellow-billed cuckoo nesting season (June 1 to August 31) (Conservation Measure Cuckoo 2).

Residual effects would be from the use of heavy equipment and machinery to carry out mechanical treatments in upland foraging areas. These could kill or injure upland prey species used by yellow-billed cuckoo. Non-selective mechanical treatments could remove some nontarget vegetation, in addition to target species. This could alter habitat for upland prey species. These potential effects could slightly reduce prey availability for yellow-billed cuckoo, but these effects are expected to be insignificant. This is because the area of habitat treated would be small (only upland areas within the range of the yellow billed cuckoo in the focused action area) and treatments would only occur along roads and ROWs, which are previously disturbed and probably do not contribute much to the yellow-billed cuckoos' prey base.

Design features and SOPs would minimize and avoid adverse effects on yellow-billed cuckoos and habitat. Because of this, mechanical treatments ***may affect but are not likely to adversely affect*** yellow-billed cuckoos. Additionally, because no treatments would occur within 0.5 mile of proposed yellow-billed cuckoo critical habitat, mechanical treatments would have ***no effect*** on proposed critical habitat.

Effects of Prescribed Fire

Prescribed fire would have minimal direct effects on yellow-billed cuckoo. This is because no treatments would occur in riparian nesting habitat or within 0.5 mile of proposed critical habitat (Conservation Measure Cuckoo 1). Furthermore, prescribed fire would not be used within 0.5 miles of suitable occupied yellow-billed cuckoo habitat (Conservation Measure Cuckoo 3).

Prescribed fire could occur outside of the nesting season in upland habitats used by yellow-billed cuckoos for foraging, dispersal, and exploratory movements. Treatments could kill or injure upland prey species. Prescribed fire could also remove vegetation used as habitat or nectar sources for prey species. These potential effects could slightly reduce prey availability for yellow-billed cuckoo; however, they are expected to be insignificant because the area of habitat treated would be small (only upland areas within the range of the yellow billed cuckoo in the focused action area) and treatments would only occur along roads and ROWs, which are previously disturbed and probably do not contribute much to the yellow-billed cuckoos' prey base.

Design features and SOPs would minimize and avoid adverse effects on yellow-billed cuckoos and habitat. Because of this, prescribed fire treatments ***may affect but are not likely to adversely affect*** yellow-billed cuckoos. Additionally, because no treatments would occur within 0.5 mile of proposed yellow-billed cuckoo critical habitat, prescribed fire treatments would have ***no effect*** on proposed critical habitat.

Effects of Revegetation

Direct effects from revegetation could occur due to the use of tools and human presence required to implement treatments. They are the same as those described above for *General Effects*. Impacts would be minimal because no treatments would occur in riparian nesting habitat or within 0.5 mile of proposed critical habitat (Conservation Measure Cuckoo 1). Furthermore, mechanical, manual, chemical, and prescribed fire treatments would not be used within 0.5 miles of suitable occupied yellow-billed cuckoo habitat (Conservation Measure Cuckoo 2, Conservation Measure Cuckoo 3). Impacts on prey in upland foraging areas outside of the nesting season could occur from trampling by fields crews and use of tools; impacts would be the same as described for *General Effects*.

Over the long term, planting or reseeding fuel breaks with native forbs and shrubs or perennial grasses may improve habitat and increase nectar sources for upland insect prey species. This would result in a gradual increase in the availability of upland prey used by yellow-billed cuckoo.

Design features and SOPs would minimize and avoid adverse effects on yellow-billed cuckoos and habitat. Because of this, revegetation treatments ***may affect but are not likely to adversely affect*** yellow-billed cuckoos. Additionally, because no treatments would occur within 0.5 mile of proposed yellow-billed cuckoo critical habitat, revegetation treatments would have ***no effect*** on proposed critical habitat.

Effects of Targeted Grazing

No treatments would occur in riparian nesting habitat or within 0.5 mile of proposed critical habitat (Conservation Measure Cuckoo 1). Targeted grazing could be used outside of these areas. Direct effects of targeted grazing due to human presence on yellow-billed cuckoo would be the same as described under *General Effects*. Effects would be less, due to shorter treatment time; that is, the time needed to release livestock would typically be less than for using other treatment methods and would likely occur in a single event. The presence of livestock would not directly affect nesting habitat because riparian areas would not be treated.

The impacts of crews trampling upland prey would be the same as those described for *General Effects*. The use of targeted grazing in upland areas next to yellow-billed cuckoo habitat would result in the loss of target and some nontarget vegetation used by insects that are the cuckoo's prey base. Potential prey reductions would likely be small, because the area of habitat for cuckoo prey that would be treated would be small (only upland areas in the range of the yellow billed cuckoo in the focused action area).

Design features and SOPs would minimize and avoid adverse effects on yellow-billed cuckoos and habitat. Because of this, targeted grazing treatments ***may affect but are not likely to adversely affect*** yellow-billed cuckoos. Additionally, because no treatments would occur within 0.5 mile of proposed yellow-billed cuckoo critical habitat, targeted grazing treatments would have ***no effect*** on proposed critical habitat.

Interrelated and Interdependent Effects

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

Cumulative Effects

The cumulative effects analysis area for ESA-listed wildlife species is the focused action area. Future state, tribal, local, or private actions that are reasonably likely to occur and affect the yellow-billed cuckoo and proposed critical habitat are riparian habitat loss and degradation. This would be due to agriculture and other uses, dams and river flow management, stream channelization and stabilization, and livestock grazing; commercial and residential developments; transportation infrastructure; vegetation treatments; pesticide use; and climate change. These actions are described in more detail below, followed by the cumulative contribution from the proposed action.

Such activities as livestock overgrazing, encroachment by agriculture, and river flow management on state and private lands cause habitat loss and alteration of natural watercourse hydrology. Water flow alterations reduce the multi-layered woody deciduous riparian plant communities next to perennial or intermittent streams. This has had a widespread impact on the distribution and abundance of yellow-billed cuckoos and proposed critical habitat, which are associated with that forest type (Rosenberg et al. 1991).

Other types of activities on State and private lands such as housing developments and associated infrastructure contribute to habitat degradation by compressing and fragmenting available habitat for cuckoos and their prey. These types of land uses are expected to continue to varying degrees across the project area and will continue to make the maintenance of yellow-billed cuckoo habitat on Federal lands important for supporting populations. Disturbance regimes imposed by humans (e.g., grazing, water diversion, flood control, woodcutting, and vegetation clearing) have facilitated the spread of tamarisk, an invasive species whose spread and persistence of has resulted in significant changes in riparian plant communities (Rosenberg et al. 1991). Further, tamarisk establishment often results in a self-perpetuating regime of periodic fires, which were uncommon in native riparian woodlands (Bush and Smith 1993).

Climate change has the potential to be an additional stressor to the western yellow-billed cuckoo. Warmer temperatures are already occurring in the southwestern United States and may alter the plant species composition of riparian forests over time. An altered climate may also disrupt food availability for the western yellow-billed cuckoo if the timing of peak insect emergence changes in relation to when the cuckoos arrive on their breeding grounds to feed on this critical food source (NPS 2018).

Disturbance due to human or animal presence on State and private lands is expected to occur throughout the action area and focused action area due to activities such as vegetation treatments, recreation, and development. Activities that occur during the breeding season on State and private lands may interfere with nesting, foraging, and ultimately reproduction Pesticide use may cause eggshell thinning, which may lead to reproduction problems. Pesticides in caterpillars, or in frogs and other prey using polluted runoff from agricultural fields, may be sources of contamination (NPS 2018). Pesticide treatments on State and private lands would likely contribute a larger amount to adverse cumulative effects because they would not be subject to design features or conservation measures.

3.1.9 Southwestern Willow Flycatcher

Listing Status and Recovery Plan

The southwestern willow flycatcher was listed as an endangered species on February 27, 1995 (USFWS 1995). A 12-month finding to review the status of southwestern willow flycatcher as a result of a petition to delist the species was released in December 2017. Based on review of best available science the USFWS determined delisting of southwestern flycatcher is not warranted. Final critical habitat for southwestern willow flycatcher was designated in 1997 and revised on January 3, 2013 (USFWS 2013). All final critical habitat it is located over 0.5 mile from the focused action area (**Figure A-16**). The recovery plan was released in 2002 (USFWS 2002).

Life History and Habitat Characteristics

Similar to the yellow-billed cuckoo, the southwestern willow flycatcher is a neotropical migrant bird associated with riparian ecosystems. All willow flycatcher subspecies spend time migrating in the United States from April to June and from July through September. Willow flycatchers, like most small, migratory, insect-eating birds, require stopover areas in order to replenish energy reserves and continue migration. Many willow flycatchers migrating are detected in riparian habitats or patches that would be unsuitable for nest placement. In these habitats, migrating flycatchers may use a variety of riparian habitats, including ones dominated by native or nonnative plant species, or mixtures of both (USFWS 2017). During the breeding season from April 15 to August 15[5], this subspecies of willow flycatcher is found in the southwestern United States in parts of California, Nevada, Utah, Colorado, Arizona, New Mexico, and Texas (USFWS 2017).

Southwestern willow flycatchers establish nesting territories, reproduce, and forage in patchy to dense mesic riparian shrub and tree communities along streams or wetlands that are 0.25 acres or greater in size, within floodplains large enough to accommodate riparian patches at least 30 feet wide. Nests are typically placed in trees where the plant growth is most dense, where trees and shrubs have vegetation near ground level, and where there is a low-density canopy. Generally, flycatchers are not found nesting in areas without willows, tamarisk, or both, though some exceptions occur. The subspecies eats a wide range of terrestrial and aquatic invertebrates.

Status and Distribution

The extent of the flycatcher's current known breeding range is similar to the historical range of southern California, southern Nevada, southern Utah, southern Colorado, Arizona, New Mexico, western Texas, and extreme northwestern Mexico (**Figure A-16**), but the quantity and distribution of breeding habitat within that range is reduced (USFWS 2017).

The willow flycatcher five-year review concluded that the flycatcher's status has improved (due to an overall increase in known estimated territories) since the 1995 listing, but its classification as "endangered" is still accurate (USFWS 2017). The most current reports estimate the number of territories range-wide as of the end of the 2012 breeding season was 1,629. Ongoing threats associated with land and water management combined with the introduction and spread of the tamarisk leaf beetle create challenges for species recovery and are likely to cause future population declines (USFWS 2017).

Threats

Primary threats to southwestern willow flycatcher are habitat loss and modification caused by dams and reservoirs, diversion and groundwater pumping, invasive plants and beetles, river management, urbanization, agricultural development, livestock grazing and management, fire and fire management, cowbird parasitism, recreation, and tamarisk leaf beetle (*Diorhabda elongate*). Other factors include

[5] Personal communication with Dawn Davis, Sagebrush Ecosystem Coordinator - Certified Wildlife Biologist, USFWS, email on April 23, 2019.

drought and the effects of climate change, vulnerability of small or isolated populations, and genetic effects (USFWS 2017).

Effects Analysis and Determinations

Relevant design features from the PEIS that would aide in the protection of southwestern willow flycatchers are:

- Design Feature 23—Manage targeted grazing to conserve suitable habitat conditions for special status species, while implementing rangeland health standards and guidelines (BLM 2014)
- Design Feature 42—If special status plant or animal populations or potential habitats occur in a proposed treatment area, a qualified biologist will assess the area for habitat suitability and balance need for treatment with the habitat needs of special status wildlife and plant species. Conduct appropriately timed surveys within suitable or potential habitats for federally listed, proposed, and BLM special status species prior to treatment. For plant species, appropriate timing may vary by species but is directly related to phenological stages (for example flowering or fruiting stages) that provide confidence in identification. Federally listed species with the potential to occur in the project area and the current BLM special status species list are found in the PEIS, Appendix J.
- Design Feature 43—Implement restrictions and conservation strategies for special status species, including federally listed, proposed, candidate, and BLM sensitive species, as contained in approved recovery and conservation plans, cooperative agreements, and other instruments in whose development the BLM has participated. If none are available, coordinate with the USFWS and/or state wildlife agencies to develop appropriate restrictions.

In addition, the following conservation measure would reduce:

- Conservation Measure Flycatcher 1—Aerial application of chemicals would not occur during the southwestern willow flycatcher breeding season (April 15 to August 15) within 0.5 mile of suitable southwestern willow flycatcher habitat.
- Conservation Measure Flycatcher 2—Mechanical treatments, ground-based broadcast application of herbicides, or cutting of noxious or invasive woody species would not occur during the southwestern willow flycatcher breeding season within 0.5 mile of suitable habitat southwestern willow flycatcher habitat.
- Conservation Measure Flycatcher 3—Prescribed fire would not be used within 0.5 mile of suitable southwestern willow flycatcher habitat.
- Conservation Measure Flycatcher 4—No targeted grazing will be implemented within 12 mi of suitable southwestern willow flycatcher habitat or final critical habitat during the southwestern willow flycatcher breeding season.
- Conservation Measure Flycatcher 5—Avoid treatments in more than 25 percent of a suitable habitat patches for southwestern willow-flycatchers in any given year.

Additional conservation measures specific to southwestern willow flycatchers would also be followed and are listed below (Conservation Measure Flycatcher 6). These were adapted from conservation measures for riparian bird species identified in the Vegetation Treatments BA (BLM 2005).

- Closely follow all application instructions and use restrictions on herbicide labels.

- Do not use 2,4-D in southwestern willow flycatcher habitat; do not broadcast spray 2,4-D within ¼ mile of southwestern willow flycatcher habitat.
- Avoid use of the following herbicides in or adjacent to southwestern willow flycatcher habitat: bromacil, clopyralid, diquat, diuron, glyphosate, hexazinone, imazapyr, metsulfuron methyl, picloram, tebuthiuron, and triclopyr.
- Do not broadcast spray clopyralid, diquat, diuron, glyphosate, hexazinone, picloram, or triclopyr in southwestern willow flycatcher habitat; do not broadcast spray these herbicides in areas adjacent to southwestern willow flycatcher habitat under conditions when spray drift onto the habitat is likely.
- If broadcast spraying imazapyr or metsulfuron methyl in or adjacent to southwestern willow flycatcher habitat, apply at the typical, rather than the maximum, application rate.
- If conducting manual spot applications of glyphosate, hexazinone, or triclopyr to vegetation in or adjacent to southwestern willow flycatcher habitat, utilize the typical, rather than the maximum, application rate.

General Effects

Given the similarity in habitat use between the southwestern willow flycatcher and the western yellow-billed cuckoo, which are both riparian-dependent passerines, the types of effects from the proposed action would be comparable. The effects of each treatment method are described in **Section 3.1.8 Yellow-billed cuckoo** and are incorporated into in this section.

Southwestern willow flycatchers associate closely with riparian habitats for breeding and foraging. All aquatic and riparian areas are included in analysis exclusion areas and buffered from all treatment types. Direct and indirect effects to willow flycatchers as described in **Section 3.1.8 Yellow-billed cuckoo** are unlikely due to 150-ft to 300-ft buffers of riparian areas for all treatment methods and additional buffers of southwestern willow flycatcher habitat based on conservation measures.

An additional potential concern for southwestern willow flycatchers is an increase in brood parasitism by brown-headed cowbirds associated with targeted grazing. Livestock grazing in and near riparian habitat may increase cowbird access to southwestern willow flycatcher nests, improve foraging opportunities, and establish foraging areas closer to flycatcher nesting areas (USFWS 2002). Conservation Measure Flycatcher 4 would prohibit targeted grazing within 12 mi of flycatcher suitable habitat and final critical habitat. This would reduce the possibility of an increase in nest parasitism to a discountable level.

The application of design features, conservation measures, and avoidance measures would avoid or minimize adverse effects on southwestern willow flycatchers and habitat. Because of this, the proposed action, including all treatment methods, ***may affect but are not likely to adversely affect*** southwestern willow flycatcher.

Cumulative Effects

The cumulative effects analysis area for ESA-listed wildlife species is the focused action area. Future state, tribal, local, or private actions that are reasonably likely to occur and affect southwestern willow flycatchers are habitat loss and alterations due to anthropogenic and natural causes. These actions are described in more detail below, followed by the cumulative contribution from the proposed action.

Riparian nesting habitat tends to be uncommon, isolated, dispersed, and dynamic due to natural disturbance and regeneration events such as floods, drought, and fire. Land and water management actions that alter river function have exacerbated these habitat characteristics over time through. Increasing human populations and development have led to large alterations and loss of riparian areas. In some instances, there have also been site-specific and temporal increases in riparian habitat. However, overall, the conditions of riparian ecosystems in the Southwest have declined from reductions in water flow and groundwater, interruptions in natural hydrological events and cycles, physical modifications to streams, direct removal of riparian vegetation, and an increase in fire events, due to water management and land use practices (USFWS 2014).

Livestock grazing on state and private lands is expected to continue throughout the action area and focused action area. Overgrazing can reduce the suitability of southwestern willow flycatcher habitat by altering plant community structure, species composition, relative abundance of species, and stream channel morphology, and increase cowbird nest parasitism (USFWS 2014).

3.2 Plant Species

3.2.1 Effects Common to All Plant Species

Design Features: ESA-listed Plant Species

ESA-listed plants would be avoided during treatments. Avoidance would come about by implementing avoidance buffers around ESA-listed individuals and populations, as described below in *Effects from Fuel Break Construction and Maintenance*. As a result, the potential for direct adverse effects on most ESA-listed plant species is anticipated to be low enough to be discountable. However, residual adverse effects may still occur. These would primarily be due to the lack of detection if surveys failed to detect ESA-listed plants or their seed banks during pre-project planning.

The potential for residual, adverse effects on most ESA-listed plant species would be substantially reduced or avoided by implementing the design features included as part of the Proposed Action. These are included in full in **Section 2.2**, Design Features from the PEIS and those specific to ESA-listed plant species are summarized below.

- Design Feature 4: Apply restrictions and design features in applicable land use plans and land use plan amendments. Develop resource-specific buffer distances and apply seasonal restrictions based on site-specific conditions, best available science, applicable land use plan guidance, and professional judgement. If any design features in this PEIS conflict with state or local BLM guidance, defer to state or local guidance.
- Design Feature 7: Where feasible, fuel breaks would be constructed where vegetation disturbance by wildland fire or surface-disturbing activities has already occurred.
- Design Feature 9: All project personnel would be required to attend an environmental training prior to initiating Project construction. The training would address environmental concerns and stipulations and requirements for compliance with the project.
- Design Feature 11: During times of high fire danger, all equipment would be equipped with a functional spark arrestor. Operators would be required to have, at a minimum, a shovel and a working fire extinguisher on hand.
- Design Feature 21: Before targeted grazing begins, complete a targeted grazing plan that optimizes successful reduction of the target species, while avoiding damaging desired plants. (see complete

Design Feature in **Table 2-2** for all stipulations that would be included in the targeted grazing plan.)

- Design Feature 22: Provide adequate rest from livestock grazing: to allow desired vegetation to recover naturally; in suitable habitat for threatened and endangered plants; and for seeded species in treated areas to successfully become established. All new seedings of grasses and forbs should not be grazed until, at least, after the end of the second growing season, or when fuel break objectives are met to allow plants to mature and develop robust root systems. This would stabilize the site, compete effectively against cheatgrass and other invasive annuals, and remain sustainable under long-term grazing management. Adjust other management activities to meet project objectives.
- Design Feature 23: Manage targeted grazing to conserve suitable habitat conditions for special status species, while implementing rangeland health standards and guidelines (BLM 2014).
- Design Feature 24: Implement a Graduated Use Plan (see **Section 2.10.1**).
- Design Feature 25: All prescribed soil disturbance would need to incorporate noxious and invasive weed management, including pre-work evaluation or avoidance.
- Design Feature 26: Noxious weeds and invasive plants would be monitored to track changes in populations over time, and corrective action would be prescribed where needed, in accordance with local weed programs. Thresholds and responses for noxious weeds and invasive plants (particularly invasive annual grasses) will be included in fuel break implementation and monitoring plans.
- Design Feature 28: Locally adapted or genetically appropriate perennial forbs and grasses would be applied at jackpot and pile burn sites when appropriate to facilitate establishment of vegetation.
- Design Feature 36: Minimize ground-disturbing treatments in areas with highly erosive soils.
- Design Feature 37: Avoid or minimize ground-disturbing activities when soils are saturated.
- Design Feature 38: Use best management practices and soil conservation practices during project design and implementation to minimize sediment discharge into streams, lands, and wetlands from such treatments as mowing, disking, and seeding. This is to protect designated beneficial uses.
- Design Feature 39: Soils, site factors, and timing of application must be suitable for any ground-based equipment used for creating a fuel break. This is to avoid excessive compaction, rutting, or damage to the soil surface layer. Equipment would be used on the contour, where feasible.
- Design Feature 40: For safety and to protect site resources, treatment methods involving equipment generally would not be applied on slopes exceeding 35 percent.
- Design Feature 41: Bare soil (disked) portions of fuel breaks adjacent to roadways would not exceed 25 feet on either side of the roadway.
- Design Feature 42: If special status plant or animal populations and their habitats occur in a proposed treatment area, assess the area for habitat quality and base the need for treatment on special status species present. Conduct appropriately timed surveys within suitable or potential habitats for federally listed, proposed, and BLM special status species prior to treatment.
- Design Feature 43: Implement restrictions and conservation strategies for special status species, including federally listed, proposed, candidate, and BLM sensitive species, as contained in approved recovery and conservation plans, cooperative agreements, and other instruments in whose development the BLM has participated. If none are available, coordinate with the USFWS and/or state wildlife agencies to develop appropriate restrictions.

After implementation of the above-listed design features, the potential for direct adverse effects on most ESA-listed plant species is anticipated to be low enough to be discountable. However, as noted above, residual adverse effects may still occur if surveys failed to detect ESA-listed plants or their seed banks during pre-project planning. Surveys, as described in Design Feature 42, may not accurately account for annual species, particularly those which do not reliably appear every year, so the potential for effects would likely be greatest for this group of plants. Biennial species and long-lived perennials are more reliably detectable because they are more persistent from year to year; therefore, the potential for effects on these two groups would be lower.

The potential that the proposed action would have direct adverse effects on ESA-listed plant species that occur in Analysis Exclusion Areas (see **Section 2.6**) would be low enough to be discountable. **Table 3-11** summarizes ESA-listed plant habitats considered to be Analysis Exclusion Areas. As described in **Section 2.6**, fuel break treatments would not be implemented in these areas; thus, direct adverse effects on ESA-listed plants in these areas are not anticipated to occur; however, the potential for residual, effects from adjacent fuel break treatments would still exist, as described in the analyses for each species below.

Table 3-11
ESA-listed Plants with Habitat in Analysis Exclusion Areas

ESA-listed Plant	Habitat Description
Barneby reed-mustard	Bare, steep, north-facing slopes in sparsely vegetated mixed desert shrub communities.
Clay/Atwood's phacelia	Xeric habitat with steep slopes. Soil is composed of clay, silt, and sand overlain by pebble and shale.
Clay reed-mustard	Steep hill sides, on clay soil rich in in gypsum and overlain with sandstone talus. Vegetation coverage is low and typically occurs in desert shrub plant communities.
Kodachrome bladderpod	White, bare shale knolls on rocky soil and with very little vegetative cover.
Pariette cactus	Fine soils in clay badlands derived from the Uinta formation in sparsely vegetated desert shrubland.
Shrubby reed-mustard	Disjunct, white shale layer resembling small, dry desert islands on level to moderate slopes, in sparsely vegetated desert shrubland.
Uinta Basin hookless cactus	Found on coarse soils or rocky surfaces on mesa slopes in desert shrubland vegetation communities where plant cover is likely sparse.

Species-specific conservation measures would further lower the potential for residual adverse effects on ESA-listed plant species for which they were developed. These measures are discussed in the effects analysis for each species.

Effects from Fuel Break Construction and Maintenance

Fuel break construction and maintenance would avoid occupied and critical habitat for ESA-listed plant species. Avoidance buffers would vary depending on the treatment type, and for chemical treatments, the specific formulation, application rate, and application method. Avoidance buffers are described in **Table 3-12** below.

Table 3-12
Avoidance Buffers for all ESA-Listed Plants and Treatment Types

Treatment Type	Buffer	Buffer Purpose
Manual, Mechanical, Revegetation, Prescribed Fire, Targeted Grazing	Avoidance buffer based on the largest documented foraging distance of known pollinators, plus an additional 10 percent over this distance. In cases where available pollinator and foraging distance data is limited, buffer individuals and populations by 1,640 feet (Dawson 2012).	Protection of pollinator habitat.
Chemical (General)	All formulations and application rates and types: 1,640 feet	Protection of pollinator habitat.
Chemical (General)	Where formulation- and application rate and type-specific buffers[1] are less than 1,640 feet, the 1,640-foot buffer would apply	Protection of pollinator habitat and ESA-listed plants from herbicide drift, runoff, or other unintentional application pathway.
Chemical (General)	Where formulation- and application rate and type-specific buffers[1] are greater than 1,640 feet, the more conservative (i.e., larger) buffer would apply as follows in rows below:	Protection of ESA-listed plants from herbicide drift, runoff, or other unintentional application pathway.
Chemical (2,4-D)	• ½ mile (2,640 feet)	Same as above.
Chemical (Aminopyralid)	• Airplane, typical application rate: 1,800 feet • Airplane, maximum application rate: 2,000 feet • Helicopter, typical application rate: 1,640 feet • Helicopter, maximum application rate: 1,700 feet • Where wind erosion is likely, 1.2 miles (6,336 feet)	Same as above
Chemical (Bromacil, Chlorsulfuron, Dicamba, Diflufenzopyr, Diuron, Imazapic, Overdrive®, Sulfometuron Methyl, Tebuthiuron)	• Where wind erosion is likely, ½ mile (2,640 feet)	Same as above
Chemical (Clopyralid)	• Ground application, high boom: ½ mile (2,640 feet) • Aerial application: ½ mile (2,640 feet) • Where wind erosion is likely, ½ mile (2,640 feet)	Same as above
Chemical (Fluridone)	• ½ mile (2,640 feet)	Same as above
Chemical (Fluroxypyr)	• Where wind erosion is likely, 1.2 miles (6,336 feet)	Same as above
Chemical (Glyphosate)	• Ground application, high boom: ½ mile (2,640 feet)	Same as above
Chemical (Hexazinone)	• Ground application, high boom: ½ mile (2,640 feet) • Where wind erosion is likely, ½ mile (2,640 feet)	Same as above

Treatment Type	Buffer	Buffer Purpose
Chemical (Imazapyr, Metsulfuron Methyl, Triclopyr Acid, Triclopyr BEE)	• Ground application, high boom: ½ mile (2,640 feet) • Ground application, maximum rate: ½ mile (2,640 feet) • Aerial application, maximum rate: ½ mile (2,640 feet) • Where wind erosion is likely, ½ mile (2,640 feet)	Same as above
Chemical (Picloram)	• Ground application: ½ mile (2,640 feet) • Aerial application: ½ mile (2,640 feet) • Where wind erosion is likely, ½ mile (2,640 feet)	Same as above
Chemical (Rimsulfuron)	• Airplane, maximum application rate: 1,900 feet	Same as above

Notes
[1] BLM 2007, pp. 4-130 to 4-134; BLM 2015, pp. 15-16, also see *Effects from Chemical Treatments below*

Avoidance buffers have also been developed for specific ESA-listed plant species and specific treatment types. These are described in **Table 3-13** below.

Table 3-13
Avoidance Buffers for Specific ESA-Listed Plants and Treatment Types

ESA-Listed Plant	Treatment Type	Buffer	Buffer Purpose
Clay/Atwood's Phacelia Kodachrome Bladderpod Last Chance Townsendia Pariette Cactus San Rafael Cactus Shrubby Reed-Mustard Slickspot Peppergrass Spalding's Catchfly Uinta Basin Hookless Cactus Webber's Ivesia Wright Fishhook Cactus Clay Reed-Mustard	Targeted Grazing	Temporary fencing to prevent livestock entry would be placed 1640 ft from individuals or populations within the graduated use area for targeted grazing treatment areas	Protection from adverse effects of livestock grazing.
Clay Reed-Mustard	All	Where surveys to determine occupancy are technically infeasible and otherwise hazardous due to topography, slope, etc., avoid suitable habitat with a 300-foot avoidance buffer	Protection from adverse effects of treatments.

In general, residual adverse effects on ESA-listed plant species could occur if undetected individuals or populations were in a fuel break treatment area. Effects would generally be due to soil disturbance or damage to plants during treatments, as discussed in more detail below. Effect intensity would vary, depending on the method proposed for fuel break construction or maintenance, as discussed under each treatment type below. The potential for residual adverse effects on specific ESA-listed species is discussed in the analysis for each species below.

Over time, creating and maintaining fuel breaks would increase fire suppression opportunities, modify wildfire behavior by reducing fire severity and intensity, and decrease the potential for wildfire to spread across the landscape. This would indirectly protect ESA-listed plant species by reducing the potential for habitat loss or alteration due to wildfire, including habitat for ESA-listed plant pollinators, and enhance ESA-listed plant habitat by facilitating natural and revegetated sagebrush community recovery. Protecting sagebrush communities, pollinator habitat, and restoration investments from future wildfire would prevent loss of, and facilitate recovery of suitable habitats that may support ESA-listed plants in the future. Overall, the proposed action is anticipated to have net beneficial effects for most ESA-listed plant species in the action area. This would come about from landscape-scale sagebrush community and pollinator habitat protection, and reduced potential for sagebrush community and pollinator habitat loss from invasive annual grass conversion; both are indirect beneficial effects that would facilitate ESA-listed plant species recovery over time.

Treatments to create and maintain fuel breaks can occur singly or in combination. For instance, multiple methods could be combined to control or eradicate noxious weeds or invasive plants using an integrated approach. For example, manual or mechanical treatments may be followed by spot treatment of herbicide or revegetation via seeding to reduce or prevent invasive annual grass germination. The potential for adverse effects on ESA-listed plants could increase if multiple types of treatments are used in the same location.

Effects from Manual Treatment Methods

Manual treatments would selectively cut, clear, remove, or prune vegetation in fuel breaks. The amount of surface disturbance associated with manual treatments is generally minor and localized. As described under *Effects from Fuel Break Construction and Maintenance*, residual adverse effects on ESA-listed plant species could occur only where undetected individuals or populations were located in or near a manual treatment area.

Residual adverse effects could occur where undetected, individual ESA-listed plant species were damaged or killed by foot traffic or vehicle access during treatments, if they are not detected during pre-treatment surveys; however, the potential for this direct adverse effect is low given the small treatment areas and limited foot traffic, and because vehicle access would be restricted to existing roads.

Manually removing the shrub canopy could result in a short-term release of understory herbaceous species, including invasive annual grasses (Davies et al. 2011). This could increase percent cover of understory herbaceous species, in both the fuel break and adjacent vegetation communities. This could indirectly adversely affect ESA-listed plants in nearby habitats, by increasing the competition for available resources like light, moisture, and nutrients. Effect intensity would be reduced by conducting invasive weed management including pre-work evaluation or avoidance (Design Feature 25), but the effect would not be completely prevented.

Effects from Mechanical Treatment Methods

Mechanical treatments would remove vegetation and prepare and sow seedbeds to create and maintain fuel breaks in areas where manual treatments would be impractical. In general, adverse effects on ESA-listed plants would be unlikely to occur after implementation of design features, and because many ESA-listed plant habitats in the action area would be considered Analysis Exclusion Areas (**Table 3-11**) where treatments would not be done. As described under *Effects from Fuel Break Construction and Maintenance*, residual adverse effects on ESA-listed plant species could occur only where undetected individuals or populations were located in or near a mechanical treatment area.

Mechanical methods would have similar residual adverse effects as described under *Effects from Manual Treatment Methods* on undetected ESA-listed plant species. However, effect intensity would generally be increased, due to the size of the affected area, the amount of soil surface disturbance, and the continuity of the disturbed area and the inability to selectively target species during mechanical treatments (Benton et al. 2016).

Like manual treatments, mechanical treatments may indirectly adversely affect ESA-listed plant species by increasing the percent cover of invasive annual grasses in the fuel break and potentially in adjacent vegetation communities (Davies et al. 2011a). This effect may be greater relative to manual treatments because additional surface disturbance could stimulate greater areas of existing understory herbaceous species, including invasive annual grasses. As described for manual treatments, conducting invasive weed management including pre-work evaluation or avoidance (Design Feature 25) would reduce potential effects but would not completely prevent them.

The use of mechanical equipment would generate airborne dust, which could settle on nearby ESA-listed species and interfere with processes such as plant photosynthesis, respiration, and transpiration, and affect pollinator efficiency (Farmer 1993, Waser et al. 2017). Direct adverse effects on undetected ESA-listed plant individuals could also occur from trampling or crushing by vehicles or equipment during treatments. This could result in mechanical damage to plants, reducing physiological or reproductive function. Similarly, if seeds were trampled, they may become too deeply buried to germinate, particularly those that grow in sandy or loose soils. Soil compaction from heavy equipment could hinder the germination of undetected seedbanks and prevent re-establishment of seedlings due to reduced water infiltration. Potential adverse effects on plant habitat from mechanical treatments include damage from the use of heavy vehicles, such as soil compaction, scarification, and mixing of soil layers (Spence et al. 1996).

Fuels, lubricants, or other potentially hazardous materials associated with heavy equipment would also have potential to be released into the environment, potentially degrading habitat quality. Maintaining equipment and designating storage and refueling sites outside sensitive areas would render this potential effect discountable.

Vegetation structure or composition alterations resulting from mechanical treatments may support different species of pollinators, which may alter pollination opportunities for ESA-listed species. As described for manual treatments, conducting invasive weed management including pre-work evaluation or avoidance (Design Feature 25) would reduce this effect. Soil compaction, ground disturbance, or changes in soil properties for water infiltration may damage or destroy ground-nesting pollinator nests and reduce potential nesting opportunities. Changes in pollinator composition or habitat suitability could indirectly adversely affect ESA-listed plants by reducing pollinator activity.

Effects from Revegetation

As described under *Effects from Fuel Break Construction and Maintenance*, residual adverse effects on ESA-listed plant species could occur only where undetected individuals or populations were located in or near a revegetation area.

Residual adverse effects could occur from mechanical damage to individual plants during seeding from equipment like tractors, drill seeders, and imprinters. Individuals could also be trampled or crushed by workers. Undetected individuals or populations near the treatment area could be indirectly adversely affected if airborne dust generated during treatments settled on plants, suppressing physiological process and pollination (Farmer 1993, Waser et al. 2017).

Planting and seeding with nonnative plant materials could indirectly adversely affect undetected ESA-listed plant species in the treatment area by increasing competition for resources such as light, water, or nutrients, and attracting a different and potentially incompatible suite of pollinators, depending on the plant species. However, the potential for these residual effects would be discountable because the BLM would prioritize native plant material for revegetation in accordance with BLM Handbook 1740-2 (BLM 2008, p. 87). According to the Handbook, nonnative plants could be used in certain circumstances provided several conditions are met; these are cases when the natural biological diversity would not be diminished by nonnative species, when nonnative species could be confined to the treatment areas, when site inventory indicates a site would not support native species reestablishment, and when resource objectives could not be met with native species. Further, an additional condition of using nonnative plants is an unavailability of suitable native species (BLM 2008, p. 87). However, because the BLM would follow the National Seed Strategy for Rehabilitation and Restoration (Plant Conservation Alliance 2015), which guides the development, availability, and use of seed needed for timely and effective restoration, it is unlikely that suitable native seed would be unavailable.

BLM Instruction Memorandum IM 2016-013 directs the BLM to integrate pollinator-friendly native plant species into seeding treatments. An increase in native, pollinator-friendly plant species in revegetated areas would increase habitat suitability for native pollinator species in and near the treatment area. In turn, this would indirectly beneficially affect nearby ESA-listed plant species by increasing pollination opportunities.

Effects from Prescribed Fire

As described under *Effects from Fuel Break Construction and Maintenance*, residual adverse effects on ESA-listed plant species could occur only where undetected individuals or populations were located in or near a prescribed fire treatment area.

Residual adverse effects from prescribed fire treatments could occur where treatments caused injury or mortality of undetected ESA-listed plant species from burning of plant tissues and crushing by equipment used during fire-related activities. Damage to the seedbed, particularly for seeds that germinate close to the soil surface, could also reduce undetected seedbanks and reproductive success. Inadvertent escape of fire from the treatment area could lead to similar effects for known and/or undetected ESA-listed plant species within the action area but outside the treatment area footprint.

Heat from prescribed fire can also damage or kill desired vegetation; the intensity of this effect depends on the species and its ability to withstand fire or regrow following fire. Because prescribed burning is most damaging to plants during their active growth period, prescribed burning would be conducted when plants are dormant, to minimize effects on nontarget native vegetation.

Heat from prescribed fire may alter the physical, chemical, and biological properties of the soil, thus negatively affecting the growing conditions for future vegetation (Busse et al. 2010, Busse et al. 2013). This effect is unlikely during broadcast burning but is more likely during pile burning. This impact would be relatively minor when burning small piles and potentially more intense when burning larger piles or piles containing large pieces of wood.

Establishing fire line during certain prescribed fire operations would have direct, adverse impacts on undetected ESA-listed species if they were present where the line was established. This is because constructing hand lines would involve physically scraping or digging with hand tools to bare mineral soil. This impact would not occur when a wet line was used because no vegetation removal or surface disturbance would occur using this method.

Use of prescribed fire can improve seed bed conditions for revegetation. For example, in areas with high invasive annual grass cover, prescribed fire would reduce the above-ground residual biomass cover and invasive annual grass seed bank, reducing competition for resources for desired vegetation. Thus prescribed fire treatments can enhance revegetation success, indirectly beneficially affecting ESA-listed plant and pollinator habitat as described above.

Effects from Chemical Treatments

As described under *Effects from Fuel Break Construction and Maintenance*, residual adverse effects on ESA-listed plant species could occur only where undetected individuals or populations were located in or near a chemical treatment area.

The potential for residual adverse effects on ESA-listed plant species from chemical treatments would be substantially reduced or avoided by implementing the conservation measures contained in the biological assessments for Vegetation Treatments using Herbicides on Bureau of Land Management Lands in 17 Western States Programmatic Environmental Impact Statement (BLM 2007, pp. 4-129 to 4-130) and the 2016 Final PEIS for Vegetation Treatments Using Aminopyralid, Fluroxypyr, and Rimsulfuron on BLM Lands in 17 Western States (BLM 2015, Appendix B-2). These measures are as follows (Conservation Measure Listed Plants 1):

- Herbicide treatments should not be conducted in areas where TEP plant species may be subject to direct spray by herbicides during treatments.
- Applicators should review, understand, and conform to the “Environmental Hazards” section on herbicide labels (this section warns of known pesticide risks and provides practical ways to avoid harm to organisms or the environment).
- To avoid negative effects to TEP plant species from off-site drift, surface runoff, and/or wind erosion, suitable buffer zones[6] should be established between treatment sites and populations (confirmed or suspected) of TEP plant species, and site-specific precautions should be taken (refer to the guidance provided below).
- Follow all instructions and SOPs to avoid spill and direct spray scenarios into aquatic habitats that support TEP plant species.
- Follow all BLM operating procedures for avoiding herbicide treatments during climatic conditions that would increase the likelihood of spray drift or surface runoff.

[6] Treatment avoidance buffers are described in **Table 3-14**, under Effects from Fuel Break Construction and Maintenance.

Additional, formulation-specific conservation measures are included in the biological assessments described above (BLM 2007, pp. 4-130 to 4-134; BLM 2015, pp. 15-16). As described in **Table 3-12** in *Effects from Fuel Break Construction and Maintenance*, a 1,640 foot buffer would be established for all treatments to protect pollinator habitat (Dawson 2012). Where formulation-specific avoidance buffers are less than this distance, the 1,640-foot buffer would apply instead. Where formulation-specific buffers are greater than 1,640 feet, the more conservative formulation-specific measure would be incorporated into the treatment as applicable. Formulation-specific measures include the following:

2,4-D

- Because the risks associated with this herbicide were not assessed, do not spray within ½ mile of terrestrial plant species or aquatic habitats where TEP aquatic plant species occur.
- Do not use aquatic formulations in aquatic habitats where TEP aquatic plant species occur.
- Assess local site conditions when evaluating the risks from surface water runoff to TEP plants located within ½ mile downgradient from the treatment area.
- In areas where wind erosion is likely, do not apply within ½ mile of TEP plant species.

Aminopyralid

- Ground Application
  - If using a low boom at the typical application rate, do not apply within 100 feet of TEP terrestrial plants[7].
  - If using a low boom at the maximum application rate or a high boom at the typical application rate, do not apply within 400 feet of TEP terrestrial plants.
  - If using a high boom at the maximum application rate, do not apply within 600 feet of TEP terrestrial plants.
- Aerial Application Over Non-Forested Land
  - Do not apply by airplane at the typical application rate within 1,800 feet of TEP terrestrial plants.
  - Do not apply by airplane at the maximum application rate within 2,000 feet of TEP terrestrial plants.
  - Do not apply by helicopter at the typical application rate within 1,600 feet of TEP terrestrial plants.
  - Do not apply by helicopter at the maximum application rate within 1,700 feet of TEP terrestrial plants.
- General
  - In areas where wind erosion is likely, do not apply within 1.2 miles of TEP plant species (an alternative suitable buffer may be developed at the local level based on an analysis of site conditions).

Bromacil

- Do not apply within 1,200 feet of terrestrial TEP plant species.

[7] Note that buffers for terrestrial plants may be appropriate for plant species that root in water but have foliage extending above the surface of the water (BLM 2015).

- If using a low boom at the typical application rate, do not apply within 100 feet of an aquatic habitat in which TEP plant species occur.
- If using a low boom at the maximum application rate or a high boom, do not apply within 900 feet of an aquatic habitat in which TEP plant species occur.
- In areas where wind erosion is likely, do not apply within ½ mile of TEP plant species.

Chlorsulfuron

- Do not apply by ground methods within 1,200 feet of terrestrial TEP species.
- Do not apply by aerial methods within 1,500 feet of terrestrial TEP species.
- Do not apply by ground methods within 25 feet of aquatic habitats where TEP plant species occur.
- Do not apply by aerial methods at the maximum application rate within 300 feet of aquatic habitats where TEP plant species occur.
- Do not apply by aerial methods at the typical application rate within 100 feet of aquatic habitats where TEP plant species occur.
- In areas where wind erosion is likely, do not apply within ½ mile of TEP plant species.

Clopyralid

- Since the risks associated with using a high boom are unknown, use only a low boom during ground applications of this herbicide within ½ mile of terrestrial TEP plant species or aquatic habitats in which TEP plant species occur.
- Do not apply by ground methods at the typical application rate within 900 of [*sic*] terrestrial TEP species.
- Do not apply by ground methods at the typical application rate within ½ mile of terrestrial TEP species.
- Do not apply by aerial methods within ½ mile of terrestrial TEP species.
- In areas where wind erosion is likely, do not apply within ½ mile of TEP plant species.

Dicamba

- If using a low boom at the typical application rate, do not apply within 1,050 feet [*sic*] of terrestrial TEP plant species.
- If using a low boom at the maximum application rate, do not apply within 1,050 feet [*sic*] of terrestrial TEP plant species.
- If using a high boom, do not apply within 1,050 feet of terrestrial TEP plant species.
- Do not apply within 25 feet of aquatic habitats where TEP plant species occur.
- In areas where wind erosion is likely, do not apply within ½ mile of TEP plant species.

Diflufenzopyr

- If using a low boom at the typical application rate, do not apply within 100 feet of terrestrial TEP plant species.
- If using a high boom, or a low boom at the maximum application rate, do not apply within 900 feet of terrestrial TEP plant species.
- If using a high boom, do not apply within 500 feet of terrestrial TEP plant species.

- Do not apply within 25 feet of aquatic habitats where TEP plant species occur.
- In areas where wind erosion is likely, do not apply within ½ mile of TEP plant species.

Diquat

- Do not use in aquatic habitats where TEP aquatic plant species occur.
- Do not apply by ground methods within 1,000 feet of terrestrial TEP species at the maximum application rate.
- Do not apply by ground methods within 900 feet of terrestrial TEP species at the typical application rate.
- Do not apply by aerial methods within 1,200 feet of terrestrial TEP species.

Diuron

- Do not apply within 1,100 feet of terrestrial TEP species.
- If using a low boom at the typical application rate, do not apply within 900 feet of aquatic habitats where TEP aquatic plant species occur.
- If using a high boom, or a low boom at the maximum application rate, do not apply within 1,100 feet of aquatic habitats where TEP aquatic plant species occur.
- In areas where wind erosion is likely, do not apply within ½ mile of TEP plant species.

Fluridone

- Since effects on terrestrial TEP plant species are unknown, do not apply within ½ mile of terrestrial TEP species.

Fluroxypyr

- Ground Application
  - If using a low boom at the typical application rate, do not apply within 100 feet of TEP terrestrial plants.
  - If using a low boom at the maximum application rate, do not apply within 600 feet of TEP terrestrial plants.
  - If using a high boom at the typical application rate, do not apply within 400 feet of TEP terrestrial plants.
  - If using a high boom at the maximum application rate, do not apply within 700 feet of TEP terrestrial plants.
- Aerial Application Over Non-Forested Land
  - Do not apply by airplane at the typical application rate within 1,100 feet of TEP terrestrial plants.
  - Do not apply by helicopter at the typical application rate within 900 feet of TEP terrestrial plants.
  - Do not apply by airplane or helicopter at the maximum application rate within 1,500 feet of TEP terrestrial plants.
- General

    - In areas where wind erosion is likely, do not apply within 1.2 miles of TEP plant species (an alternative suitable buffer may be developed at the local level based on an analysis of site conditions).

Glyphosate

- Since the risks associated with using a high boom are unknown, use only a low boom during ground applications of this herbicide within ½ mile of terrestrial TEP plant species.
- Do not apply by ground methods at the typical application rate within 50 feet of terrestrial TEP plant species.
- Do not apply by ground methods at the maximum application rate within 300 feet of terrestrial TEP plant species.
- Do not apply by aerial methods within 300 feet of terrestrial TEP plant species.

Hexazinone

- Since the risks associated with using a high boom or an aerial application are unknown, only apply this herbicide by ground methods using a low boom within ½ mile of terrestrial TEP plant species and aquatic habitats that support aquatic TEP species.
- Do not apply by ground methods at the typical application rate within 300 feet of terrestrial TEP plant species or aquatic habitats that support aquatic TEP plant species.
- Do not apply by ground methods at the maximum application rate within 900 feet of terrestrial TEP plant species or aquatic habitats that support aquatic TEP plant species.
- In areas where wind erosion is likely, do not apply within ½ mile of TEP plant species.

Imazapic

- Do not apply by ground methods within 25 feet of terrestrial TEP species or aquatic habitats where TEP plant species occur.
- Do not apply by helicopter at the typical application rate within 25 feet of terrestrial TEP plant species.
- Do not apply by helicopter at the maximum application rate, or by plane at the typical application rate, within 300 feet of terrestrial TEP plant species.
- Do not apply by plane at the maximum application rate within 900 feet of terrestrial TEP species.
- Do not apply by aerial methods at the maximum application rate within 300 feet of aquatic TEP species.
- Do not apply by aerial methods at the typical application rate within 100 feet of aquatic TEP species.
- In areas where wind erosion is likely, do not apply within ½ mile of TEP plant species.

Imazapyr

- Since the risks associated with using a high boom are unknown, use only a low boom for ground applications of this herbicide within ½ mile of terrestrial TEP plant species or aquatic habitats in which TEP plant species occur.
- Do not apply at the typical application rate, by ground or aerial methods, within 900 feet of terrestrial TEP plant species or aquatic habitats in which aquatic TEP species occur.

- Do not apply at the maximum application rate, by ground or aerial methods, within ½ mile of terrestrial TEP plant species or aquatic habitats in which aquatic TEP species occur.
- Do not use aquatic formulations in aquatic habitats where TEP aquatic plant species occur.
- In areas where wind erosion is likely, do not apply within ½ mile of TEP plant species.

Metsulfuron Methyl

- Since the risks associated with using a high boom are unknown, use only a low boom for ground applications of this herbicide within ½ mile of terrestrial TEP plant species or aquatic habitats in which TEP plant species occur.
- Do not apply at the typical application rate, by ground or aerial methods, within 900 feet of terrestrial TEP plant species or aquatic habitats in which aquatic TEP species occur.
- Do not apply at the maximum application rate, by ground or aerial methods, within ½ mile of terrestrial TEP plant species or aquatic habitats in which aquatic TEP species occur.
- In areas where wind erosion is likely, do not apply within ½ mile of TEP plant species.

Overdrive®

- If using a low boom at the typical application rate, do not apply within 100 feet of terrestrial TEP plant species.
- If using a low boom at the maximum application rate, do not apply within 900 feet of terrestrial TEP plant species.
- If using a high boom, do not apply within 900 feet of terrestrial TEP plant species.
- Do not apply within 25 feet of aquatic habitats where TEP plant species occur.
- In areas where wind erosion is likely, do not apply within ½ mile of TEP plant species.

Picloram

- Do not apply by ground or aerial methods, at any application rate, within ½ mile of terrestrial TEP plant species.
- Assess local site conditions when evaluating the risks from surface water runoff to TEP plants located within ½ mile downgradient from the treatment area.
- In areas where wind erosion is likely, do not apply within ½ mile of TEP plant species.

Rimsulfuron

- Ground Application
  - If using a low boom at the typical application rate, do not apply within 200 feet of TEP terrestrial plants.
  - If using a low boom at the maximum application rate or a high boom at the typical application rate, do not apply within 400 feet of TEP terrestrial plants.
  - If using a high boom at the maximum application rate, do not apply within 700 feet of TEP terrestrial plants.
- Aerial Application Over Non-Forested Land
  - Do not apply by airplane at the typical application rate within 1,600 feet of TEP terrestrial plants.

- Do not apply by airplane at the maximum application rate within 1,900 feet of TEP terrestrial plants.
- Do not apply by helicopter at the typical application rate within 1,400 feet of TEP terrestrial plants.
- Do not apply by airplane or helicopter at the maximum application rate within 1,600 feet of TEP terrestrial plants.

- General
  - In areas where wind erosion is likely, do not apply within 1.2 miles of TEP plant species (an alternative suitable buffer may be developed at the local level based on an analysis of site conditions).
  - Do not use in watersheds where annual precipitation exceeds 50 inches.
  - In watersheds where annual precipitation exceeds 10 inches, prior to use of rimsulfuron conduct a local-level analysis of site conditions and develop suitable conservation measures for protection of TEP plant species from surface runoff.

Sulfometuron Methyl

- Do not apply by ground or aerial methods within 1,500 feet of terrestrial TEP species.
- Do not apply by ground methods within 900 feet of aquatic habitats where TEP plant species occur, or by aerial methods within 1,500 feet of aquatic habitats where TEP plant species occur.
- In areas where wind erosion is likely, do not apply within ½ mile of TEP plant species.

Tebuthiuron

- If using a low boom at the typical application rate, do not apply within 25 feet of terrestrial TEP plant species.
- If using a low boom at the maximum application rate or a high boom at the typical application rate, do not apply within 50 feet of terrestrial TEP plant species.
- If using a high boom at the maximum application rate, do not apply within 900 feet of terrestrial TEP plant species.
- Do not apply within 25 feet of aquatic habitats where TEP plant species occur.
- In areas where wind erosion is likely, do not apply within ½ mile of TEP plant species.

Triclopyr Acid

- Since the risks associated with using a high boom are unknown, use only a low boom during ground applications of this herbicide within ½ mile of terrestrial TEP plant species.
- Since the risks associated with using a high boom are unknown, use only a low boom during ground applications at the maximum application rate of this herbicide within ½ mile of aquatic habitats in which TEP plant species occur.
- Do not apply by ground methods at the typical application rate within 300 feet of terrestrial TEP plant species.
- Do not apply by aerial methods at the typical application rate within 500 feet of terrestrial TEP plant species.

- Do not apply by ground or aerial methods at the maximum application rate within ½ mile of terrestrial TEP plant species or aquatic habitats in which TEP plant species occur.
- If applying to aquatic habitats in which aquatic TEP plant species occur, do not exceed the targeted water concentration on the product label.
- In areas where wind erosion is likely, do not apply within ½ mile of TEP plant species.

Triclopyr BEE

- Since the risks associated with using a high boom are unknown, use only a low boom for ground applications of this herbicide within ½ mile of terrestrial TEP plant species or aquatic habitats in which TEP plant species occur.
- Do not apply by ground methods at the typical application rate within 300 feet of terrestrial TEP plant species or aquatic habitats in which TEP plant species occur.
- Do not apply by aerial methods at the typical application rate within 500 feet of terrestrial TEP plant species or aquatic habitats in which TEP plant species occur.
- Do not apply by ground or aerial methods at the maximum application rate within ½ mile of terrestrial TEP plant species or aquatic habitats in which TEP plant species occur.
- Do not use aquatic formulations in aquatic habitats where TEP aquatic plant species occur.
- In areas where wind erosion is likely, do not apply within ½ mile of TEP plant species.

As described under *Effects Common to All Plant Species*, after application of the design features and conservation measures described above, the potential for direct adverse effects from chemical treatments on ESA-listed plant species is anticipated to be low enough to be discountable in most situations. However, residual adverse effects from chemical treatments may still occur if surveys (Design Feature 42) fail to detect ESA-listed plants or their seed banks during pre-project planning. As described, the potential for this residual effect would be relatively higher for annual plant species that may not be detectable each year, and lower for persistent, perennial and biennial plant species.

If undetected ESA-listed plant species or their seed banks were in a chemical treatment area, direct adverse effects could occur. Potential effects include death, reduced productivity, and abnormal growth from unintended contact with chemicals via drift, runoff, wind transport, or accidental spills and direct spraying. The degree of impacts depends on the chemical used and its properties, such as persistence, the application rate, the treatment method, the physical site conditions, and the weather (such as wind or rain) during treatments (BLM 2007, p. 4-47).

Direct adverse effects on undetected ESA-listed plant individuals could also occur from trampling or crushing by vehicles or workers during treatments. This could result in mechanical damage to plants, reducing physiological function. Similarly, if seeds were trampled, they may become too deeply buried to germinate, particularly those that grow in sandy or loose soils.

Chemical treatments could also adversely affect pollinator species for ESA-listed plants. Some chemical formulations can be toxic to pollinators; acute or chronic exposure to these formulations could result in mortality and reduced population sizes. Indirectly, this could adversely affect ESA-listed plant species that rely on pollinators for reproduction. Broadcast chemical treatment applications would have the largest potential for inadvertent application of chemicals to undetected ESA-listed plants and pollinators, due to the non-selective nature of this application method.

Chemical treatments could have indirect effects on ESA-listed plant species by altering the species composition of treated areas. Elimination or reduction of nonnative species from a site could increase its suitability for ESA-listed plant species, especially those that compete with, have been displaced by, or are otherwise threatened by nonnative species. Where chemical treatments are used to remove all vegetation to create brown strips, the potential for erosion and sedimentation into adjacent habitat would be increased. This could reduce habitat conditions of surrounding areas that may serve as habitat for ESA-listed species and their pollinators.

Effects from Targeted Grazing

As described under *Effects from Fuel Break Construction and Maintenance*, residual adverse effects on ESA-listed plant species could occur only where undetected individuals or populations were located in or near a targeted grazing treatment area.

Potential residual adverse effects from targeted grazing would include mortality and injury from grazing and trampling of ESA-listed plants, reduction of supporting pollinator plants, soil compaction, introduction of invasive species, and habitat degradation. Grazing would typically affect only the above-ground portion ESA-listed plants and some plants could re-sprout, though, this effort could reduce reproductive ability. Direct effects from grazing would be most extensive during flowering, during times of drought or other stress, or if the same plants were grazed repeatedly. Trampling would result in physical damage to the plant's structure and plants may also be uprooted. Grazing could also reduce other native flowering plants that support pollinator insects throughout the year. Livestock trampling could reduce the ability of seed germination through burying and soil compaction. Grazing has been linked to the spread of weeds, and can reduce the quality of habitat by spreading seeds (on fur or in feces) throughout treated areas. Concentrated grazing, for instance, near water features or along fencelines, can damage or destroy biological soil crusts, which are important habitat components for some ESA-listed plant species.

Establishing temporary fences to limit livestock movement during targeted grazing can also affect ESA-listed plant species. Effects would be most likely to come about from crushing or trampling during fence installation or removal, either by crews or vehicles, having similar effects as above. Depending on the fence type, limited soil disturbance can occur during installation or removal, increasing the potential for indirect effects from weed establishment and spread, and subsequent competition with ESA-listed plants.

Implementation of design features would minimize the effects of targeted grazing to ESA-listed plants and their habitats. Specifically, implementing a graduated use plan (Design Feature 24 and **Section 2.10.1**), and development of targeted grazing and monitoring plans, including quarantine periods to reduce the spread of weeds (Design Feature 21) would reduce the potential for residual adverse effects on ESA-listed plant species. With implementation of design features targeted grazing would not pose a significant threat to ESA-listed plant species in the action area.

The potential that livestock would graze in graduated use areas would diminish with increasing distance from the treatment area, and would also depend on local topography (e.g., cattle would be unlikely to use steep slopes and bare areas). Targeted livestock grazing treatments ¼-mile or more from known ESA-listed plant populations would not be expected to adversely affect populations given the low amount of incidental grazing at this distance. Similarly, local topography that was unattractive to livestock situated between treatment areas and known ESA-listed plant populations would discourage incidental grazing in the population. If targeted livestock grazing treatments were carried out within ¼-mile of known ESA-listed plant populations, individual plants could be directly adversely affected by trampling. This is because some grazing, up to 30 percent utilization, may occur within ¼-mile of the targeted grazing treatment area.

As livestock use an area, they can cause changes to soil structure from trampling the ground and help introduce invasive species which changes the structure of the plant community as described above. This, in turn, can alter the insect community. Some of these changes include damage to ground-nesting pollinators and their nests, changes in water infiltration due to soil compaction, subsequent nonnative invasive plant invasions, and changes in the timing and availability of pollinator food plants (Jones 2000).

Interrelated and Interdependent Effects

Interrelated and interdependent actions are those that would not occur if not for the proposed action. No interrelated or interdependent effects on any ESA-listed plants have been identified for the proposed action.

3.2.2 Barneby Reed-mustard

Listing Status and Recovery Plan

Barneby reed-mustard was listed as endangered by the USFWS in 1992 (USFWS 1992). The listing was based on the endemic nature of the plant and the estimate of population size, which included 2,000 plants (USFWS 1992). A recovery plan was finalized in 1994 (USFWS 1994), however, the recovery criteria outlined in that plan are outdated and no longer reflective of the best scientific information available (USFWS 2011c). A 5-year review was completed in 2011 (USFWS 2011c), which documents the species' progress or lack thereof, towards recovery. Critical habitat has not been designated or proposed.

Life History and Habitat Characteristics

Barneby reed-mustard is a perennial forb, belonging to the mustard family (*Brassicaceae*). It has multiple stems arising from a branching woody stem and taproot. The stems grow 4 to 14 inches tall, and bear elliptical, entire leaves up to 2 inches in length. It flowers from April to June, and fruit ripens from May to June. Primary pollinators are not all known (USFWS 2011c), but have been documented to include ground-dwelling bees (USFWS 1994).

Barneby reed-mustard is endemic to red clay soils that are rich in selenium and gypsum and overlain with sandstone talus (**Figure A-17**). Habitat for this species is described as bare, steep, north-facing slopes (NatureServe 2019). This species occurs in sparsely vegetated mixed desert shrub communities, dominated by shadscale (*Atriplex confertifolia*), buckwheat (*Eriogonum corymbosum*) and ephedra (*Ephedra torreyana* and *E. viridis*) (NatureServe 2019).

Status and Distribution

When the recovery plan was published, Barneby reed-mustard was thought to be restricted to red clay soils of the Moenkopi and Chinle formations, in Wayne and Emery counties in south-central Utah (USFWS 1994). Since that time, Barneby reed-mustard has been documented on the Moenkopi, Chinle, Cutler, Kaibab Limestone, and Carmel Formations on BLM-administered lands and Capitol Reef National Park in northern Wayne and southern Emery counties (USFWS 2011c). However, a clear understanding of the total distribution, and the suitable available habitat, for this species on these lands is not known. USFWS estimates the total population to be approximately 2,251 individuals at 4 populations, most of which occur in Capitol Reef National Park. The Sy's Butte/Hidden Splendor Mine population is the only known population on BLM-administered lands. This population occurs in the southern portion of the San Rafael Swell, north and east of Muddy Creek, and along the San Rafael Reef. Of the 13,296 acres of the species' total range, approximately 3 percent (387 acres) occurs within the focused action area and approximately 2 percent (268 acres) occurs within the action area as shown on **Figure A-17** (USFWS and BLM GIS 2018).

Threats

The primary threat to Barneby reed-mustard identified at the time of listing and in the Recovery Plan was habitat loss and degradation associated with future uranium mining on BLM-administered lands (USFWS 2004). USFWS now considers this threat low, because it has been over 40 years since active mining occurred, and there are no current mining proposals in this area (USFWS 2011c). In addition, visitor trampling, particularly within Capitol Reef National Park, was considered a primary threat at the time of listing. However, after reevaluation, USFWS no longer considers trampling to be a threat. Other threats include OHV use and grazing on BLM-administered lands, invasive species and wildfire, and erosion.

Effects Analysis and Determination of Effects

There are no design features specific to Barneby reed-mustard; however, design features for ESA-listed plant species would prevent or minimize the potential for direct adverse effects from manual and mechanical treatments, prescribed fire, revegetation, and targeted grazing methods as discussed in **Section 3.2.1**, Effects Common to All Plant Species.

Conservation Measures

To prevent or minimize the potential for residual adverse effects on Barneby reed-mustard from the proposed treatments after implementation of the design features listed above, the BLM would be required to implement the following conservation measures:

- Conservation Measure Barneby Reed-Mustard 1—Establish a treatment avoidance buffer around individuals or populations to protect pollinator habitat. Individuals or populations would be avoided with a treatment buffer of 1,640 feet (Dawson 2012).

Further, chemical treatments would adhere to applicable conservation measures identified in the Vegetation Treatments on Bureau of Land Management Lands in 17 Western States Biological Assessment (BLM 2007, pp. 4-129 to 4-134), as discussed in **Section 3.2.1**, Effects Common to All Plant Species.

Effects Analysis

Approximately 390 acres, or 3 percent, of the total range of Barneby's reed-mustard, occurs in the focused action area (USFWS and BLM GIS 2018). This is the area that would be available for fuel break creation and maintenance within the species' range, with a half-mile buffer.

As discussed in **Section 3.2.1**, Effects Common to All Plant Species, the native, sparsely vegetated areas that provide habitat for this species would be considered Analysis Exclusion Areas (see **Table 3-11**) where fuel break treatments would not be implemented; therefore, direct adverse effects on Barneby reed-mustard are not anticipated to occur in these areas.

Where fuel breaks are constructed near known populations, ground-dwelling bees, a primary pollinator for this species, could be directly affected by habitat loss. Indirectly, this may affect Barneby reed-mustard reproductive success, ultimately affecting population persistence depending on the severity of pollinator effects, as discussed under *Effects Common to All Plant Species*. Implementing Conservation Measure Barneby Reed-Mustard 1 would minimize this effect to an insignificant level for all treatment methods by ensuring enough pollinator habitat is conserved to maintain listed plant populations.

Where fuel breaks are constructed near occupied habitat, a low potential exists for residual direct adverse effects, as described in *Effects Common to All Plant Species*, to affect individual plants that may grow at the margins of suitable habitat, and thus, outside of Analysis Exclusion Areas. For instance, Barneby reed-mustard individuals are occasionally found down slope of occupied sites where seeds have rolled or been blown downhill (USFWS 2011c). Implementing Conservation Measure Barneby Reed-Mustard 1 would also minimize the potential for this residual effect to a discountable level for all treatment methods. This is because treatment avoidance buffers to protect pollinator habitat would also be sufficient to prevent adverse effects on individuals growing at the margins of suitable habitat.

The proposed action would indirectly beneficially affect Barneby's reed-mustard over time. It would do this by conserving landscape-scale sagebrush communities and pollinator habitat, and reducing the potential for sagebrush community loss from wildfire and invasive annual grass conversion, as discussed under *Effects Common to All Plant Species*.

Overall, adverse effects on Barneby's reed-mustard would be discountable or insignificant due to design features and conservation measures. Further, indirect beneficial effects are expected over time from landscape-scale habitat conservation. The proposed action ***may affect, but is not likely to adversely affect*** Barneby reed-mustard for all treatment methods. There is no critical habitat designated for this species, therefore, no effects on critical habitat would occur.

Cumulative Effects

The cumulative effects analysis area for ESA-listed plants is the focused action area. All Barneby's reed-mustard range in the focused action area occurs on BLM-administered lands (USFWS and BLM GIS 2018). Given this, there are no reasonably foreseeable future state, tribal, local, or private actions that are likely to affect Barneby's reed-mustard.

3.2.3 Clay/Atwood's Phacelia

Listing Status and Recovery Plan

The USFWS officially listed clay/Atwood's phacelia (clay phacelia) as endangered in 1978 (USFWS 1978b). A recovery plan was released in 1982, but no critical habitat rules have been published for the species. The objective for the recovery plan includes establishment of a self-sustaining population of 2,000 to 3,000 individuals on 120 acres of protected habitat and possibly establish at least one new population' (USFWS 1982). Additionally, the goal for the self-sustaining and new populations, includes establishing on BLM managed lands, so that monitoring and direct protection can more easily occur.

Life History and Habitat Characteristics

Clay phacelia was formerly considered a winter annual, but new data suggests that it is instead a true biennial, which germinates in the spring, grows into a rosette during the summer, overwinters, and reproduces the following summer (USFWS 2013e). Germination is probably triggered by late summer or early autumn storms, and two rain events per summer may be necessary for survival. Seed output is high, and seeds produced in one year germinate over the course of several years (USFWS 2013e). This species is likely an obligate outcrosser that requires insect pollinators, including several species of native, mostly solitary bees that nest in the ground and in woody plant material (USFWS 2013e).

Clay phacelia occurs on an extremely limited band of soil derived from an upper member of the Green River geologic formation called Green River Shale in Utah County, Utah at 6,000–6,400 feet. Soil is composed of clay, silt, and sand overlain by pebble and shale. Occupied sites are xeric with steep slopes, have southeast- to west-facing aspects, and receive an average of 16.8 inches of precipitation annually (USFWS 2013e).

Associated plant species includes yellow-flowered buckwheat (*Eriogonum brevicaule*), serviceberry (*Amelanchier alnifolia* Nutt.), Gambel oak (*Quercus gambelii* Nutt.), and Indian ricegrass (*Stipa hymenoides*). Clay phacelia sometimes grows among sparse stands of pinyon-juniper (*Pinus edulis- Juniperus osteosperma*) or mountain brush (*Amelanchier alnifolia-Cercocarpus montanus-Rhus aromatica*). Clay phacelia is a poor competitor (USFWS 2013e).

Status and Distribution

Clay phacelia's range covers a 7.5 mile stretch along Highway 6 in Spanish Fork Canyon in Utah County, Utah. There are three known populations: Water Hollow-Garner Canyon (includes several element occurrences and three introduced sites), Tie Fork (introduced population), and Tucker-Clear Creek (the type locality). A fourth historic population, the Pleasant Valley Junction (Colton) population, has not been relocated since its initial discovery in 1883, and probably does not exist today. Accurate population estimates or trends are not available (USFWS 2013e). Of the 170,940 acres of the species total range, approximately 1 percent (935 acres) occurs within the focused action area and approximately 1 percent occurs within the action area (1,276 acres) as shown on **Figure A-18** (USFWS and BLM GIS 2018),

Threats

The primary threat detailed in the 1982 recovery plan was identified as habitat loss and modification due to the Denver and Rio Grande Railroad and the associated service road (USFWS 1982). This threat only affects the Tucker population, which the railroad bisects, but the level of threat has increased due to an increase in railway use (USFWS 2013e). Other threats include grazing and trampling, highway maintenance and expansion, development of multiple transmission lines, and the nonnative invasive plant species houndstongue (*Cynoglossum officinale*) and horehound (*Marrubium vulgare*).

Effects Analysis and Determination of Effects

There are no design features specific to clay phacelia; however, design features for ESA-listed plant species would prevent or minimize the potential for direct adverse effects from manual and mechanical treatments, prescribed fire, revegetation, and targeted grazing methods as discussed in **Section 3.2.1**, Effects Common to All Plant Species.

Conservation Measures

To prevent or minimize the potential for residual adverse effects on clay phacelia from the proposed treatments after implementation of the design features listed above, the BLM would be required to implement the following conservation measures:

- Conservation Measure Clay Phacelia 1— Establish a treatment avoidance buffer around individuals or populations to protect pollinator habitat. Individuals or populations would be avoided with a treatment buffer of 1,640 feet (Dawson 2012).
- Conservation Measure Clay Phacelia 2—To protect this species from adverse effects from livestock grazing, temporary fencing to prevent livestock entry would be placed 1640 feet from individuals or populations within the graduated use area for targeted grazing treatment areas.

Further, chemical treatments would adhere to applicable conservation measures identified in the Vegetation Treatments on Bureau of Land Management Lands in 17 Western States Biological Assessment (BLM 2007, pp. 4-129 to 4-134), as discussed in **Section 3.2.1**, Effects Common to All Plant Species.

Effects Analysis

Approximately 935 acres, or 1 percent, of the total range of clay phacelia, occurs in the focused action area (USFWS and BLM GIS 2018). This is the area that would be available for fuel break creation and maintenance within the species' range, with a half-mile buffer.

As discussed in **Section 3.2.1**, Effects Common to All Plant Species, the native, sparsely vegetated areas that provide habitat for this species would be considered Analysis Exclusion Areas (see **Table 3-11**) where fuel break treatments would not be implemented; therefore, direct adverse effects on clay phacelia are not anticipated to occur in these areas.

Where fuel breaks are constructed near known populations, ground- and woody stem-nesting bees, known pollinators for this species, could be directly affected as discussed under *Effects Common to All Plant Species*. Indirectly, this may affect clay phacelia reproductive success, ultimately affecting population persistence depending on the severity of pollinator effects. Implementing Conservation Measure Clay Phacelia 1 would minimize this effect to an insignificant level for all treatment methods by ensuring enough pollinator habitat is conserved to maintain listed plant populations.

If targeted livestock grazing treatments were carried out within ¼-mile of known populations, individuals could be directly adversely affected by trampling, as described in **Section 3.2.1**, Effects Common to All Plant Species. Implementing Conservation Measure Clay Phacelia 2 would lower the potential for this effect to a discountable level by preventing livestock entry to occupied habitat.

The proposed action may indirectly beneficially affect clay phacelia over time. It would do this by conserving sagebrush communities and pollinator habitat within the species' range, and reducing the potential for sagebrush community loss from wildfire and invasive annual grass conversion, as discussed under *Effects Common to All Plant Species*. While clay phacelia does not typically occur in sagebrush communities, adjacent community types would also be conserved, potentially indirectly affecting habitat for clay phacelia.

Overall, adverse effects on clay phacelia would be insignificant due to implementation of design features and conservation measures. Further, indirect beneficial effects are expected over time from landscape-scale habitat conservation. The proposed action ***may affect, but is not likely to adversely affect*** clay phacelia for all treatment methods. There is no critical habitat designated for this species, therefore, no effects on critical habitat would occur.

Cumulative Effects

The cumulative effects analysis area for ESA-listed plants is the focused action area. Of the approximately 935 acres of the species' range in the focused action area, approximately 402 acres is on private lands, while 393 acres is on Utah state-managed lands (USFWS and BLM GIS 2018). Reasonably foreseeable future state, and private actions that could affect clay phacelia and its habitat are railway use, highway maintenance and expansion, transmission line development, grazing and trampling, and competition from nonnative invasive plants (USFWS 2013e).

Several rights-of-way developments and associated activities may adversely affect clay phacelia. The Union Pacific railroad and service road bisect a population, and anticipated railway use increases may adversely affect the population through dust and air pollution deposition. Anticipated construction for widening of US Highway 6, and proposed transmission lines along this alignment, may affect clay phacelia by habitat loss for this species and its pollinators (USFWS 2013e).

Several nonnative invasive plant species occur in clay phacelia habitat. Periodic control to prevent competition with clay phacelia is ongoing, but more work is needed to better understand competition dynamics and clay phacelia response to competition (USFWS 2013e). Grazing and trampling by sheep and llama, and grazing-exacerbated erosion, have been identified as an ongoing threat to clay phacelia on private lands (USFWS 2013e).

3.2.4 Clay Reed-mustard

Listing Status and Recovery Plan

Clay reed-mustard was originally listed as threatened by the USFWS on January 14, 1992 (USFWS 1992). The recovery plan for the species was published in 1994 (USFWS 1994). A 5-year review was conducted and published in 2011 (USFWS 2011d). The 5-year review concluded that the species should remain listed as threatened, because the objectives/goals of the recovery plan had not yet been met and because of continuing threats from potential oil and gas development (USFWS 2011d).

Life History and Habitat Characteristics

Clay reed-mustard is a perennial forb belonging to the mustard family. Individual plants typically grow 5 to 12 inches tall with flowers 0.3 to 0.4 inches long. Flowers develop between April and May (Tilley et al. 2011). Specific pollinators are unknown; however, it is believed pollination of *Brassicaceae* species is primarily by insects. The precise insect species pollinate clay reed-mustard are not known, but ground nesting, solitary bees pollinate the closely related shrubby reed-mustard (*S. suffrutescens*), that grows in nearby habitats, and it is likely clay reed-mustard pollinators are similar (USFWS 2011d).

Clay reed-mustard habitat is on steep hill sides, on clay soil rich in gypsum and overlain with sandstone talus at elevations ranging from 4,800 to 5,640 feet (USFW 1992). The overall vegetation coverage within habitat is low and is typically desert scrub plant communities with shadscale, Indian ricegrass (*Achnatherum hymenoides*), pygmy sagebrush (*Artemisia pygmaea*), western wheatgrass (*Pascopyrum smithii*), Salina wildrye (*Elymus salina*), and jointfir (*Ephedra* spp.) (USFWS 1994).

Status and Distribution

Currently, the estimated clay reed-mustard range is 67,413 total acres (USFWS 2019). Approximately 7,733 acres, or 11 percent, of the range falls within the focused action area and approximately 16,136 acres, or 24 percent, is within the action area (**Figure A-19**). Suitable habitat for the species is not entirely mapped, due to the difficulty of navigating the terrain it is located on (USFWS 2011d).

Clay reed-mustard is believed to be endemic to Uintah County, Utah. The species is known to occur in 6 populations near Hill Creek, Willow Creek and Green River, which includes an estimated 6,000 plants (USFWS 2011d). The known population areas are located primarily with public lands administered by the BLM (89 percent) and the remaining on State School and Institutional Trust Land Administration (11 percent) and private lands (less than 1 percent).

Threats

The primary threat listed in the 1994 species recovery plan was identified as oil and gas development. Other threats to the species as identified in the recovery plan include those associated with development of oil and gas roads, such as habitat fragmentation, fugitive dust and increased potential for spread of invasive species. Erosion and sedimentation were also identified as potential threats to the species from oil and gas development.

The species small population and limited distribution makes it vulnerable to minor environmental disturbances and extinction. Further, habitat alterations and fragmentation caused by human land use activities can change native ground-nesting bee populations and species composition, which are often more limiting than pollen or nectar. Increased oil and gas development is likely to disturb nest sites for ground nesting bee species, which could limit clay reed-mustard cross-pollination and genetic diversity (USFWS 2011d).

Effects Analysis and Determination of Effects

There are no design features specific to clay reed-mustard; however, design features for ESA-listed plant species would prevent or minimize the potential for direct adverse effects from manual and mechanical treatments, prescribed fire, revegetation, and targeted grazing methods as discussed in **Section 3.2.1**, Effects Common to All Plant Species.

Conservation Measures

To prevent or minimize the potential for residual adverse effects on clay reed-mustard from the proposed treatments after implementation of the design features listed above, the BLM would be required to implement the following conservation measures:

- Conservation Measure Clay Reed-Mustard 1—Site inventories would be conducted within suitable habitat to determine occupancy. Where standard surveys are technically infeasible and otherwise hazardous due to topography, slope, etc., suitable habitat would be assessed and mapped for avoidance; in such cases, 300-foot avoidance buffers would be maintained between surface disturbance and avoidance areas. However, site specific distances would be approved by USFWS and BLM when disturbance would occur upslope of habitat. To avoid water flow and/or sedimentation into occupied habitat and avoidance areas, silt fences, hay bales, and similar structures or practices would be incorporated into the project design.
- Conservation Measure Clay Reed-Mustard 2— Establish a treatment avoidance buffer around individuals or populations to protect pollinator habitat. Individuals or populations would be avoided with a treatment buffer of 1,640 feet (Dawson 2012).

Further, chemical treatments would adhere to applicable conservation measures identified in the Vegetation Treatments on Bureau of Land Management Lands in 17 Western States Biological Assessment (BLM 2007, pp. 4-129 to 4-134), as discussed in **Section 3.2.1**, Effects Common to All Plant Species.

Effects Analysis

Approximately 7,738 acres, or 11 percent, of the total range of clay reed-mustard, occurs in the focused action area (USFWS and BLM GIS 2018). This is the area that would be available for fuel break creation and maintenance within the species' range, with a half-mile buffer.

As discussed in **Section 3.2.1**, Effects Common to All Plant Species, the steep, native, sparsely vegetated areas that provide habitat for this species would be considered Analysis Exclusion Areas (see **Table 3-11**) where fuel break treatments would not be implemented; therefore, direct adverse effects on clay reed-mustard are not anticipated to occur in these areas.

Because clay reed-mustard grows on steep slopes, anthropogenic-caused erosion and sedimentation are a particular concern (USFWS 2011d). In these situations, surface-disturbing fuel break treatments conducted upslope of populations may cause indirect adverse effects from erosion and sedimentation on downslope populations. The potential for this effect would be low because Design Features 36 through 41 would minimize ground disturbance in areas with erosive soils and on steep slopes, and would minimize sediment generation. However, the potential for residual indirect effects is not discountable. Implementing Conservation Measure Clay Reed-Mustard 1 and 2 would minimize the potential for this residual effect to a discountable level for all treatment methods. This is because site-specific treatment avoidance buffers of 300 feet around suitable habitat where occupancy is unknown, and 1,640 feet around occupied habitat, and erosion control measures would be sufficient to prevent adverse effects on individuals from anthropogenic-caused erosion and sedimentation.

Where fuel breaks are constructed near known populations, ground-dwelling bees, a likely pollinator for this species (USFWS 2011d), could be directly affected as discussed under *Effects Common to All Plant Species*. Indirectly, this may affect clay reed-mustard reproductive success, ultimately affecting population persistence depending on the severity of pollinator effects. Implementing Conservation Measure Clay Reed-Mustard 2 would minimize this effect to an insignificant level for all treatment methods by ensuring enough pollinator habitat is conserved to maintain listed plant populations.

The proposed action may indirectly beneficially affect clay reed-mustard over time. It would do this by conserving sagebrush communities and pollinator habitat within the species' range, and reducing the potential for sagebrush community loss from wildfire and invasive annual grass conversion, as discussed under *Effects Common to All Plant Species*.

Overall, adverse effects on clay reed-mustard would be insignificant due to implementation of design features and conservation measures. Further, indirect beneficial effects are expected over time from landscape-scale habitat conservation. The proposed action ***may affect, but is not likely to adversely affect*** clay reed-mustard for all treatment methods. There is no critical habitat designated for this species, therefore, no effect on critical habitat would occur.

Cumulative Effects

The cumulative effects analysis area for ESA-listed plants is the focused action area. Of the approximately 7,733 acres of the species' range in the focused action area, approximately 15 percent of this is on Tribal, state, and private lands, as follows: approximately 795 acres are on Utah state-managed lands, 252 acres are on Bureau of Indian Affairs-administered lands, and 113 acres is on private lands (USFWS and BLM GIS 2018). Reasonably foreseeable future Tribal, state, and private actions that could affect clay reed-mustard and its habitat are primarily oil and gas development (USFWS 2011d).

The entire range of clay reed-mustard is underlain by oil-shale, and all federal lands supporting populations are leased for oil and gas development (USFWS 2011d). It is unknown if Tribal, state, and private lands supporting the species are likewise leased, but the potential for this exists. Oil and gas development carries attendant threats, including habitat fragmentation, erosion, sedimentation, and fugitive dust impacts. Roads associated with energy exploration cause a high level of habitat fragmentation; the small, low-density clay reed-mustard populations are prone to adverse effects from habitat fragmentation. Habitat fragmentation can also affect plant-pollinator relationships. Fragmented plant populations are less attractive to insect pollinators, which spend more time in larger unfragmented habitats. Fewer pollinator visits can lead to lower seed set and reduced reproductive success (USFWS 2011d). Roads also mobilize and spread dust into adjacent vegetation, negatively affecting plant physiology and reproduction (USFWS 2011d).

3.2.5 Jones Cycladenia

Listing Status and Recovery Plan

The USFWS listed Jones cycladenia as a threatened species under the ESA in 1986 due to its rarity, and threats from impacts from mineral and oil and gas exploration and off-road vehicle disturbance (USFWS 1986). No critical habitat has been designated for this species. A recovery plan has not yet been released, but the 2008 recovery outline serves to guide recovery efforts until a comprehensive recovery plan has been finalized (USFWS 2008c).

Life History and Habitat Characteristics

Jones cycladenia is a long-lived, herbaceous perennial in the Dogbane family (Apocynaceae). As a rhizomatous[8] species, it overwinters as subterranean rhizomes, and a single individual may contain several to a hundred above-ground stems. Life history information for this species is lacking. Fruit and seed production is likely extremely limited, and no seedling germination events have been documented. Pollinators may appear episodically or may have been lost. Flowering is from mid-April to early June (USFWS 2008c).

Jones cycladenia grows on gypsiferous, saline soils of Cutler, Summerville, and Chinle Formations at elevations of 4,390–6,000 feet. It occurs in plant communities of mixed desert scrub, juniper, or wild buckwheat-Mormon tea (USFWS 2008c). At least 3 known populations occur on sparsely vegetated "badland" hills (USFWS 1986).

Status and Distribution

Jones cycladenia is known from 26 sites in 5 areas of Utah and Arizona: Joe Hutch Creek, San Rafael, Moab, and Greater Circle Cliffs in Utah, and Pipe Springs in Arizona. Much of the habitat considered to be suitable for Jones cycladenia has not been surveyed and many sites have not been revisited in the past

[8] Having a long underground stem system that cannot be viewed above ground

10 years. Future searches for Jones cycladenia could result in new finds that would have important implications on the species' status (USFWS 2008c).

The total population contains an estimated 25,000 above-ground stems, which represent approximately 1,100 genetic individuals. Surveys in 2007 and 2008 indicated a 250 percent increase in the number of ramets over the long-term (1992 to 2006) mean, but only a few sites are being routinely monitored. This may disproportionately influence perceived recovery progress (USFWS 2008c).

Of the 16,451,322 acres of the total range of Jones cycladenia, approximately 393,856 acres, or 2 percent, occurs in the focused action area, and approximately 807,424 acres or 5 percent occurs in the action area (**Figure A-20**; USFWS and BLM GIS 2018).

Threats

At the time of listing, the main threats were ongoing and potential anthropogenic impacts on habitat due to OHV use; oil, gas, and mineral exploration; and livestock grazing (USFWS 1986), though the listing rules notes the probability of grazing causing serious damage was low (USFWS 2008c). Since listing, a number of biological limiting factors have been identified. These include low fruit production and seed set, likely due to a complicated pollination system and inadequate pollinator abundance; genetic bottlenecking or genetic drift; lack of population recruitment; and a fractured distribution. Other threats reported since the time of listing include: climate change, natural predation, and relations to fragile biological soil crusts in some locations (USFWS 2008c).

Effects Analysis and Determinations

There are no design features specific to Jones cycladenia; however, design features for ESA-listed plant species would prevent or minimize the potential for direct adverse effects from manual and mechanical treatments, prescribed fire, revegetation, and targeted grazing methods as discussed in **Section 3.2.1**, Effects Common to All Plant Species.

Conservation Measures

To prevent or minimize the potential for residual adverse effects on Jones cycladenia from the proposed treatments after implementation of the design features listed above, the BLM would be required to implement the following conservation measures:

- Conservation Measure Jones Cycladenia 1—Establish a treatment avoidance buffer around individuals or populations to protect pollinator habitat. Individuals or populations would be avoided with a treatment buffer of 1,640 feet (Dawson 2012).

Further, chemical treatments would adhere to applicable conservation measures identified in the Vegetation Treatments on Bureau of Land Management Lands in 17 Western States Biological Assessment (BLM 2007, pp. 4-129 to 4-134), as discussed in **Section 3.2.1**, Effects Common to All Plant Species.

Effects Analysis

Approximately 393,856 acres, or 2 percent, of the total range of Jones cycladenia, occurs in the focused action area (**Figure A-20**; USFWS and BLM GIS 2018). This is the area that would be available for fuel break creation and maintenance within the species' range, with a half-mile buffer.

Implementation of design features for ESA-listed plant species as discussed in **Section 3.2.1**, Effects Common to All Plant Species, would reduce the potential for direct, adverse effects on Jones cycladenia. Design Feature 42 would require pre-treatment surveys in suitable habitat (e.g., gypsiferous, saline soils of Cutler, Summerville, and Chinle Formations), and Design Feature 43 would require appropriate conservation strategies, such as site-specific avoidance buffers, to be implemented to avoid adverse impacts.

Residual direct adverse effects could occur if undetected individuals or populations were located in a fuel break treatment area. Effects would vary depending on the treatment type, as described in **Section 3.2.1**, Effects Common to All Plant Species. However, the design features would minimize the potential for this residual effect to a discountable level for all treatment methods.

Though pollinator species are not known, if fuel breaks were constructed near known Jones cycladenia populations, potential pollinators or their habitat could be adversely affected as described in **Section 3.2.1**, Effects Common to All Plant Species. Indirectly, this may affect Jones cycladenia reproductive success; however, fruit and seed production is limited, and asexual reproduction also occurs (USFWS 2008c). Nonetheless, implementing Conservation Measure Jones Cycladenia 1 would minimize the effects on potential pollinators and their habitat to an insignificant level for all treatment methods by ensuring pollinator habitat is conserved near listed plant populations.

The proposed action would indirectly beneficially affect Jones cycladenia over time. It would do this by conserving landscape-scale sagebrush communities by reducing the potential for community loss from wildfire. While Jones cycladenia does not generally occur in sagebrush communities, adjacent community types would also be conserved, potentially indirectly affecting habitat for Jones cycladenia.

Further, while pollinators for Jones cycladenia are not known (USFWS 2008c), conserving various habitats for potential pollinator species on a range-wide scale would increase the potential that pollinator habitat would likewise be conserved. This would also be an indirect beneficial effect.

Overall, adverse effects on Jones cycladenia from all treatment methods would be discountable due to design features and conservation measures. Further, indirect beneficial effects are expected over time from landscape-scale habitat conservation. The proposed action ***may affect, but is not likely to adversely affect*** Jones cycladenia for all treatment methods.

There is no critical habitat designated for this species, therefore, no effects on critical habitat would occur.

Cumulative Effects

The cumulative effects analysis area for ESA-listed plants is the focused action area. Of the approximately 393,856 acres of the species' range in the focused action area, approximately 34,165 acres are on private lands, 21,345 acres are on Utah state-managed lands (USFWS and BLM GIS 2018). Reasonably foreseeable future actions that could affect Jones cycladenia and its habitat are OHV use, mountain biking, livestock grazing, and mineral exploration and development; however, identified threats are primarily on federal lands and a variety of protective measures have been developed to address these (USFWS 2008c).

Nonetheless, it is reasonable to assume these activities could also occur on state and private lands within the range of the species. Direct and indirect adverse effects from these activities would typically include surface disturbance and biological soil crust loss, vegetation removal, habitat loss and fragmentation, trampling, and increased competition from nonnative invasive plant species.

3.2.6 Kodachrome Bladderpod

Listing Status and Recovery Plan

The USFWS listed Kodachrome bladderpod as an Endangered species under the ESA in 1993 and published a Recovery Outline in 2009. Identified recovery needs include habitat surveys, protection from illegal OHV use, evaluation of cattle use, support research on the ecology and life history of this species. No critical habitat has been designated for this species. A recovery plan has not yet been released, but the 2009 recovery outline serves to guide recovery efforts until a comprehensive recovery plan has been finalized (USFWS 2009).

Life History and Habitat Characteristics

The Kodachrome bladderpod is a perennial herbaceous plant in the mustard family. The plant produces a dense mound of cushion-like growth with yellow flowers. Little is known about the specific biology of the Kodachrome bladderpod. Reproduction is sexual; it is unknown if the species is also capable of asexual reproduction. The mechanisms of pollination are unknown. Plants typically flower from late April through May, and seed dispersal occurs in June (USFWS 2009).

Kodachrome bladderpod grows on white, bare shale knolls derived from the Winsor member of the Carmel geologic formation at about 5,700 feet. Occupied sites have rocky soil and very little vegetative cover. Associated plant species include bitterbrush (*Purshia tridentata*), yellow cryptantha (*Cryptantha flava*), pinyon pine (*Pinus edulis*), Utah juniper (*Juniperus osteosperma*), Indian ricegrass (*Achnatherum hymenoides*), wild buckwheat (*Eriogonum fasciculatum*), and hyaline herb (*Hymenopappus filifolius*) (USFWS 2009).

Status and Distribution

Kodachrome bladderpod is known from one population in the Kodachrome Flats area of the Paria River Drainage in Kane County, Utah. The known range is about 2.5 miles long and 0.75 miles wide. Over 90 percent of the species' known range occurs on the Grand Staircase-Escalante National Monument, which is managed by the BLM. This remainder of the species' range occurs on private and state (Kodachrome Basin State park) land (USFWS 2009).

Of the 180,705 acres of the total range of Kodachrome bladderpod, approximately 10,159 acres, or 6 percent, occurs in the focused action area and 35,586 acres or 20 percent occurs in the action area (**Figure A-21**; USFWS and BLM GIS 2018).

A 1989 survey by the Utah Natural Heritage Program in the Kodachrome Basin, Little Dry Valley, and Rock Springs Creek areas identified 20,000 individuals over approximately 700 acres. There have been limited studies to document the population trends for this species (USFWS 2009).

Threats

At the time of listing, mineral development was considered a main threat to the Kodachrome bladderpod, but activities ceased upon creation of the Grand Staircase-Escalante National Monument and are no longer expected to occur within the range of the species.

Currently, illegal OHV use is the main threat to the species persistence because habitat provides easy access and preferred terrain for OHV users. OHV use can increase mortality and degrade habitat (USFWS 2009). Livestock grazing may pose a low threat to the species with occasional trampling, soil compaction, and erosion. Prolonged drought conditions due to climate change may threaten the species by reducing the frequency and duration of flowering and/or germination events, lowering recruitment, compromising population viability, and reducing pollinator availability. Improved climate change forecasts are needed to better understand this potential threat (USFWS 2009).

Effects Analysis and Determination of Effects

There are no design features specific to Kodachrome bladderpod; however, design features for ESA-listed plant species would prevent or minimize the potential for direct adverse effects from manual and mechanical treatments, prescribed fire, revegetation, and targeted grazing methods as discussed in **Section 3.2.1**, Effects Common to All Plant Species.

Conservation Measures

To prevent or minimize the potential for residual adverse effects on Kodachrome bladderpod from the proposed treatments after implementation of the design features listed above, the BLM would be required to implement the following conservation measures:

- Conservation Measure Kodachrome Bladderpod 1—Establish a treatment avoidance buffer around individuals or populations to protect pollinator habitat. Individuals or populations would be avoided with a treatment buffer of 1,640 feet (Dawson 2012).
- Conservation Measure Kodachrome Bladderpod 2—To protect this species from adverse effects from livestock grazing, temporary fencing to prevent livestock entry would be placed 1640 feet from individuals or populations within the graduated use area for targeted grazing treatment areas.

Further, chemical treatments would adhere to applicable conservation measures identified in the Vegetation Treatments on Bureau of Land Management Lands in 17 Western States Biological Assessment (BLM 2007, pp. 4-129 to 4-134), as discussed in **Section 3.2.1**, Effects Common to All Plant Species.

Effects Analysis

Approximately 10,159 acres, or 6 percent, of the total range of Kodachrome bladderpod, occurs in the focused action area (**Figure A-21**; USFWS and BLM GIS 2018). This is the area that would be available for fuel break creation and maintenance within the species' range, with a half-mile buffer.

As discussed in **Section 3.2.1**, Effects Common to All Plant Species, the native, sparsely vegetated areas that provide habitat for this species would be considered Analysis Exclusion Areas (see **Table 3-11**) where fuel break treatments would not be implemented. Further, implementation of design features for ESA-listed plant species as discussed in **Section 3.2.1**, Effects Common to All Plant Species, would reduce the potential for any residual, direct, adverse effects. Design Feature 42 would require pre-treatment surveys in suitable habitat (i.e., white, bare shale knolls derived from the Winsor member of the Carmel geologic formation), and Design Feature 43 would require appropriate conservation strategies, such as site-specific avoidance buffers, to be implemented to avoid adverse impacts. Therefore, direct adverse effects on Kodachrome bladderpod are not anticipated to occur; the potential for direct adverse effects would be discountable.

If fuel breaks were constructed near known populations, pollinators could be adversely affected as described in **Section 3.2.1**, Effects Common to All Plant Species. Indirectly, this may affect Kodachrome bladderpod reproductive success, ultimately affecting population persistence depending on the severity of pollinator effects. Implementing Conservation Measure Kodachrome Bladderpod 1 would minimize this effect to an insignificant level for all treatment methods by ensuring enough pollinator habitat is conserved near listed plant populations to maintain them.

The proposed action would indirectly beneficially affect Kodachrome bladderpod over time. It would do this by conserving landscape-scale vegetation communities by reducing the potential for community loss from wildfire. While Kodachrome bladderpod does not occur in sagebrush communities, adjacent community types would also be conserved, potentially indirectly affecting habitat for Kodachrome bladderpod.

Further, while pollinators for Kodachrome bladderpod are not known (USFWS 2009), conserving various habitats for potential pollinator species on a range-wide scale would increase the potential that pollinator habitat would likewise be conserved. This would also be an indirect beneficial effect.

Overall, adverse effects on Kodachrome bladderpod from all treatment methods would be discountable due to Analysis Exclusion Areas, design features, and conservation measures. Further, indirect beneficial effects are expected over time from landscape-scale habitat conservation. The proposed action ***may affect, but is not likely to adversely affect*** Kodachrome bladderpod for all treatment methods.

There is no critical habitat designated for this species, therefore, no effects on critical habitat would occur.

Cumulative Effects

The cumulative effects analysis area for ESA-listed plants is the focused action area. Of the approximately 10,159 acres of the species' range in the focused action area, approximately 170 acres are on private lands (USFWS and BLM GIS 2018). Reasonably foreseeable future actions that could affect Kodachrome bladderpod and its habitat are primarily OHV use and livestock grazing (USFWS 2009).

The largest threat to the Kodachrome bladderpod is illegal OHV use on federal lands. While OHV use on private lands has not been identified as a threat, adverse impacts from this activity have the potential to occur. Impacts from OHV users include increased mortality from crushing and soil disturbance. Similarly while cattle grazing on private lands has not been identified as a threat, and cattle are not known to graze on Kodachrome bladderpod; grazing on the Grand Staircase-Escalante National Monument has been identified as a low threat to the species with occasional trampling, soil compaction, and erosion effects (USFWS 2009). This activity on private lands in the focused action area is likely, and may similarly affect the species.

3.2.7 Last Chance Townsendia

Listing Status and Recovery Plan

The USFWS listed Last Chance townsendia as a threatened species under the ESA in 1985, but no critical habitat has been designated for this species. The 1993 recovery plan indicates a high degree of threat and a low recovery potential that may be in conflict with economic activity (USFWS 1993b). The recovery plan has not been updated, but the 5-year review indicates that new research on the life history and habitat of the species should be incorporated. Furthermore, the recovery criteria are no longer believed adequate to gauge the status of the species under the ESA and believes an updated plan is needed (USFWS 2013f).

Life History and Habitat Characteristics

Last Chance townsendia is a small, stemless, mound-forming perennial plant in the sunflower family (*Asteraceae*). Plants, which are about 0.6–1 inch tall, flower in the early spring from late-April through early-June. This species is short lived and reproduces solely by seed beginning in the second year. Reproduction is positively correlated with plant size (USFWS 2013f). Studies have confirmed that the species is sexual and diploid at study sites, whereby flowers require pollen from other Last Chance townsendia plants by a pollination vector; however, the possibility that populations at higher elevations reproduce asexually but has been not ruled out (USFWS 2013f).

Insects, such as native bees, are likely the main mechanism for pollination, but wind pollination may also occur. Seed production is low, possibly due to low pollinator numbers, inclement weather affecting pollinator flight activity, or small pollinator population size (USFWS 2013f).

This species occurs over a wide elevation gradient (6,102–9,100 feet) and on a variety of soil substrates. The majority of populations are found on soils within the Moenkopi Formation, Morrison Formation, Mancos Shale Group, and the San Rafael Group. The species appears to be restricted to fine-textured shale soils within each formation, which create small islands of habitable space in areas of otherwise uninhabitable soils (Tilley et al. 2010; USFWS 2013f).

Commonly associated plant species include galleta grass (*Hilaria jamesii*), Utah Juniper (*Juniperus osteosperma*), blue grama grass (*Bouteloua gracilis*), and shadscale (USFWS 2013f). It has been documented in a variety of plant communities including the Castle Valley saltbush (*Atriplex gardneri* var. *cuneata*) plant community in the San Rafael Swell, openings of pinyon-juniper woodlands within the Fishlake Plateau, and in ponderosa pine woodlands in the upper Deep Creek mountains (USFWS 2013f).

Status and Distribution

Last Chance townsendia is a narrow endemic to south-central Utah in Emery, Sevier, and Wayne counties. In the Recovery Plan, the known distribution of the species was limited to 15 acres (USFWS 1993b). Since the Recovery Plan was written, surveys have greatly expanded the distribution of the species, which is now known to encompass 9,000 acres (USFWS 2013f). The focused action area overlaps 45,391 acres, or 5 percent, of the species 1,002,345-acre range, and the action area overlaps 80,335 acres, or 8 percent, of the range (BLM and USFWS GIS 2018; **Figure A-22**).

The species' range extends across Capitol Reef National Park, Fishlake National Forest, Dixie National Forest, and BLM-administered land managed by the Price and Richfield Field Offices. The BLM-administered land contains the most occupied habitat for Last Chance townsendia with approximately 4,830 acres, followed by the USFS with 2,620 acres and Capitol Reef National Park with 2,390 acres (USFWS 2013f).

There are 23 populations of Last Chance townsendia with an estimated total population of 6,848 individuals. Overall abundance has declined over the last 13 years, primarily due to climate conditions (USFWS 2013f).

Threats

The final rule and the Recovery Plan cite mineral and energy development, road building, livestock grazing, and OHV use as threats to the species; however, increasing drought due to climate change likely poses the greatest threat mainly due to the rangewide scope, the imminent and future immediacy, and the species apparent sensitivity to the threat. Lower elevation populations of the species are particularly sensitive to drought conditions. Precipitation data from 1997 until 2011 show below average annual precipitation from 1997 to 2009, with 2002 and 2009 recording the lowest precipitation amounts during that time period (USFWS 2013f). Drought conditions can directly affect Last Chance townsendia through declines in survival, plant vigor, and reproductive output, Though the species may have some level of drought tolerance given the arid habitat it occupies, the recent drought conditions are implicated in substantial population declines at sites in Capitol Reef and on BLM-administered land (USFWS 2013f).

Effects Analysis and Determination of Effects

There are no design features specific to Last Chance townsendia; however, design features for ESA-listed plant species would prevent or minimize the potential for direct adverse effects from manual and mechanical treatments, prescribed fire, revegetation, and targeted grazing methods as discussed in **Section 3.2.1**, Effects Common to All Plant Species.

Conservation Measures

To prevent or minimize the potential for residual adverse effects on Last Chance townsendia from the proposed treatments after implementation of the design features listed above, the BLM would be required to implement the following conservation measure:

- Conservation Measure Last Chance Townsendia 1— Establish a treatment avoidance buffer around individuals or populations to protect pollinator habitat. Individuals or populations would be avoided with a treatment buffer of 1,640 feet (Dawson 2012).
- Conservation Measure Last Chance Townsendia 2—To protect this species from adverse effects from livestock grazing, temporary fencing to prevent livestock entry would be placed 1640 feet from individuals or populations within the graduated use area for targeted grazing treatment areas.

Further, chemical treatments would adhere to applicable conservation measures identified in the Vegetation Treatments on Bureau of Land Management Lands in 17 Western States Biological Assessment (BLM 2007, pp. 4-129 to 4-134), as discussed in **Section 3.2.1**, Effects Common to All Plant Species.

Effects Analysis

Approximately 45,391 acres, or 5 percent, of the total range of Last Chance townsendia, occurs in the focused action area (**Figure A-22**; USFWS and BLM GIS 2018). This is the area that would be available for fuel break creation and maintenance within the species' range, with a half-mile buffer.

Implementation of design features for ESA-listed plant species as discussed in **Section 3.2.1**, Effects Common to All Plant Species, would reduce the potential for direct, adverse effects on Last Chance townsendia. Design Feature 42 would require pre-treatment surveys in suitable habitat, and Design Feature 43 would require appropriate conservation strategies, such as site-specific avoidance buffers, to be implemented to avoid adverse impacts.

Residual direct adverse effects could occur if undetected individuals or populations were located in a fuel break treatment area. Effects would vary depending on the treatment type, as described in **Section 3.2.1**, Effects Common to All Plant Species. However, the design features would minimize the potential for this residual effect to a discountable level for all treatment methods.

Where fuel breaks are constructed near known populations, ground-dwelling bees or other primary pollinators, could be directly affected as discussed under *Effects Common to All Plant Species*. Indirectly, this may affect Last Chance townsendia reproductive success, ultimately affecting population persistence depending on the severity of pollinator effects. Implementing Conservation Measure Last Chance Townsendia 1 would minimize this effect to an insignificant level for all treatment methods by ensuring enough pollinator habitat is conserved to maintain listed plant populations.

If targeted livestock grazing treatments were carried out within ¼-mile of known populations, individuals could be adversely affected by trampling or soil compaction, as described in **Section 3.2.1**, Effects Common to All Plant Species. Implementing Conservation Measure Last Chance Townsendia 2 would lower the potential for this effect to a discountable level by preventing livestock entry to occupied habitat.

The proposed action would indirectly beneficially affect Last Chance townsendia over time. It would do this by conserving landscape-scale sagebrush communities and pollinator habitats by reducing the potential for community loss from wildfire. While Last Chance townsendia does not generally occur in sagebrush communities, it does occur in several plant communities given the wide elevational range it occupies (USFWS 2013f). Vegetation adjacent to sagebrush communities would also likely be conserved, potentially indirectly affecting habitat for Last Chance townsendia.

Overall, adverse effects on Last Chance townsendia from all treatment methods would be discountable or insignificant due to design features and conservation measures. Further, indirect beneficial effects are expected over time from landscape-scale habitat conservation. The proposed action ***may affect, but is not likely to adversely affect*** Last Chance townsendia for all treatment methods.

There is no critical habitat designated for this species, therefore, no effects on critical habitat would occur.

Cumulative Effects

The cumulative effects analysis area for ESA-listed plants is the focused action area. Of the approximately 45,391 acres of the species' range in the focused action area, approximately 5,748 acres are on private lands, while 2,587 acres are on Utah state-managed lands (USFWS and BLM GIS 2018). Reasonably foreseeable future actions that could affect Last Chance townsendia and its habitat are livestock grazing, energy and mineral exploration and development, and OHV use (USFWS 2013f). These actions have primarily been identified on federal lands in the species range, and a variety of protective measures have been developed to address these. Nonetheless, it is reasonable to assume these activities could also occur on state and private lands within the range of the species.

Direct and indirect adverse effects from these activities would typically come about from surface and biological soil crust disturbance, dust deposition, and increased potential for nonnative plant spread. Cattle trampling and soil compaction is a threat because Last Chance townsendia, like many small herbaceous plants, can be severely damaged in heavily travelled areas, such as around watering areas, fences, and along trails (USFWS 2013f).

3.2.8 Pariette Cactus

Listing Status and Recovery Plan

The Pariette cactus previously fell under USFWS' 1979 original threatened status listing for the *Scelerocactus glaucus* populations in western Colorado and northeastern Utah (USFWS 2010a). Further studies of the *Scelerocactus* species indicated that there were three distinct species, which ultimately lead to the Pariette cactus retaining the threatened status listing in 2009. The Recovery Outline for this species was published in 2010. The preliminary recovery strategy focuses on surveying existing habitat, protecting and restoring habitat, and protecting individual plants and populations from direct and indirect threats (USFWS 2010a). Critical habitat has not been designated for this species.

Life History and Habitat Characteristics

The Pariette cactus is a barrel-shaped cactus ranging from 1 to 3 inches tall. This species produces bell shaped pink flowers about 0.4 to 0.6 inches long and 0.4 to 1.2 inches wide. The Pariette cactus grows on fine soils in clay badlands derived from the Uinta formation and its habitat is sparsely vegetated desert shrubland dominated by species of saltbush (*Atriplex* spp.), rabbitbrush (*Chrysothamnus* spp.), and horsebrush (*Tetradymia* spp.) (USFWS 2010a). The life history of the Pariette cactus is poorly known, but it is thought to be a long-lived perennial usually flowering after 3 or 4 years. A broad assemblage of native bees and possibly other insects, including ants and beetles, pollinate Pariette cactus (USFWS 2010a).

Status and Distribution

Pariette cactus is restricted to one population in a 72,000 acre area located in the Pariette Draw along the Duchesne-Uintah County boundary in Utah (USFWS 2010a). Approximately 185,000 acres has been mapped as the current range of this species (USFWS 2019). Land ownership within the range of the species includes BLM, Ute Tribe, State of Utah, and private land, with the majority of the species' known population occurring on BLM and Ute Tribal lands (**Figure A-23**). As some individuals have been found in marginal habitats outside of the main population areas, more information is needed to better map the species' range. The total population size for the species is estimated at approximately 12,000 known cactus locations where each location represents at least one cactus but could represent multiple cacti (USFWS 2010a).

Approximately 18,166 acres, or 10 percent, of the total range of Pariette cactus occurs in the action area and approximately 19,867 acres, or 11 percent, occurs in the focused action area (USFWS and BLM GIS 2018; **Figure A-23**).

Threats

At the time of original listing of the Uinta Basin hookless cactus complex, ongoing and foreseeable threats included mineral and energy development, illegal collection, recreational off-road vehicle (ORV) use, and grazing. Energy development remains one of the largest threats to this species through direct loss of habitat. All potential Pariette cactus habitat on federal and tribal land has been leased for energy development (USFWS 2010a). A Biological Opinion was issued for the Monument Butte Oil and Gas Development Project EIS which proposes 5,750 wells on 1,245 new well pads which includes disturbance within USFWS Core Conservation Areas for Pariette Cactus (BLM 2016). The Biological Opinion included a Final Mitigation and Conservation Strategy devised to avoid, minimize, and mitigate impacts on Pariette cactus which would offset disturbance to Core Conservation Areas and direct removal of individuals (BLM 2016).

Illegal collecting was identified as threat to this species (USFWS 2010a); however, the effect of illegal collecting on this species has not been determined. Livestock grazing has been cited as a threat to Pariette cactus as grazing results in mortality when livestock trample individual plants. Nearly all potential habitat on BLM-administered land is leased for grazing (USFWS 2010a). Overgrazing can also create conditions favorable to weed establishment and weeds such as cheatgrass and halogeton (*Halogeton glomeratus*) are prevalent on BLM-administered land in the range of Pariette cactus (USFWS 2010a). While grazing may contribute to the spread of weeds, the Recovery Plan does not specifically list cheatgrass or halogeton as a threat to Pariette cactus.

Effects Analysis and Determination of Effects

There are no design features specific to Pariette cactus; however, design features for ESA-listed plant species would prevent or minimize the potential for direct adverse effects from manual and mechanical treatments, prescribed fire, revegetation, and targeted grazing methods as discussed in **Section 3.2.1**, Effects Common to All Plant Species.

Conservation Measures

To prevent or minimize the potential for residual adverse effects on Pariette cactus from the proposed treatments after implementation of the design features listed above, the BLM would be required to implement the following conservation measure:

- Conservation Measure Pariette Cactus 1—Establish a treatment avoidance buffer around individuals or populations to protect pollinator habitat. Individuals or populations would be avoided with a treatment buffer of 1,640 feet (Dawson 2012).
- Conservation Measure Pariette Cactus 2—To protect this species from adverse effects from livestock grazing, temporary fencing to prevent livestock entry would be placed 1640 feet from individuals or populations within the graduated use area for targeted grazing treatment areas.

Further, chemical treatments would adhere to applicable conservation measures identified in the Vegetation Treatments on Bureau of Land Management Lands in 17 Western States Biological Assessment (BLM 2007, pp. 4-129 to 4-134), as discussed in **Section 3.2.1**, Effects Common to All Plant Species.

Effects Analysis

Approximately 19,867 acres, or 11 percent, of the total range of Pariette cactus, occurs in the focused action area (USFWS and BLM GIS 2018). This is the area that would be available for fuel break creation and maintenance within the species' range, with a half-mile buffer.

As discussed in **Section 3.2.1**, Effects Common to All Plant Species, the native, sparsely vegetated areas that provide habitat for this species would be considered Analysis Exclusion Areas (see **Table 3-11**) where fuel break treatments would not be implemented. Further, implementation of design features for ESA-listed plant species as discussed in **Section 3.2.1**, Effects Common to All Plant Species, would reduce the potential for any residual, direct, adverse effects. Design Feature 42 would require pre-treatment surveys in suitable habitat (i.e., fine soils in clay badlands derived from the Uinta formation), and Design Feature 43 would require appropriate conservation strategies, such as site-specific avoidance buffers, to be implemented to avoid adverse impacts. Therefore, direct adverse effects on Pariette cactus are not anticipated to occur; the potential for direct adverse effects would be discountable.

Where fuel breaks are constructed near known populations, ground-dwelling bees, a primary pollinator for this species, could be directly affected as discussed under *Effects Common to All Plant Species*. Indirectly, this may affect Pariette cactus reproductive success, ultimately affecting population persistence depending on the severity of pollinator effects. Implementing Conservation Measure Pariette Cactus 1 would minimize this effect to an insignificant level for all treatment methods by ensuring enough pollinator habitat is conserved to maintain listed plant populations.

The proposed action would indirectly beneficially affect Pariette cactus over time. It would do this by conserving landscape-scale vegetation communities by reducing the potential for community loss from wildfire. While Pariette cactus does not occur in sagebrush communities, adjacent community types would also be conserved, potentially indirectly affecting habitat for Pariette cactus. Further, conserving various habitats for pollinator species on a range-wide scale would increase the potential that pollinator habitat would likewise be conserved. This would also be an indirect beneficial effect.

Overall, the potential for adverse effects on Pariette cactus from all treatment methods would be discountable due to Analysis Exclusion Areas, design features, and conservation measures, while potential adverse effects on pollinators and their habitat would be insignificant. Further, indirect beneficial effects are expected over time from landscape-scale habitat conservation. The proposed action ***may affect, but is not likely to adversely affect*** Pariette cactus for all treatment methods. There is no critical habitat designated for this species, therefore, no effects on critical habitat would occur.

Cumulative Effects

The cumulative effects analysis area for ESA-listed plants is the focused action area. Of the approximately 19,867 acres of the species' range in the focused action area, approximately 1,880 acres are on Utah state-managed lands, and 353 acres are on private lands (USFWS and BLM GIS 2018). Reasonably foreseeable future state and private actions that could affect Pariette cactus and its habitat are primarily oil and gas development; illegal collection, livestock grazing, and climate change are also identified threats (USFWS 2010a).

As of 2010, there were 1,290 existing or planned wells in potential habitat across all landownerships (846 of these were on BLM-administered lands; USFWS 2010a). Surface disturbance from oil and gas development, including wells, roads and pipelines, can result in habitat fragmentation and destruction, mortality of cacti, loss of seedbanks, dust accumulation, soil erosion, compaction, and sedimentation, and increases noxious weed invasions (USFWS 2010a).

Illegal collection is a threat on all landownerships. Collectors prefer larger, reproductive age individuals, leaving behind a younger, less reproductive population. As of 2006, approximately 96 percent of the known range (at the time, approximately 14,166 acres) was within 1,312 feet of a well. Such development facilitates human access and discovery by illegal collectors (USFWS 2010a).

Livestock grazing can lead to cacti mortality from trampling and overgrazing can degrade habitat by facilitating the establishment of invasive species, which tend to outcompete native vegetation, including cacti (USFWS 2010a). Livestock grazing likely occurs on state, tribal, and private lands, though levels are unknown.

Effects related to climate change, like persistent or prolonged drought conditions, changes in community assemblages and the ability of nonnative species to succeed, may affect long-term persistence of Pariette cactus. Pariette cactus mortality due to drought is well documented, and noxious weeds are often able to out-compete native species under drought conditions (USFWS 2010a). There are no state regulatory mechanism that provide for protection or conservation of Pariette cactus or its habitat, and this may limit recovery of the species.

3.2.9 San Rafael Cactus

Listing Status and Recovery Plan

The USFWS listed San Rafael cactus as endangered under the ESA in 1987 and published a draft recovery plan in 2015. No critical habitat has been designated for this species. The draft recovery plan indicates a moderate degree of threat and low recovery potential. Recovery actions focus on conserving extant populations, primarily by abating threats such as illegal collection, grazing effects, OHV related disturbances and through demonstration of increasing trends within existing populations or additional populations to ensure long-term demographic and genetic viability (USFWS 2015b).

Life History and Habitat Characteristics

San Rafael cactus is part of the cactus family (*Cactaceae*) and endemic to south central Utah. Little research has been conducted on pollination mechanisms and pollinators, and no research has been conducted on seed germination success for the species. It is considered long-lived but there have been no long term demography studies. The species reproduces sexually, is self-incompatible, and requires cross pollination. Pollinators include many species of bees. Small population size may limit pollinator visits and reproductive success. Flowering occurs from March to May and fruiting from May to June. The specific timing of flowering and fruiting varies from year to year and is influenced by temperature and moisture conditions of late winter and early spring. Lower elevation occurrences usually flower at least 5 to 15 days earlier than the upper elevations (USFWS 2015b).

The species grows in a wide variety of soils but may favor fine-textured, mildly alkaline soils rich in calcium and derived from limestone substrates of the Carmel Formation and the Sinbad member of the Moenkopi formation. It has also been found on shale barrens of the Brushy Basin member of the Morrison, Carmel, Mancos and Dakota geologic formations and in areas of primarily alluvial and colluvium soils. The species most commonly occurs on benches, hill tops, and gentle slopes, and it is most abundant on sites with a southern exposure at elevations of 4,760-6,820 ft.

Populations are a component of the vegetative community occurring at the lower elevations of a piñon-juniper woodland plant community and the upper elevations of a galleta three awn shrub steppe community of the Canyonlands section of the Colorado Plateau Floristic Division. The vegetative community is characterized by open woodlands of scattered Utah juniper and piñon pine with an understory of shrubs and grasses within the Colorado Plateau. Associated vegetation is mostly xerophytic and sparsely distributed (USFWS 2015b).

Status and Distribution

San Rafael cactus primarily occurs on federal lands, including lands managed by the Price and Richfield Field Offices of the BLM and on Capitol Reef National Park. It has also been found on land owned by the State of Utah and managed by the School and Institutional Trust Lands Administration. Due to the species' relatively recent discovery, little information is available on its historic abundance. The 21 known populations all occur in Emery County and comprise a total of 8,159 documented individuals. New populations were identified as recently as 2013, suggesting that additional populations may remain to be discovered (USFWS 2015b). Currently, the species known range is 3,465,488 acres; of this, approximately 230,638 acres, or 7 percent, occurs in the action area and approximately 108,544 acres, or 3 percent, occurs in the focused action area (**Figure A-24**).

Threats

The main threats to this species are OHV use, livestock grazing, energy and mineral development, and climate change. Other, moderate- and low-level threats are illegal collection, the inadequacy of existing regulatory mechanisms, native ungulate and wild horse disturbance, invasive species, predation, and energy and mineral development.

Effects Analysis and Determination of Effects

There are no design features specific to San Rafael cactus; however, design features for ESA-listed plant species would prevent or minimize the potential for direct adverse effects from manual and mechanical treatments, prescribed fire, revegetation, and targeted grazing methods as discussed in **Section 3.2.1**, Effects Common to All Plant Species.

Conservation Measures

To prevent or minimize the potential for residual adverse effects on San Rafael cactus from the proposed treatments after implementation of the design features listed above, the BLM would be required to implement the following conservation measure:

- Conservation Measure San Rafael Cactus 1—Establish a treatment avoidance buffer around individuals or populations to protect pollinator habitat. Individuals or populations would be avoided with a treatment buffer of 1,640 feet (Dawson 2012).
- Conservation Measure San Rafael Cactus 2—To protect this species from adverse effects from livestock grazing, temporary fencing to prevent livestock entry would be placed 1640 feet from individuals or populations within the graduated use area for targeted grazing treatment areas.

Further, chemical treatments would adhere to applicable conservation measures identified in the Vegetation Treatments on Bureau of Land Management Lands in 17 Western States Biological Assessment (BLM 2007, pp. 4-129 to 4-134), as discussed in **Section 3.2.1**, Effects Common to All Plant Species.

Effects Analysis

Approximately 108,544 acres, or 3 percent, of the total range of San Rafael cactus occurs in the focused action area (**Figure A-24**; USFWS and BLM GIS 2018). This is the area that would be available for fuel break creation and maintenance within the species' range, with a half-mile buffer.

Implementation of design features for ESA-listed plant species as discussed in **Section 3.2.1**, Effects Common to All Plant Species, would reduce the potential for direct, adverse effects on San Rafael cactus. Design Feature 42 would require pre-treatment surveys in suitable habitat, and Design Feature 43 would require appropriate conservation strategies, such as site-specific avoidance buffers, to be implemented to avoid adverse impacts.

Residual direct adverse effects could occur if pre-treatment surveys failed to detect individuals in a fuel break treatment area. The potential effects would vary depending on the treatment type, but would generally be as described in **Section 3.2.1**, Effects Common to All Plant Species. However, the design features would minimize the potential for this residual effect to a discountable level for all treatment methods.

If fuel breaks were constructed near known populations, pollinators could be adversely affected as described in **Section 3.2.1**, Effects Common to All Plant Species. Indirectly, this may affect San Rafael cactus reproductive success, ultimately affecting population persistence depending on the severity of pollinator effects. Implementing Conservation Measure San Rafael Cactus 1 would minimize this effect to an insignificant level for all treatment methods by ensuring enough pollinator habitat is conserved near listed plant populations to maintain them.

If targeted livestock grazing treatments were carried out within ¼-mile of known populations, individuals could be directly adversely affected by trampling, as described in **Section 3.2.1**, Effects Common to All Plant Species. Implementing Conservation Measure San Rafael Cactus 2 would lower the potential for this effect to a discountable level by preventing livestock entry to occupied habitat.

The proposed action would indirectly beneficially affect San Rafael cactus over time. It would do this by conserving landscape-scale vegetation communities by reducing the potential for community loss from wildfire. While San Rafael cactus does not occur in sagebrush communities, adjacent community types would also be conserved, potentially indirectly affecting habitat for San Rafael cactus. Further, conserving various habitats for pollinator species on a range-wide scale would increase the potential that pollinator habitat would likewise be conserved. This would also be an indirect beneficial effect.

Overall, the potential for adverse effects on San Rafael cactus from all treatment methods would be discountable due to design features, and conservation measures, while potential adverse effects on pollinators and their habitat would be insignificant. Further, indirect beneficial effects are expected over time from landscape-scale habitat conservation. The proposed action ***may affect, but is not likely to adversely affect*** San Rafael cactus for all treatment methods.

There is no critical habitat designated for this species, therefore, no effects on critical habitat would occur.

Cumulative Effects

The cumulative effects analysis area for ESA-listed plants is the focused action area. Of the approximately 108,544 acres of the species' range in the focused action area, approximately 6,681 acres are on private lands, and 6,821 acres are on Utah state-managed lands (USFWS and BLM GIS 2018). Reasonably foreseeable future state and private actions that could affect San Rafael cactus and its habitat are OHV use, livestock grazing, energy and minerals development, illegal collection, and climate change (USFWS 2010a).

All recorded individuals of San Rafael cactus occur on BLM (85 percent) or Utah state (15 percent) land that is open to OHV use on designated routes only. Negative impacts of OHV use include physical injury and mortality, and negative impacts to reproduction from dust, soil erosion and compaction (USFWS 2015b). Unauthorized OHV use is high at known locations on BLM-administered lands, but OHV compliance on state-managed lands is not known.

Livestock grazing can lead to cacti mortality from trampling and overgrazing can degrade habitat by facilitating the establishment of invasive species, which tend to outcompete native vegetation, including cacti. Grazing is permitted throughout the known range of San Rafael cactus and evidence of livestock has been recorded in every population, although grazing pressure is not equal at every population or every surveyed site within a population. Livestock grazing likely occurs on state and private lands, though levels are unknown.

Bentonite clay and gypsum mining have impacted populations that are partially on state-managed lands, and there is generally a high interest in energy and mineral development throughout the species range (USFWS 2015b). Surface disturbance from energy and mineral development, including wells, roads and pipelines, can result in habitat fragmentation and destruction, mortality of cacti, loss of seedbanks, dust accumulation, soil erosion, compaction, and sedimentation, and increases noxious weed invasions (USFWS 2015b).

Illegal collection is a threat on all landownerships, but the level of illegal collection that occurs is unknown. Collectors can quickly reduce known populations, especially those that are small, if protective measures are not instituted. There are no state regulatory mechanism that provide for protection or conservation of San Rafael cactus or its habitat, and this may limit recovery of the species.

No studies specifically on the impact of drought on San Rafael cactus have been performed, but given the data available for other related species of cactus with similar ranges, increased drought conditions are likely to negatively impact the long-term persistence of the species (USFWS 2015b). This is particularly true when drought impact is assessed cumulatively with small population size and other human-caused and natural threats, as discussed in this section.

3.2.10 Shrubby Reed-mustard

Listing Status and Recovery Plan

Shrubby reed-mustard (*Glaucocarpum suffrutescens*) (Rollins) Welsh and Chatterley, was listed as an endangered species in 1987, under the name toad-flax cress, *Glaucocarpum suffrutescens* Rollins. The name was changed from toad—flax cress to shrubby reed—mustard, and the genus was changed from *Glaucocarpum* to *Schoenocrambe* in 1992. The 1994 recovery plan indicated that downlisting or delisting of the species would be unlikely in the near future die to threats from land-disturbing activities (USFWS 1994).

Life History and Habitat Characteristics

Shrubby reed-mustard is a perennial herb in the mustard family. It grows in clumps from a branched, slightly woody stem. Flowering occurs in April to May and fruiting from May to June. The species lifespan is unknown. The species reproduces sexually and is capable of self-pollination; however, seed set is higher in pollinated plants relative to self-pollinated plants. Pollinators of shrubby reed-mustard include several native bee species. Recent research indicates that the species may be pollinator limited (USFWS 2010b).

Shrubby reed-mustard grows in an extremely limited band of soil derived from an upper member of the Green River geologic formation. The soil forms a disjunct white shale layer resembling small, dry desert islands on level to moderate slopes (USFWS 1994, 2010). It is found in desert shrub land with occasional Utah juniper (*Juniperus osteosperma*) and pinyon pine (*Pinus edulis*). Associated species in the vegetative community include many local endemics found only in the Uintah Basin (USFWS 1994).

Status and Distribution

Shrubby reed-mustard is known from three areas in Uintah and Duchesne Counties of Utah: (1) The Gray Knolls Area, which is centered in the Gray Knolls between the Green River and Hill Creek, Uintah County and contains two populations including Dog Knolls and Gray Knolls; (2) The Pack Mountain Area, which is centered on Little Pack Mountain and the slopes of Big Pack Mountain between Hill Creek and Willow Creek, Uintah County and contains four populations including Agency Draw, Big Pack Mountain, Johnson Draw, and Thorn Ranch. Thorn Ranch is the type locality for the species, but is presumed extirpated. (3) The Badlands Cliff Area, which is at the base of the Badlands cliff above the Wrinkles Road, Duchesne County and contains only the Badlands Cliff population. It is unknown if the three areas or if the seven populations are genetically isolated or if pollinators are able to travel between the areas or populations to ensure genetic diversity (USFWS 2010b).

Populations fluctuate greatly over time, possibly due to precipitation patterns, but it is unknown if the species exhibits prolonged dormancy as a survival strategy in response to drought (USFWS 2010b). The population declined in size and range from 1935, when the species was first discovered, to 1987, when the species was listed. The reasons for the decline are not well understood, but stone mining within occupied habitat and winter sheep grazing may have been major contributors (USFWS 1994).

In the shrubby reed mustard's 5-year review, the USFWS estimated the species was limited to about 3,000 individuals within 3 areas and 7 populations. This estimate was lower than the 5,000 individuals provided in the 1994 recovery plan (USFWS 1994, 2010b).

The shrubby reed mustard's range is approximately 169,403 acres; of this approximately 26,589 acres, or 16 percent, occurs in the action area and 27,079 acres, or 16 percent, of occurs in the focused action area (**Figure A-25**; USFWS and BLM GIS 2018).

Threats

At the time of listing, the main threats to shrubby reed mustard were historical alteration of habitat, potential oil and gas development, inadequacy of regulatory mechanisms, and small population sizes. Since listing, the threats of oil and gas development, mining of stone-building materials, and small population sizes remain. Oil and gas development throughout major portions of the species' habitat is planned, and continued protection from the ESA is required to prevent likely extirpation from direct destruction or from the effects of road dust and habitat fragmentation. New potential threats from invasive species or climate change may exacerbate adverse effects (USFWS 2010b).

Effects Analysis and Determination of Effects

There are no design features specific to shrubby reed-mustard; however, design features for ESA-listed plant species would prevent or minimize the potential for direct adverse effects from manual and mechanical treatments, prescribed fire, revegetation, and targeted grazing methods as discussed in **Section 3.2.1**, Effects Common to All Plant Species.

Conservation Measures

To prevent or minimize the potential for residual adverse effects on shrubby reed-mustard from the proposed treatments after implementation of the design features listed above, the BLM would be required to implement the following conservation measures:

- Conservation Measure Shrubby Reed-Mustard 1— Establish a treatment avoidance buffer around individuals or populations to protect pollinator habitat. Individuals or populations would be avoided with a treatment buffer of 1,640 feet (Dawson 2012).
- Conservation Measure Shrubby Reed-Mustard 2—To protect this species from adverse effects from livestock grazing, temporary fencing to prevent livestock entry would be placed 1640 feet from individuals or populations within the graduated use area for targeted grazing treatment areas.

Further, chemical treatments would adhere to applicable conservation measures identified in the Vegetation Treatments on Bureau of Land Management Lands in 17 Western States Biological Assessment (BLM 2007, pp. 4-129 to 4-134), as discussed in **Section 3.2.1**, Effects Common to All Plant Species.

Effects Analysis

Approximately 27,079 acres, or 16 percent, of the total range of shrubby reed mustard occurs in the focused action area (**Figure A-25**; USFWS and BLM GIS 2018). This is the area that would be available for fuel break creation and maintenance within the species' range, with a half-mile buffer.

As discussed in **Section 3.2.1**, Effects Common to All Plant Species, the white shale soils and sparsely-vegetated desert scrub vegetation that provide habitat for this species would be considered Analysis Exclusion Areas (see **Table 3-11**) where fuel break treatments would not be implemented; therefore, direct adverse effects on shrubby reed-mustard are not anticipated to occur in these areas.

Where fuel breaks are constructed near known populations, ground-dwelling bees, a likely pollinator for this species (USFWS 2011d), could be directly affected by habitat loss. Indirectly, this may affect shrubby reed-mustard reproductive success and genetic interchange, ultimately affecting population persistence depending on the severity of pollinator effects, as discussed under *Effects Common to All Plant Species*. Implementing Conservation Measure Shrubby Reed-Mustard 1 would minimize this effect to an insignificant level for all treatment methods by ensuring enough pollinator habitat is conserved to maintain listed plant populations.

The proposed action would indirectly beneficially affect shrubby reed-mustard over time. It would do this by conserving landscape-scale vegetation communities and pollinator habitat by reducing the potential for community loss from wildfire. While shrubby reed-mustard does not occur in sagebrush communities, adjacent community types would also be conserved, potentially indirectly affecting habitat for shrubby reed-mustard.

Overall, adverse effects on shrubby reed-mustard would be insignificant due to implementation of design features and conservation measures. Further, indirect beneficial effects are expected over time from landscape-scale habitat conservation. The proposed action ***may affect, but is not likely to adversely affect*** shrubby reed-mustard for all treatment methods.

There is no critical habitat designated for this species, therefore, no effects on critical habitat would occur.

Cumulative Effects

The cumulative effects analysis area for ESA-listed plants is the focused action area. Of the approximately 27,079 acres of the species' range in the focused action area, approximately 22 percent of this is on Tribal, state, and private lands, as follows: approximately 2,574 acres are on Utah state-managed lands, 2,088 acres are on private lands, and 1,352 acres are on Bureau of Indian Affairs-administered lands (USFWS and BLM GIS 2018). Reasonably foreseeable future Tribal, state, and private actions that could affect shrubby reed-mustard and its habitat are primarily oil and gas development and mining (USFWS 2010b).

The entire range of shrubby reed-mustard is underlain by oil-shale, and all federal lands supporting populations are leased for oil and gas development (USFWS 2010d). It is unknown if Tribal, state, and private lands supporting the species are likewise leased, but the potential for this exists. Oil and gas development carries attendant threats, including habitat fragmentation, erosion, sedimentation, and fugitive dust impacts. Roads associated with energy exploration cause a high level of habitat fragmentation. Habitat fragmentation can also affect plant-pollinator relationships. Fragmented plant populations are less attractive to insect pollinators, which spend more time in larger unfragmented habitats. Fewer pollinator visits can lead to lower seed set and reduced reproductive success. Roads also mobilize and spread dust into adjacent vegetation, negatively affecting plant physiology and reproduction.

Building stone mining was a significant historical threat to the species and is responsible for past population extirpation. Currently, this is a substantive issue on private lands in shrubby reed-mustard range, where it has caused direct adverse effects and habitat loss. The extent of this threat on private lands is not known (USFWS 2010d). Building stone mining does not occur on tribal lands in the species' range (USFWS 2010d).

3.2.11 Slickspot Peppergrass

Listing Status and Recovery Plan

This species was first listed in December 2009, but as a result of a Court order from the United States District Court for the District of Idaho the listing was vacated and remanded for further consideration. USFWS addressed the court's request and proposed that threatened status be reinstated for slickspot peppergrass in February 2014. Slickspot peppergrass was relisted as threatened as of September 2016 (USFWS 2016b). USFWS is currently finalizing a draft Species Status Assessment[9]. A final recovery plan has not been completed, though a recovery outline has been prepared (USFWS 2011f). Proposed critical habitat for slickspot peppergrass is addressed under *Slickspot Peppergrass Proposed Critical Habitat*, below.

Life History and Habitat Characteristics

Slickspot peppergrass is a small, intricately-branched flowering plant in the mustard family. This species flowers once then dies. It has two different life strategies, an annual strategy where it flowers and dies in the same year and a biennial strategy where is grows in the first year as a rosette and produces flower and seeds in the second year. The biennial rosette form requires favorable climatic conditions and often dies before reproducing due to dry summer conditions. Numbers of above-ground slickspot peppergrass vary widely from year to year depending on seasonal precipitation and climatic conditions. Above-ground plants represent only a portion of the total population and seed banks (a reserve of dormant seeds in the soil) make up the other portion. Most slickspot peppergrass seeds are located in the top two inches of the soil. During unfavorable climatic years, slickspot peppergrass is dependent on a persistent seed bank to maintain the population (USFWS 2016). The extreme variability in number of plants to emerge above-ground makes annual counts and detections difficult.

[9] Personal communication with Dawn Davis, Sagebrush Ecosystem Coordinator - Certified Wildlife Biologist, USFWS, email to Gillian Wigglesworth, BLM Idaho State Office, on July 11, 2019.

The plant grows in unique microsite habitats known as slickspots, which are found within the semiarid sagebrush-steppe ecosystem of southwestern Idaho (USFWS 2011g). Slickspots are visually distinct openings in the sagebrush-steppe community. They are characterized by soils with high sodium content and distinct clay layers. Slickspots make up a small area within the larger sagebrush-steppe community (USFWS 2011g). One component of quality habitat for peppergrass is biological soil crust. These crusts help stabilize soil, prevent erosion, increase nutrients in the soil, regulate water in the soil, and prevent establishment of invasive plants (USFWS 2011g). These soil crusts are sensitive to disturbances such as compression due to livestock or off highway vehicles, and damage by fire. Biological soil crusts are slow to recover from such disturbances (USFWS 2011g).

Slickspot peppergrass is primarily an outcrossing species requiring pollen from separate plants for more successful fruit production, and has a low seed set in the absence of insect pollinators. Slickspot peppergrass can self-pollinate, however, with a self-reproduction rate of only 12 to 18 percent. Known slickspot peppergrass insect pollinators include several families of bees, beetles, flies, and others.

Status and Distribution

Slickspot peppergrass is endemic to the volcanic plains of southwestern Idaho region. There are three regions of slickspot peppergrass populations: Boise Foothills, the Snake River Plain and a disjunct population on the Owyhee Plateau. Under the original listing there were 80 extant element occurrences collectively comprising approximately 15,800 acres (USFWS 2009). In 2014, 45,569 total plants were counted, which was the third highest amount over 10 years of surveys (USFWS 2016). In 2018, Idaho Fish and Wildlife Information System data indicated there are 115 existing element occurrences of slickspot peppergrass over about 16,279 acres rangewide[10]; however, actual occupied area is a small fraction of the total because the plant is generally restricted to slickspot microsites, and because only a small percentage of those slickspots support the species. The majority of slickspot peppergrass sites are located on Federal lands with most being on BLM-administered lands.

Slickspot peppergrass occurs in approximately 180,184 acres of element occurrences; of this, approximately 29,615 acres, or 16 percent, occurs in the action area and approximately 12,161 acres, or 7 percent, occurs in the focused action area (USFWS GIS 2018 and BLM GIS 2018; **Figure A-26**).

Threats

The primary threats that affect the habitat and survival of slickspot peppergrass are altered wildfire regime (increasing frequency, size, and duration of wildfires), and invasive, nonnative plant species encroachment, mainly cheatgrass, both of which are further intensified by climate change. Cheatgrass can affect peppergrass directly through competition, but it also acts indirectly on the species by providing continuous fine fire fuels that contribute to increased frequency and extent of wildfires in southwest Idaho. Frequent wildfires ultimately result in the conversion of the sagebrush-steppe habitat to nonnative annual grasslands, with consequent losses of native species diversity and natural ecological function. Some peppergrass occurrences may survive in unburned areas for a while but they will likely not be viable over the long term as native sagebrush-steppe habitat converts to annual grasslands dominated by nonnative species (USFWS 2016). More than 50 percent of known slickspot peppergrass element occurrences have been affected by wildfire (USFWS 2016b). Wildfire also damages biological soil crusts, which are important to the

[10] Personal communication with Dawn Davis, Sagebrush Ecosystem Coordinator - Certified Wildlife Biologist, USFWS, email to Gillian Wigglesworth, BLM Idaho State Office, on July 11, 2019.

sagebrush-steppe ecosystem and slickspots where peppergrass occur because the soil crusts stabilize and protect soil surfaces from wind and water erosion, retain soil moisture, discourage annual weed growth, and fix atmospheric nitrogen (USFWS 2011g).

Additional threats to slickspot peppergrass include development, habitat fragmentation and isolation, livestock use, and seed predation from harvester ants. Livestock can cause mechanical damage by trampling habitat and individual plants. Owyhee harvester ants remove peppergrass seeds and deplete the seed bank. Indirect threats may occur from activities that adversely affect peppergrass pollinators or degrade microsite conditions to prevent recolonization or seed germination. Activities identified as affecting pollinators include conversion of native vegetation to nonnative vegetation, chemical treatments, and loss of other flowering plants supporting pollinators. Degradation of habitat that can affect future recolonization or seed germination can include soil compaction or biological soil crust damage from livestock or vehicles, removal or damage of seed banks from soil erosion, fire effects, development, and burying of seeds resulting from soil disturbance.

A Conservation Agreement between the BLM and USFWS was established in 2006 and updated in 2009, 2013, and most recently in 2014 (**Appendix D**). The Conservation Agreement commits the BLM to implementing conservation measures[11] for slickspot peppergrass that would avoid or minimize effects associated with BLM actions planned under the guidance of their Land Use Plans (USFWS 2016b). The conservation measures and associated implementation actions for ongoing BLM programs provide overall guidance for avoiding or minimizing direct and indirect effects on suitable and occupied slickspot peppergrass habitat, and restoring and maintaining suitable and occupied habitat. Conservation measures and implementation actions for slickspot peppergrass include conducting species inventories on BLM-administered lands, exchanging location information with agency partners, completing site-specific Section 7 consultation on both ongoing and new actions, and avoiding or minimizing potential adverse effects of site-specific projects covered under land use programs. Site-specific implementation and effectiveness monitoring, including annual reporting requirements, will also be completed to track progress toward achieving conservation objectives (USFWS 2016b).

Effects Analysis and Determination of Effects

There are no design features specific to slickspot peppergrass; however, design features for ESA-listed plant species would prevent or minimize the potential for direct adverse effects from manual and mechanical treatments, prescribed fire, revegetation, and targeted grazing treatments as discussed in **Section 3.2.1**, Effects Common to All Plant Species.

Conservation Measures

To prevent or minimize the potential for residual adverse effects on slickspot peppergrass from the proposed treatments after implementation of the design features listed above, the BLM would be required to implement the following conservation measures:

[11] Conservation Agreement conservation measures would apply to the BLM Four Rivers Field Office in southwest Idaho only. This is because the Four Rivers Field Office land use plans (the 1988 Cascade RMP, portions of the 1983 Kuna Management Framework Plan, and the 1987 Jarbidge RMP) currently do not contain specific conservation measures for slickspot peppergrass. Other BLM field office land use plans in the planning area contain conservation measures for slickspot peppergrass, so the Conservation Agreement no longer applies to these areas.

- Conservation Measure Slickspot Peppergrass 1—A qualified biologist would conduct pretreatment slickspot habitat surveys in accordance with slickspot peppergrass inventory guidelines (BLM 2010). If suitable or occupied slickspot habitat is identified, a treatment avoidance buffer of 1,640 feet, would be established to protect the microhabitat and potential seed bank. Fencing, flagging, signs or other methods to denote or exclude the avoidance buffer would be implemented. No treatments or actions would occur within the avoidance buffer.
- Conservation Measure Slickspot Peppergrass 2—Within the potential range of slickspot peppergrass only native plant material would be used for revegetation.
- Conservation Measure Slickspot Peppergrass 3—If prescribed fire treatments occur within the potential range of slickspot peppergrass, follow-up native seeding or revegetation would be implemented to suppress nonnative, invasive species occupancy.
- Conservation Measure Slickspot Peppergrass 4—All slickspot peppergrass proposed critical habitat will be avoided and buffered as per Conservation Measure Slickspot Peppergrass 1.
- Conservation Measure Slickspot Peppergrass 5—Establish a treatment avoidance buffer around individuals or populations to protect pollinator habitat. Individuals or populations would be avoided with a treatment buffer of 1,640 feet (Dawson 2012).
- Conservation Measure Slickspot Peppergrass 6—To protect this species from adverse effects from livestock grazing, temporary fencing to prevent livestock entry would be placed ¼-mile from suitable and occupied habitat within the graduated use area for targeted grazing treatment areas.

Chemical treatments would also adhere to applicable conservation measures identified in the Vegetation Treatments on Bureau of Land Management Lands in 17 Western States Biological Assessment (BLM 2007, pp. 4-129 to 4-134), as discussed in **Section 3.2.1**, Effects Common to All Plant Species.

Further, conservation measures in the slickspot peppergrass Conservation Agreement (**Appendix D**) as described above, would be implemented as applicable, based on BLM field office jurisdiction where treatments were done.

Effects Analysis

Approximately 12,161 acres, or 7 percent, of slickspot peppergrass element occurrence acreage, occurs in the focused action area (USFWS and BLM GIS 2018; **Figure A-26**). This is the area that would be available for fuel break creation and maintenance within the species' range, with a half-mile buffer.

Two primary threats to slickspot peppergrass were identified in the 2016 final listing; altered wildfire regime and invasive, nonnative plant species (USFWS 2016b). The proposed action would create and maintain fuel breaks to slow the spread of wildfires, reduce wildfire size, better protect sagebrush communities, and reduce invasive plant species expansion. Indirectly, the proposed action would beneficially affect slickspot peppergrass and its habitats through increased conservation, and potentially aid in species recovery by reducing the primary threat of wildfire and invasive annual grass expansion. However, since fuel break treatments are proposed in potential slickspot peppergrass habitat, the potential for adverse effects resulting from proposed fuel break treatments is not discountable.

Implementation of design features for ESA-listed plant species as discussed in **Section 3.2.1**, Effects Common to All Plant Species, would reduce the potential for direct, adverse effects on slickspot peppergrass. Design Feature 42 would require pre-treatment surveys in suitable habitat, and Design

Feature 43 would require appropriate conservation strategies, such as site-specific avoidance buffers, to be implemented to avoid adverse impacts.

To prevent or minimize the potential for residual adverse effects on slickspot peppergrass from the proposed treatments after implementation of the design features listed above, species-specific conservation measures for slickspot peppergrass, including those in the slickspot peppergrass Conservation Agreement (**Appendix D**) based on BLM field office jurisdiction, would be followed during treatments. Future site-specific projects adopting the design features for ESA-listed plant species, and conservation measures would avoid or reduce the potential for most adverse effects on slickspot peppergrass to a discountable level. Where potential adverse effects from fuel break treatments cannot be lowered to an insignificant or discountable level by specific conservation measures, additional consultation would be undertaken with USFWS. Examples may include aerial herbicide application over suitable habitat with unknown occupancy, or if avoidance buffers around suitable or occupied habitat would impede effective fuel break creation.

Potential effects on slickspot peppergrass from specific treatment types are discussed below.

Effects from Manual Treatments

Manual methods would be primarily used in pinyon-juniper woodlands but may be used in sagebrush communities where pinyon-juniper encroachment is occurring or to decrease fuel continuity in a fuel break. As discussed in **Section 3.2.1**, Effects Common to All Plant Species, the potential for effects resulting from manual treatment methods would be minimal, because of the small disturbance areas that would be expected from manual treatments, because of the relatively limited area in which its use is feasible, and because workers could avoid slickspot microsites during treatments.

Pre-treatment surveys would identify suitable and occupied habitat (Design Feature 42). Manual treatments would not occur in occupied or suitable habitat, and these areas would be avoided when treatments were proposed nearby, in accordance with Conservation Measure Slickspot Peppergrass 1. There is a small chance that undetected individuals or seed banks in the fuel break could be directly adversely affected by trampling, as described under *Effects Common to All Plant Species*. However, the potential for this effect would be discountable, since treatments would avoid both suitable and occupied habitat.

Manual treatments could damage biological soil crusts that are an important habitat component for slickspot peppergrass. This would indirectly adversely affect slickspot peppergrass by altering habitat conditions, and potentially rendering suitable habitat unsuitable. However, because of the limited extent and localized nature of manual treatments, this effect would be insignificant when measured at the scale of the species' range.

Where manual treatments are carried out near known populations, ground-dwelling bees or other insect pollinators could be directly affected as discussed under *Effects Common to All Plant Species*. Indirectly, this may affect slickspot peppergrass reproductive success, ultimately affecting population persistence depending on the severity of pollinator effects. Implementing Conservation Measure Slickspot Peppergrass 5 would minimize this effect to an insignificant level by ensuring enough pollinator habitat is conserved via avoidance buffers, to maintain slickspot peppergrass populations.

Manual treatments would indirectly beneficially affect slickspot peppergrass over time, particularly where treatments to remove encroaching pinyon-juniper woodlands were carried out in suitable or occupied habitat in sagebrush communities. This would help conserve habitat, including slickspots in sagebrush communities, biological soil crusts, and pollinator habitat, by reducing fuel loadings and potential habitat damage from wildfire over time.

Overall, given the limited extent and localized nature of manual treatments, because direct adverse effects would be discountable after design features and conservation measures were implemented, and given the anticipated beneficial effects over time, the BLM determines that manual treatments ***may affect, but are not likely to adversely affect*** slickspot peppergrass.

Effects from Mechanical Treatments

As discussed in **Section 3.2.1**, Effects Common to All Plant Species, the type of potential adverse effects from mechanical methods would be similar to manual treatments. However, effect intensity would generally be increased, due to the larger size of the affected area, the greater amount of surface disturbance, the increased continuity of the disturbed area, and the inability to selectively target species during mechanical treatments (Benton et al. 2016).

As for manual treatments, pre-treatment surveys would identify suitable and occupied habitat (Design Feature 42), and these areas would be avoided in accordance with Conservation Measure Slickspot Peppergrass 1. As such, mechanical treatments would not occur in suitable or occupied habitat or the avoidance buffer around these areas, and therefore direct adverse effects on slickspot peppergrass are not anticipated.

The potential for residual adverse effects from mechanical treatments, as described in *Effects Common to All Plant Species*, on undetected individuals or seedbanks in the fuel break would be discountable. This is because mechanical treatments would avoid both suitable and occupied habitat for slickspot peppergrass.

Mowing would reduce vegetation height in the fuel break. The potential for residual direct adverse effects on slickspot peppergrass individuals would be discountable because mowing would not occur in suitable or occupied habitat or the avoidance buffer around these areas. Further, mower height is typically a minimum of six inches off the ground and thus the mower blades would not remove slickspot peppergrass plants, in the unlikely scenario they were present in a mowing treatment area. In the unlikely scenario that undetected individuals or seedbanks were present in a treatment area, plant rosettes or seed banks could be buried under mown material, resulting in damage, death, or failure to germinate. Mowing could reduce the availability of other flowering forbs that support slickspot pollinators, indirectly reducing reproductive success. Because mowing would not occur in suitable or occupied habitat or the avoidance buffer around these areas, residual indirect adverse effects on slickspot peppergrass would also be discountable.

Since suitable and occupied habitat and an avoidance buffer around these areas would be avoided during mechanical treatments as described above, the potential for mechanical treatments to damage biological soil crusts in these areas would be discountable. If biological soil crusts were present in undetected suitable or occupied habitat in a treatment area, damage to these features, as described above, may indirectly adversely affect slickspot peppergrass by reducing habitat suitability and increasing potential for invasive annual grass expansion.

Erosion caused by vegetation removal around slickspot microsites could increase runoff and sediment accumulation in slickspots, degrading suitable or occupied habitat quality. Since suitable and occupied habitat and an avoidance buffer around these areas would be avoided during mechanical treatments (Conservation Measure Slickspot Peppergrass 1), the potential for this impact would be discountable. The potential for this impact to occur would be further reduced by incorporating design features to avoid working in saturated soils (Design Feature 37), reduce erosion and sedimentation (Design Feature 38), and avoid excessive damage to soils (Design Feature 39).

Similarly, if treatments occurred during wet weather, mud may accumulate on equipment tires or tracks. If slickspot peppergrass seeds are present in the mud, they could be transported out of slickspots or buried too deep for germination to occur. The potential for this impact to occur would be discountable by incorporating the same conservation measures and design features described above.

Mechanical treatments done when soils are dry would tend to generate dust, as described in *Effects Common to All Plant Species* with tilling treatments resulting in the greatest dust generation. Treatments could deposit dust in slickspots or on slickspot peppergrass plants. This type of effect is expected to be temporary, dependent on proximity of treated areas relative to suitable or occupied habitat, and would not likely result in a uniform deposition of dust over a given population. Avoiding suitable and occupied habitat and an avoidance buffer around these areas in accordance with Conservation Measure Slickspot Peppergrass 1 would further reduce affect intensity; therefore, indirect adverse effects from dust generation would be insignificant.

Where mechanical treatments are carried out near occupied habitat, ground-dwelling bees or other insect pollinators could be directly affected by habitat loss due to trampling, soil disturbance, and habitat loss as described under *Effects Common to All Plant Species*. This could indirectly adversely affect slickspot peppergrass reproductive success, ultimately affecting population persistence depending on the severity of pollinator effects. Implementing Conservation Measure Slickspot Peppergrass 5 would minimize this effect to an insignificant level by ensuring enough pollinator habitat is conserved via avoidance buffers, to maintain slickspot peppergrass populations.

Overall, pretreatment slickspot habitat surveys and implementation of avoidance buffers around suitable and occupied habitat in accordance with design features and conservation measures would exclude mechanical treatments from these areas, avoiding or minimizing potential adverse effects from mechanical treatments in the vicinity. If mechanical treatments would be required within suitable or occupied habitat to create effective fuel breaks, then additional consultation would occur. Thus, the BLM determines that mechanical treatments ***may affect, but are not likely to adversely affect*** slickspot peppergrass.

Effects from Revegetation

Potential effects from seedbed preparation for revegetation treatments are discussed under manual, mechanical, prescribed fire, and chemical treatments. Seedbed preparation would typically occur in areas dominated by invasive annual grasses, primarily in unsuitable slickspot peppergrass habitat or areas where the potential for slickspot peppergrass to occur is low. These treatments would not occur in occupied, suitable, or proposed critical habitats.

Conservation Measure Slickspot Peppergrass 2 requires native plant material to be used for revegetation in slickspot peppergrass range. Thus, plant materials used for revegetation would not compete with slickspot peppergrass. Aerial seeding of sagebrush and native grasses and forbs would not impact slickspot peppergrass and slickspots due to the lack of soil surface disturbance. This treatment would have the beneficial effect of improving plant community structure and increasing species diversity and resilience to disturbance. However, this method, in areas adjacent to slickspot occurrences, may not be effective if there is existing vegetation that would compete with germinating plants or high cover of litter on the soil surface that would impede seed-to-soil contact.

Hand planting native shrubs such as sagebrush typically results in little ground disturbance or disturbance to existing vegetation. Disturbance from hand planting methods occurs in interspaces between existing plants, but would not occur in suitable slickspot microsite habitat. Thus, potential direct adverse effects to slickspot peppergrass from trampling or crushing plants, or disturbance of seed banks or plants due to digging activities, are not expected to occur.

Similar to manual treatments, since slickspot microsites are easily detected and would be avoided during revegetation projects, direct effects on this species or its suitable or occupied habitat from vehilcles during project access are not expected to occur.

Over the long term, treatments that would re-establish a more natural plant community structure and reduce or eliminate noxious weeds and invasive plants that compete with slickspot peppergrass. This would enhance the potential for population persistence. In addition, restoration of greater vegetation diversity, especially forbs, would improve habitats for pollinator insects.

Overall, given that adverse effects would be discountable or insignificant after design features and conservation measures were implemented, and given the anticipated beneficial effects over time, the BLM determines that revegetation treatments ***may affect, but are not likely to adversely affect*** slickspot peppergrass.

Effects from Prescribed Fire

Prescribed fire treatment is intended to remove litter accumulations from invasive plants that could impede effectiveness of herbicide and seeding treatments. Pre-treatment surveys would identify suitable and occupied habitat (Design Feature 42), and these areas would be avoided in accordance with Conservation Measure Slickspot Peppergrass 1. As such, prescribed fire treatments would not occur in suitable or occupied habitat or the avoidance buffer around these areas, and therefore direct adverse effects on slickspot peppergrass from this treatment method are not anticipated.

There is a low potential that prescribed fire could move into avoidance buffers and directly affect slickspot peppergrass. Should this occur, prescribed fire could remove all or part of the above-ground biomass of slickspot peppergrass plants and other surrounding vegetation. Slickspots naturally have low vegetation cover and thus may be less likely to burn, reducing this effect potential or intensity. Since the highest germination rates are for seeds that are close to the soil surface, prescribed fire could damage seeds in slickspots, particularly those with invasive annual grasses, potentially preventing future germination. However, the potential for these effects is low enough to be discountable, because multiple design features (Design Features 15–20) would ensure that prescribed fire operations are conducted within defined prescription parameters.

As with mechanical treatments, prescribed fire could result in airborne dust or ash that could accumulate in slickspots or on slickspot peppergrass plants. This effect would be dependent on ash production, and proximity of treated areas relative to slickspot peppergrass and its habitat. It would not likely result in a uniform deposition of dust or ash over a given population and is expected to be insignificant.

Because prescribed fire treatments would not be done in occupied or suitable habitat, consistent with Conservation Measure Slickspot Peppergrass 1, direct impacts from line establishment, as discussed under *Effects Common to All Plant Species*, are not expected to occur.

Prescribed fire in slickspot peppergrass range could result in a flush of non-native annual invasive plants due to release of minerals such as nitrogen resulting from the combustion of plant material and litter. This could result in additional competition with slickspot peppergrass and other native plants that support slickspot peppergrass pollinators. However, prescribed fire would be followed by chemical treatments to reduce invasive annual grass germination in the short term, and revegetation treatments with native species to reduce the potential for invasive annual grass establishment in the long term in accordance with Conservation Measure Slickspot Peppergrass 3. Since this effect would be offset by follow-up treatments it would therefore be discountable.

Pretreatment surveys and avoidance buffers of slickspot habitat would avoid disturbance to occupied and suitable habitat. Site-specific burn plans, detailing prescribed fire parameters, would ensure proper management of prescribed fire and avoid adverse effects to slickspot peppergrass. Since slickspot microsite habitat makes up only a fraction of the total suitable habitat and only 12,161 acres (7 percent) of acreage in element occurrences are located in the focused action area, it is not anticipated prescribed burning would jeopardize a given population survivorship. Implementation of design features, and slickspot peppergrass specific conservation measures would render adverse effects discountable, or minimize them to insignificant levels. Therefore, the BLM determines that prescribed fire treatments ***may affect, but is not likely to adversely affect*** slickspot peppergrass.

Effects from Chemical Treatments

Chemical treatments would be used primarily in areas dominated by noxious weeds and invasive plants in unsuitable habitat or where the potential for slickspot peppergrass to occur is low. Consistent with Conservation Measure Slickspot Peppergrass 1, chemical treatments would only be used outside of avoidance buffers around occupied and suitable habitat. Where used outside of the avoidance buffers, chemical treatments would be done in accordance with BMPs and SOPs in the Vegetation Treatments Using Herbicides on Bureau of Land Management Lands in 17 Western States Programmatic Environmental Impact Statements and the Final PEIS on using Aminopyralid, Fluroxypyr, and Rimsulfuron (BLM 2007, 2016) as described in **Section 3.2.1**, Effects Common to All Plant Species. Further, formulation-specific conservation measures as described in **Section 3.2.1**, would minimize or avoid the potential for off-site drift, accidental spills, or direct chemical exposure to slickspot peppergrass. Thus, potential direct adverse effects on slickspot peppergrass from herbicide exposure would be discountable.

Chemical treatments outside avoidance buffers could indirectly affect slickspot peppergrass by altering habitat vegetation composition and nectar sources for pollinator insects, as discussed in **Section 3.2.1**, Effects Common to All Plant Species. Ensuring enough pollinator habitat is conserved around occupied or suitable habitat to sustain slickspot populations (Conservation Measure Slickspot Peppergrass 5) would make this effect discountable.

Overall, given that adverse effects would be discountable after design features and conservation measures were implemented, the BLM determines that chemical treatments ***may affect, but are not likely to adversely affect*** slickspot peppergrass.

Effects from Targeted Grazing

Targeted livestock grazing treatments would not be carried out in occupied or suitable habitat for slickspot peppergrass or avoidance buffers around these areas, in accordance with Conservation Measure Slickspot Peppergrass 1. Direct adverse effects on slickspot peppergrass from livestock grazing, as described under *Effects Common to All Plant Species*, are not expected to occur

Targeted livestock grazing outside of occupied or suitable habitat avoidance buffers, but within the range of slickspot peppergrass, would be done according to multiple design features. This would lessen the potential for adverse effects on slickspot peppergrass habitat. These include conducting treatments in accordance with a targeted grazing plan (Design Feature 21) and graduated use plan (Design Feature 24 and **Section 2.10.1**) and conducting grazing to conserve habitat conditions (Design Feature 23).

If targeted livestock grazing treatments were carried out within ¼-mile of occupied or suitable habitat, slickspot peppergrass individuals and seed banks could be directly adversely affected by trampling, herbivory, soil compaction, biological crust damage, and increased weed spread, as described under *Effects Common to All Plant Species*. This is because some livestock, depending on the local topography and site conditions, may graze outside of the targeted grazing treatment area; it is not discountable that livestock may stray into occupied or suitable habitat. Implementing Conservation Measure Slickspot Peppergrass 6 would lower the potential for this effect to a discountable level by preventing livestock entry to occupied or suitable habitat.

Overall, given that adverse effects would be discountable or insignificant after design features and conservation measures were implemented, the BLM determines that targeted grazing treatments ***may affect, but are not likely to adversely affect*** slickspot peppergrass.

Slickspot Peppergrass Proposed Critical Habitat

Critical habitat was proposed for slickspot peppergrass on May 10, 2011 (USFWS 2011f). On February 12, 2014, USFWS revised the proposed rule to include recently discovered slickspot peppergrass locations that met critical habitat designation criteria (USFWS 2014d). Final designation of critical habitat has not yet occurred.

In total, there are approximately 61,332 acres of proposed critical habitat for slickspot peppergrass. Proposed critical habitat occurs in Ada, Gem, Payette, Elmore, and Owyhee Counties in Idaho (**Figure A-26**). Of this, approximately 37,196 acres, or 61 percent, occurs in the action area and approximately 16,447 acres, or 27 percent, occurs in the focused action area (USFWS GIS 2018 and BLM GIS 2018).

The PCEs for slickspot peppergrass proposed critical habitat are listed below:

PCE 1: Ecologically-functional microsites or "slickspots" that are characterized by the following:

- A high sodium and clay content, and a three-layer soil horizonation sequence, which allows for successful seed germination, seedling growth, and maintenance of the seed bank. The surface horizon consists of a thin, silty, vesicular, pored (small cavity) layer that forms a physical crust (the silt layer). The subsoil horizon is a restrictive clay layer with an: abruptic (referring to an abrupt change in texture) boundary with the surface layer, that is natric or natric-like in properties (a type of argillic (clay-based) horizon with distinct structural and chemical features) (the restrictive layer). The second argillic subsoil layer (that is less distinct than the upper argillic horizon) retains moisture through part of the year (the moist clay layer); and

- Sparse vegetation with low to moderate introduced invasive nonnative plant species cover.

PCE 2: Relatively-intact native *Artemisia tridentata* ssp. *wyomingensis* (Wyoming big sagebrush) vegetation assemblages, represented by native bunchgrasses, shrubs, and forbs, within 250 m (820 feet) of slickspot peppergrass element occurrences to protect slickspots and slickspot peppergrass from disturbance from wildfire, slow the invasion of slickspots by nonnative species and native harvester ants, and provide the habitats needed by slickspot peppergrass' pollinators.

PCE 3: A diversity of native plants whose blooming times overlap to provide pollinator species with sufficient flowers for foraging throughout the seasons and to provide nesting and egg-laying sites; appropriate nesting materials; and sheltered, undisturbed places for hibernation and overwintering of pollinator species. In order for genetic exchange of slickspot peppergrass to occur, pollinators must be able to move freely between slickspots. Alternative pollen and nectar sources (other plant species within the surrounding sagebrush vegetation) are needed to support pollinators during times when slickspot peppergrass is not flowering, when distances between slickspots are large, and in years when slickspot peppergrass is not a prolific flowerer.

PCE 4: Sufficient pollinators for successful fruit and seed production, particularly pollinator species of the sphecid and vespid wasp families, species of the bombyliid and tachnid fly families, honeybees, and halictid bee species, most of which are solitary insects that nest outside of slickspots in the surrounding sagebrush-steppe vegetation, both in the ground and within the vegetation.

Effects Analysis and Determination of Effects

In accordance with Conservation Measure Slickspot Peppergrass 4, no treatments would occur in proposed critical habitat. Further, in accordance with Conservation Measure Slickspot Peppergrass 5, an avoidance buffer of 1,640 feet would be established around proposed critical habitat, and no treatments would be conducted in these areas. This would be done to protect pollinators, a PCE of proposed critical habitat. Because treatments would not be conducted in avoidance buffers, direct adverse effects on proposed critical habitat PCEs in and around slickspot microsites, including appropriate Wyoming big sagebrush communities, a diverse array of native pollinator nectar plants, and sufficient pollinator habitat, are not expected to occur.

Although treatments would not be done within the avoidance buffer described above, the potential for indirect adverse effects on proposed critical habitat PCEs, is not discountable when treatments are conducted outside of, but near the avoidance buffer. For instance, prescribed fire may escape treatment areas, herbicides, ash, or dust may drift outside of application areas, and livestock may stray outside of targeted grazing areas. These effects are discussed in detail for the individual treatment methods above.

As discussed for the individual treatment methods above, implementing design features would reduce the potential for most adverse effects to a discountable level. When the design features are considered together with avoidance buffers under Conservation Measure Slickspot Peppergrass 4, adverse effects on slickspot peppergrass proposed critical habitat would be discountable. Further, the proposed action would have indirect beneficial impacts on slickspot peppergrass and its pollinators over time. With implementation of design features and conservation measures the BLM determines that all treatment methods are ***not likely to destroy or adversely modify*** slickspot peppergrass proposed critical habitat. If treatments are determined to be required within proposed critical habitat to create effective and necessary fuel breaks, further site-specific consultation would be required.

Cumulative Effects

The cumulative effects analysis area for ESA-listed plants is the focused action area. Of the approximately 17,450 total acres of element occurrences for the species in the focused action area, approximately 2,287 acres (13 percent) are on private lands and approximately 761 acres (4 percent) are on Idaho state-managed lands (USFWS and BLM GIS 2018). The majority of slickspot peppergrass range, and occupied and suitable habitat, occurs on federal lands administered by the BLM. Idaho state-managed and private lands occur adjacent to suitable and occupied habitat, but it is unknown how much suitable or occupied habitat occurs on state and private lands.

Reasonably foreseeable future state, and private actions that could affect slickspot peppergrass and proposed critical habitat would constitute cumulative effects. Actions that could adversely affect slickspot peppergrass include treatment of noxious weeds and invasive plants, including with herbicides or other methods, revegetation using of plant materials that compete with slickspot peppergrass, livestock grazing, OHV use, and facility, agricultural, and rights-of-way development.

Cumulative impacts on non-federal lands may also include lack of management actions to maintain occupied and potential habitat. For example, non-federal lands may be less likely to have habitat restoration and weed control treatments, and habitat burned by wildfire is typically not revegetated. As a result, these areas could become dominated by noxious weeds and invasive plants. In addition, these lands can be seed sources for noxious weed and invasive plant seeds that could spread to adjacent federal lands, increasing the need for continued on-going and larger-scale treatments. Noxious weed and invasive plant control would not be subject to the same use restrictions as on federal lands, including those under the proposed action. Formulations would not be limited to those in the proposed action. Therefore, damage to or destruction of slickspots, plants, or seedbanks could occur as a result of these actions. Similarly, maintenance and installation of fences, pipelines, water developments, and trailing routes in occupied or potential habitats would have less oversight and could result in additional cumulative effects to slickspot peppergrass.

The State of Idaho has implemented conservation measures defined in the Candidate Conservation Agreement (CCA) signed between the State of Idaho, BLM, and nongovernmental cooperators. The majority of the individual conservation efforts being implemented for slickspot peppergrass that are applicable to individual projects are contained in the CCA, which was established in 2006 and updated in 2009, 2013, and most recently in 2014 (**Appendix D**).

The CCA includes rangewide efforts to address the need to maintain and enhance slickspot peppergrass habitat; reduce intensity, frequency, and size of natural- and human-caused wildfires; minimize loss of habitat associated with wildfire-suppression activities; reduce the potential of nonnative plant species invasion after wildfire; minimize habitat loss associated with rehabilitation and restoration techniques; minimize the establishment of invasive nonnative species; minimize habitat loss or degradation from OHV use; mitigate the adverse effects of military training; and minimize the effect of ground disturbances caused by livestock penetrating trampling when soils are saturated.

3.2.12 Spalding's Catchfly

Listing Status and Recovery Plan

The USFWS listed Spalding's catchfly (*Silene spaldingii*) as a threatened species under the ESA in 2001 and published a recovery plan in 2007. The recovery plan indicates a moderate degree of threat and high recovery potential. The recovery strategy focuses on protecting and maintaining multiple self-sustaining, reproducing populations in key conservation areas in the five physiographic regions with occupied habitats. Recovery actions are centered around protection and management of habitat in the key conservation areas through conserving, identifying, developing, and expanding existing habitat and reducing direct and indirect threats to species populations (USFWS 2007b). Critical habitat for this species has not been designated.

Life History and Habitat Characteristics

Spalding's catchfly is an herbaceous perennial plant belonging to the pink family. This regional endemic species is predominantly found in mesic slopes, flats, or depressions in bunchgrass grasslands and sagebrush-steppe, and occasionally in open-canopy pine stands.

Plants emerge from below ground level in mid-to late May with reproduction achieved solely by seed and flowering typically occurring from mid-July through August. Above-ground plant parts die back to below ground level in the fall.

Observed pollinators are primarily the bumblebee *Bombus fervidus*; other pollinators are solitary bees, wasps, and night-pollinating moths. Spalding's catchfly reproduces best when outcrossing occurs, and pollinators are essential in maintaining the genetic fitness of populations. Adjacent invasive nonnative plants may negatively affect reproduction (USFWS 2007b)

Status and Distribution

This plant is currently distributed in five physiographic regions in eastern Washington, west-central Idaho, northeastern Oregon, and disjunct in western Montana and British Columbia, Canada. Of the 99 currently known populations, 66 are comprised of fewer than 100 individuals each and an addition 23 populations exceeding 100 or more individuals each.

Of the approximately 9,650,212 acres of the total Spalding's catchfly range, approximately 2,540 acres, or less than 1 percent, occurs in the action area, and approximately 4,781 acres, or less than 1 percent, occurs in the focused action area (**Figure A-27**; USFWS and BLM GIS 2018).

Threats

Invasive nonnative plants are one of the primary threats facing Spalding's catchfly as they can adversely affect native plants through a variety of mechanisms such as competitive exclusion and altering of pollinator behaviors. In addition to this, threats to this species include habitat degradation, destruction and fragmentation resulting from changes in wildfire regime, urban and agricultural development, livestock grazing, disturbances from OHV, herbicide treatments, and the loss of genetic variation due to small, fragmented populations.

Effects Analysis and Determination of Effects

There are no design features specific to Spalding's catchfly; however, design features for ESA-listed plant species would prevent or minimize the potential for direct adverse effects from manual and mechanical treatments, prescribed fire, revegetation, and targeted grazing methods as discussed in **Section 3.2.1**, Effects Common to All Plant Species.

Conservation Measures

To prevent or minimize the potential for residual adverse effects on Spalding's catchfly from the proposed treatments after implementation of the design features listed above, the BLM would be required to implement the following conservation measures:

- Conservation Measure Spalding's Catchfly 1—Establish a treatment avoidance buffer around individuals or populations to protect pollinator habitat. Individuals or populations would be avoided with a treatment buffer of 1,640 feet (Dawson 2012).
- Conservation Measure Spalding's Catchfly 2—To protect this species from adverse effects from livestock grazing, temporary fencing to prevent livestock entry would be placed 1640 feet from individuals or populations within the graduated use area for targeted grazing treatment areas.
- Conservation Measure Spalding's Catchfly 3—Where prescribed fire treatments are proposed in suitable habitat in the species range, treatments should mimic historical fire behavior to the extent that this is known. Prescribed burning should occur during times when Spalding's catchfly is typically dormant to prevent adverse effects on reproduction. Where invasive annual grasses are present in a prescribed fire treatment area in the species range, revegetation, weed control, and monitoring should be conducted to prevent invasive annual grass germination to the extent possible.

Further, chemical treatments would adhere to applicable conservation measures identified in the Vegetation Treatments on Bureau of Land Management Lands in 17 Western States Biological Assessment (BLM 2007, pp. 4-129 to 4-134), as discussed in **Section 3.2.1**, Effects Common to All Plant Species.

Effects Analysis

Approximately 4,781 acres, or less than 1 percent, of the total range of Spalding's catchfly occurs in the focused action area (**Figure A-27**; USFWS and BLM GIS 2018). This is the area that would be available for fuel break creation and maintenance within the species' range, with a half-mile buffer.

Implementation of design features for ESA-listed plant species as discussed in **Section 3.2.1**, Effects Common to All Plant Species, would reduce the potential for direct, adverse effects on Spalding's catchfly. Design Feature 42 would require pre-treatment surveys in suitable habitat, and Design Feature 43 would require appropriate conservation strategies, such as site-specific avoidance buffers, to be implemented to avoid adverse impacts.

Residual direct adverse effects could occur if pre-treatment surveys failed to detect individuals in a fuel break treatment area. The potential effects would vary depending on the treatment type, but would generally be as described in **Section 3.2.1**, Effects Common to All Plant Species. However, the design features would minimize the potential for this residual effect to a discountable level for all treatment methods.

If fuel breaks were constructed near known populations, pollinators could be adversely affected as described in **Section 3.2.1**, Effects Common to All Plant Species. Indirectly, this may affect reproductive success and genetic exchange, ultimately affecting population persistence depending on the severity of pollinator effects. Implementing Conservation Measure Spalding's Catchfly 1 would minimize this effect to an insignificant level for all treatment methods by ensuring enough pollinator habitat is conserved near listed plant populations to maintain them.

If targeted livestock grazing treatments were carried out within ¼-mile of known populations, individuals could be directly adversely affected by trampling, herbivory (especially late in the season as this plant remains greener than surrounding vegetation), and mechanical damage (including loss of flowers or seeds), as described in **Section 3.2.1**, Effects Common to All Plant Species. Implementing Conservation Measure Spalding's Catchfly 2 would lower the potential for this effect to a discountable level by preventing livestock entry to occupied habitat.

Spalding's catchfly is adapted to historical fire regimes, which vary throughout its range depending on the region (USFWS 2007b). Contemporary fire regimes, both prescribed and natural, have had varying, generally positive effects on Spalding's catchfly, including broken dormancy, increased stem and flower production, and increased seedling recruitment. These effects have generally been diminished in populations where nonnative invasive plants have increased post-fire (USFWS 2007b). Given this, Spalding's catchfly would likely be beneficially affected by prescribed fire treatments that mimic, to the extent known, historical fire regimes.

Prescribed fire treatments would not be conducted in occupied habitat, per Conservation Measure Spalding's Catchfly 1, so direct effects on Spalding's catchfly from prescribed fire are not expected. However, the potential that prescribed fire treatments carried out in suitable habitat in the species' range could affect undetected individuals, particularly those that are dormant, is not discountable. Conformance with Conservation Measure Spalding's Catchfly 3 would ensure that potential effects on undetected or dormant individuals in suitable habitat in the species range would be beneficial.

Using hand tools to construct fire line, as described in *Effects Common to All Plant Species*, may directly adversely affect undetected or dormant individuals in suitable habitat in the species' range. However, because less than one percent of the species range occurs in the focused action area, if this effect should occur it would likely be small enough as to be insignificant. Further, the potential for beneficial effects from prescribed fire, described above, would offset any potential adverse direct effects from fire line construction.

The proposed action would indirectly beneficially affect Spalding's catchfly over time. It would do this by conserving landscape-scale sagebrush communities and pollinator habitat by reducing the potential for community loss from wildfire and invasive annual grass conversion.

Overall, adverse effects on Spalding's catchfly would be insignificant or discountable due to implementation of design features and conservation measures. Further, indirect beneficial effects are expected over time from landscape-scale habitat conservation. The proposed action ***may affect, but is not likely to adversely affect*** Spalding's catchfly for all treatment methods.

There is no critical habitat for this species, therefore, no effects on critical habitat would occur.

Cumulative Effects

The cumulative effects analysis area for ESA-listed plants is the focused action area. Of the approximately 4,781 acres of the species' range in the focused action area, approximately 62 percent of this is on private and Washington State lands, as follows: approximately 2,892 acres are on private lands and approximately 33 acres are on Washington state-managed lands (USFWS and BLM GIS 2018). To date, survey effort to document occupied habitat has been lower on privately-owned lands than on publicly managed lands (USFWS 2007b). Yet even with lower survey effort, over half the known sites and estimated plant numbers, range-wide, occur on privately owned lands.

Reasonably foreseeable future private and state actions that could affect Spalding's catchfly would constitute cumulative effects. These include livestock grazing, and noxious weed and invasive plant treatments, including with herbicides or other methods. These are briefly described below.

Livestock grazing has occurred and will continue to occur on private lands in the focused action area. Long-term effects and trends are not well understood, in part due to the relatively long lifespan of Spalding's catchfly, but short term adverse effects have been well documented, including loss of reproductive structures, individuals, and habitat degradation (USFWS 2007b). Water developments have likely increased adverse livestock grazing and trampling impacts by allowing cattle to forage in areas they were previously unable to. Conversely, livestock grazing has been suggested as a management tool at sites where grasses produce large amounts of litter, and fire is not a practical management option. In these areas, managed grazing may enhance germination and seedling establishment.

Ongoing noxious weed control using herbicides and other vegetation treatments has the potential to affect Spalding's catchfly in the focused action area. Private land owners, the State of Washington, and counties have in the past and will continue to conduct active control programs. Formulations would not be limited to those in the proposed action. The full scope of control programs throughout the focused action area is not known.

An additional cumulative effect is climate change. Climate change may lead to increased size and frequency of natural and human-caused wildfires, resulting in widespread impacts on sagebrush communities, including from invasive annual grass spread. Climate change may increase recurrence and severity of droughts, further exacerbating this effect (Scasta et al. 2016; Breshears et al. 2016). Likely effects on Spalding's catchfly include reduced habitat suitability or habitat loss.

3.2.13 Uinta Basin Hookless Cactus

Listing Status and Recovery Plan

Uinta Basin hookless cactus (*Sclerocactus wetlandicus*) was originally listed in 1979 as a threatened species under the ESA under the name Uinta Basin hookless cactus (*Sclerocactus glaucus*). In 2009, the USFWS officially recognized the split of *S. glaucus* into three distinct species: *S. brevispinus*, *S. glaucus*, and *S. wetlandicus*. *Sclerocactus wetlandicus* (from here on Uinta Basin hookless cactus), comprises the bulk of the previously termed Uinta Basin hookless cactus complex in Utah (in the Uinta Basin proper) and remains listed as a threatened species under the ESA rangewide. The Recovery Outline for Uinta Basin hookless cactus was published in 2010 and serves to guide recovery efforts and inform consultation and permitting activities until a comprehensive recovery plan for the species is approved (USFWS 2010c).

Life History and Habitat Characteristics

Uinta Basin hookless cactus is a succulent plant in the cactus family. Data on the species' life history is limited, but information can be derived from life history data for *S. glaucus* (USFWS 2010c). Reproduction of *S. glaucus* is sexual, flowering occurs from April to May, and fruits are produced from May to June. Seeds, which are small and dense, are dispersed by gravity, water flow, and possibly insects and birds. Size is probably mainly related to an individual plant's age rather than site quality (USFWS 1990).

Uinta Basin hookless cactus is generally found on coarse soils or rocky surfaces on mesa slopes at elevations of 4,400 to 6,200 feet. It is found in desert shrubland vegetation communities with associated species such as shadscale saltbush, James' galleta (*Pleuraphis jamesii*), black sagebrush (*Artemisia nova*), and Indian ricegrass (*Achnatherum hymenoides*). Plant cover is likely sparse (USFWS 2010c). Pollinators for the species include a variety of native bees and possibly other insects such as ants and beetles (USFWS 2010c).

Status and Distribution

Uinta Basin hookless cactus is found primarily along the Green River and its tributaries within Uintah County, Utah. There are approximately 6,500 known cactus locations, and the estimated population size is 30,000 individuals. Long-term status or trend population data are unavailable (USFWS 2010c).

The Uinta Basin hookless cactus range is approximately 957,516 acres; of this, 146,496 acres, or 15 percent, occurs in the action area, and approximately 160,256 acres, or 17 percent, occurs in the focused action area (**Figure A-28;** USFWS and BLM GIS 2018).

Threats

Energy development, which causes direct loss of habitat, is one of the main threats to this species, as 63 percent of the species' total range occurs within areas approved for energy field development projects (USFWS 2010c). Other threats include illegal collection, overgrazing, parasitism by the cactus-borer beetle (*Moneilema semipunctatum*), lagomorph and rodent browsing, climate change effects (e.g., persistent or prolonged drought conditions and changes in community assemblages), herbicide and pesticide use, and lack of regulatory mechanisms that provide protection or conservation of the Uinta Basin hookless cactus or its habitat (USFWS 2010c).

Effects Analysis and Determination of Effects

There are no design features specific to Uinta Basin hookless cactus; however, design features for ESA-listed plant species would prevent or minimize the potential for direct adverse effects from manual and mechanical treatments, prescribed fire, revegetation, and targeted grazing methods as discussed in **Section 3.2.1**, Effects Common to All Plant Species.

Conservation Measures

To prevent or minimize the potential for residual adverse effects on Uinta Basin hookless cactus from the proposed treatments after implementation of the design features listed above, the BLM would be required to implement the following conservation measures:

- Conservation Measure Uinta Basin Hookless Cactus 1—Establish a treatment avoidance buffer around individuals or populations to protect pollinator habitat. Individuals or populations would be avoided with a treatment buffer of 1,640 feet (Dawson 2012).

- Conservation Measure Uinta Basin Hookless Cactus 2—To protect this species from adverse effects from livestock grazing, temporary fencing to prevent livestock entry would be placed 1640 feet from individuals or populations within the graduated use area for targeted grazing treatment areas.

Further, chemical treatments would adhere to applicable conservation measures identified in the Vegetation Treatments on Bureau of Land Management Lands in 17 Western States Biological Assessment (BLM 2007, pp. 4-129 to 4-134), as discussed in **Section 3.2.1**, Effects Common to All Plant Species.

Effects Analysis

The focused action area overlaps approximately 160,256 acres of Uinta Basin hookless cactus range (**Figure A-28;** USFWS and BLM GIS 2018). This is 17 percent of the total 957,516 range of the species and represents the area that would be available for fuel break creation and maintenance within the species' range, with a half-mile buffer.

As discussed in **Section 3.2.1**, Effects Common to All Plant Species, the native, sparsely vegetated areas that provide habitat for this species would be considered Analysis Exclusion Areas (see **Table 3-11**), and no fuel break treatments would be implemented in these areas; therefore, direct adverse effects on Uinta Basin hookless cactus are not anticipated to occur in these areas.

If targeted livestock grazing treatments were carried out within ¼-mile of known populations, individuals could be directly adversely affected by trampling, as described in **Section 3.2.1**, Effects Common to All Plant Species. Implementing Conservation Measure Uinta Basin Hookless Cactus 2 would lower the potential for this effect to a discountable level by preventing livestock entry to occupied habitat.

Although treatments would not occur in Uinta Basin hookless cactus habitat, if fuel breaks are constructed near known populations, pollinators could be affected as discussed under *Effects Common to All Plant Species*. Indirectly, this may affect Uinta Basin hookless cactus reproductive success, ultimately affecting population persistence depending on the severity of pollinator effects. Implementing Conservation Measure Uinta Basin Hookless Cactus 1 would minimize this effect to an insignificant level for all treatment methods by establishing a buffer around individuals or populations to protect pollinator habitat.

The proposed action would indirectly beneficially affect Uinta Basin hookless cactus over time. It would do this by conserving landscape-scale vegetation communities by reducing the potential for community loss from wildfire. Further, conserving various habitats for pollinator species on a range-wide scale would increase the potential that pollinator habitat would likewise be conserved. This would also be an indirect beneficial effect.

Overall, the potential for adverse effects on Uinta Basin hookless cactus from all treatment methods would be discountable due to design features, avoidance measure, and conservation measures, while potential adverse effects on pollinators and their habitat would be insignificant. Further, indirect beneficial effects are expected over time from landscape-scale habitat conservation. The proposed action ***may affect, but is not likely to adversely affect*** Uinta Basin hookless cactus for all treatment methods.

Cumulative Effects

The cumulative effects analysis area for ESA-listed plants is the focused action area. Of the approximately 160,256 acres of the species' range in the focused action area, approximately 1,371 acres are on private lands, 1,679 acres are on BIA-managed lands, and 16,077 acres are on Utah state-managed lands (USFWS and BLM GIS 2018). Reasonably foreseeable future state, and private actions that could affect Uinta Basin hookless cactus and its habitat are oil and gas development and livestock grazing.

Ten percent of Uinta Basin hookless cactus potential habitat has been disturbed by historical energy field development. Additionally, 63 percent of the total range of the species occurs within approved energy field development projects, and 37 percent of the potential range on tribal lands is within oil and gas development project boundaries. Increased surface disturbance from wells, roads and pipelines for oil and gas projects can result in habitat fragmentation and destruction, mortality of cacti, loss of seedbanks, dust accumulation, and increases noxious weed invasions (USFWS 2010c).

Livestock grazing can lead to cacti mortality from trampling and overgrazing can degrade habitat by facilitating the establishment of invasive species, which tend to outcompete native vegetation, including cacti (USFWS 2010c). Livestock grazing likely occurs on state, tribal, and private lands, though levels are unknown. There are no known city, county, or State regulatory mechanism that provide for protection or conservation of Uinta Basin hookless cactus or its habitat, and this may limit recovery of the species.

3.2.14 Webber's Ivesia

Listing Status and Recovery Plan

Webber's ivesia was identified as a candidate for listing under the ESA in 2002 and listed as threatened with final critical habitat in 2014 (USFWS 2014e, 2014f). The USFWS found the species to be subject to the present or threatened destruction, modification, or curtailment of its habitat due to nonnative plant invasions; modified fire regimes; OHV use and roads; development; livestock grazing; and climate change (USFWS 2014e). A recovery plan has not yet been published for this species.

Life History and Habitat Characteristics

Webber's ivesia is a low, spreading perennial forb endemic to Nevada and California. There are no studies available regarding the reproductive strategy for Webber's ivesia. New leaves and flowering stems emerge in the spring, from early May and to mid-July. Fruits mature in about a month, between mid-June and the end of July. Specific pollinators have not been identified, but most *Ivesia* species appear to reproduce from seed with insect-mediated pollination occurring between flowers of the same or different plants. Seeds are large, and dispersal is thought to be limited (NFWO 2014).

The establishment and persistence of new plants may be correlated with annual fluctuations in precipitation, and prolonged cycles of consistent drought throughout summer may limit new plant establishment. The species' limited dispersal and an apparent lack of recruitment are thought to restrict the its occupied range and distribution (NFWO 2014).

Webber's ivesia occurs on flats, benches, or terraces near large valleys between 4,475 to 6,237 feet in elevation. It is typically associated with open to sparsely vegetated areas with a low sagebrush—perennial bunchgrass—forb community, and a few populations occur in big sagebrush communities. It grows on vernally moist, rocky, clay soils that shrink and swell upon drying and wetting. Development of these specialized soils is estimated to take a few thousand years, and likely cannot be recreated or restored (USFWS 2014e).

Status and Distribution

Webber's ivesia is known to occur on approximately 170 acres along the transition zone between the eastern edge of the northern Sierra Nevada and the northwestern edge of the Great Basin in California and Nevada. The species range covers approximately 390,300 acres; of this, approximately 33,500 acres, or 9 percent, occurs in the action area and 15,600 acres, or 4 percent, occurs in the focused action area (**Figure A-29**).

At the time of listing in 2014, Webber's ivesia was known historically from a total of 17 populations, however, one had been extirpated and part of another (one of four subpopulations) had possibly been extirpated. Of the remaining 16 populations known in 2014, two had unknown status (meaning the USFWS assumes populations are extant) and another 10 occupied an area less than 5 acres (USFWS 2014e). Population size estimates and trends has been difficult due to inconsistencies in previous survey efforts. In 2014, best available estimates suggested there were between 990,814 and 5,029,394 individuals across the 16 extant populations, however, this estimate was made with low confidence (USFWS 2014e).

Since the time of listing, new populations have been discovered. One population, on BLM-administered land in Washoe County, Nevada, covers approximately 3 acres and contains between 7,000 and 10,000 individuals. An additional population occurs on private property and will likely be extirpated by planned land development[12]. There is no designated critical habitat at these locations.

Threats

The primary threat to this species is the combined and synergistic effect from the encroachment of nonnative, invasive plant species (e.g., cheatgrass, bulbous bluegrass, and medusahead) and the resulting modified fire regime. Nonnative, invasive plant species have become established at 12 of the 16 extant Webber's ivesia populations, causing competition, displacement, and degradation of the quality and composition of the native plant community. In addition to these effects, these invasive annual grasses contribute fuels that increase the frequency, intensity, and likelihood of wildfire (USFWS 2014e). Other threats include OHV use, roads, development, livestock grazing, and climate change, all of which contribute to mortality, habitat loss, and/or habitat degradation (USFWS 2014e).

Webber's Ivesia Critical Habitat

Critical habitat occurs on 16 occupied units comprising a total of 2,170 acres. Of this, approximately 166 acres, or 8 percent, occurs in the action area and approximately 276 acres, or 13 percent, occurs in the focused action area (USFWS and BLM GIS 2018).

Webber's ivesia critical habitat PCEs are as follows (USFWS 2014f):

1. Plant community.
    A. Open to sparsely vegetated areas composed of generally short-statured associated plant species.
    B. Presence of appropriate associated species that can include (but are not limited to): *Antennaria dimorpha*, *Artemisia arbuscula*, *Balsamorhiza hookeri*, *Elymus elymoides*, E*rigeron bloomeri*, *Lewisia rediviva*, *Poa secunda*, and *Viola beckwithii*.

[12] Personal communication. Phone call, June 27, 2019, between Dean Tonenna, BLM, and Morgan Trieger, EMPSi, regarding newly-discovered Webber's ivesia populations.

   C. An intact assemblage of appropriate associated species to attract the floral visitors that may act as pollinators.
2. Topography. Flats, benches, or terraces that are generally above or adjacent to large valleys. Occupied sites vary from slightly concave to slightly convex or gently sloped (0–15°) and occur on all aspects.
3. Elevation. Elevations between 4,475 and 6,237 ft.
4. Suitable soils and hydrology.
   A. Vernally moist soils with an argillic horizon that shrink and swell upon drying and wetting; these soil conditions are characteristic of known populations and are likely important in the maintenance of the seedbank and population recruitment.
   B. Suitable soils that can include (but are not limited to): Reno—a fine, smectitic, mesic Abruptic Xeric Argidurid; Xman—a clayey, smectitic, mesic, shallow Xeric Haplargids; Aldi— a clayey, smectitic, frigid Lithic Ultic Argixerolls; and Barshaad—a fine, smectitic, mesic Aridic Palexeroll.

Effects Analysis and Determinations

There are no design features specific to Webber's ivesia; however, design features for ESA-listed plant species would prevent or minimize the potential for direct adverse effects from manual and mechanical treatments, prescribed fire, revegetation, and targeted grazing methods as discussed in **Section 3.2.1**, Effects Common to All Plant Species.

Conservation Measures

To prevent or minimize the potential for residual adverse effects on Webber's ivesia from the proposed treatments after implementation of the design features listed above, the BLM would be required to implement the following conservation measures:

- Conservation Measure Webber's Ivesia 1—Establish a treatment avoidance buffer around individuals or populations to protect pollinator habitat. Individuals or populations would be avoided with a treatment buffer of 1,640 feet (Dawson 2012).
- Conservation Measure Webber's Ivesia 2—To protect this species from adverse effects from livestock grazing, temporary fencing to prevent livestock entry would be placed 1640 ft from individuals or populations within the graduated use area for targeted grazing treatment areas.
- Conservation Measure Webber's Ivesia 3—All Webber's ivesia designated critical habitat will be avoided and buffered with an avoidance buffer of 1,640 feet, to protect the PCEs. Fencing, flagging, signs or other methods to denote or exclude the avoidance buffer would be implemented. No treatments or actions would occur within the avoidance buffer.

Further, chemical treatments would adhere to applicable conservation measures identified in the Vegetation Treatments on Bureau of Land Management Lands in 17 Western States Biological Assessment (BLM 2007, pp. 4-129 to 4-134), as discussed in **Section 3.2.1**, Effects Common to All Plant Species.

Effects Analysis – Webber's Ivesia

Approximately 15,634 acres, or 4 percent, of the total range of Webber's ivesia occurs in the focused action area (**Figure A-29**; USFWS and BLM GIS 2018). This is the area that would be available for fuel break creation and maintenance within the species' range, with a half-mile buffer.

Implementation of design features for ESA-listed plant species as discussed in **Section 3.2.1**, Effects Common to All Plant Species, would reduce the potential for any residual, direct, adverse effects. Design Feature 42 would require pre-treatment surveys in suitable habitat, and Design Feature 43 would require appropriate conservation strategies, such as site-specific avoidance buffers, to be implemented to avoid adverse impacts. Therefore, direct adverse effects on Webber's ivesia re not anticipated to occur; the potential for direct adverse effects would be discountable.

If fuel breaks were constructed near known populations, pollinators could be adversely affected as described in **Section 3.2.1**, Effects Common to All Plant Species. Indirectly, this may affect Webber's ivesia reproductive success, ultimately affecting population persistence depending on the severity of pollinator effects. Implementing Conservation Measure Webber's Ivesia 1 would minimize this effect to an insignificant level for all treatment methods by ensuring enough pollinator habitat is conserved near listed plant populations to maintain them.

If targeted livestock grazing treatments were carried out within ¼-mile of known populations, individuals could be directly adversely affected by trampling, as described in **Section 3.2.1**, Effects Common to All Plant Species. Implementing Conservation Measure Webber's Ivesia 2 would lower the potential for this effect to a discountable level by preventing livestock entry to occupied habitat.

The proposed action would indirectly beneficially affect Webber's ivesia over time. It would do this by conserving landscape-scale sagebrush communities and pollinator habitat by reducing the potential for community loss from wildfire and invasive annual grass conversion.

Overall, the potential for adverse effects on Webber's ivesia from all treatment methods would be discountable due to design features, and conservation measures, while potential adverse effects on pollinators and their habitat would be insignificant. Further, indirect beneficial effects are expected over time from landscape-scale habitat conservation. Thus the BLM has determined that the proposed action ***may affect, but is not likely to adversely affect*** Webber's ivesia for all treatment methods.

Effects Analysis – Webber's Ivesia Designated Critical Habitat

Approximately 276 acres, or 13 percent, of all designated Webber's ivesia critical habitat occurs in the focused action area (USFWS and BLM GIS 2018; **Figure A-29**). This is the area that would be available for fuel break creation and maintenance within the species' range, with a half-mile buffer, as discussed in **Section 2.5**, Action Area.

In accordance with Conservation Measure Webber's Ivesia 1 and 3, no treatments would occur in designated critical habitat. Further, an avoidance buffer of 1,640 feet would be established around critical habitat, and no treatments would be conducted in these areas to protect pollinator habitat. Because treatments would not be conducted in avoidance buffers, direct adverse effects on designated critical habitat PCEs, including plant community and pollinators, and soil and hydrology conditions, are not expected to occur. Given the nature of potential treatments under the proposed action, the topography and elevation PCEs have no potential to be affected under any treatment method.

Although treatments would not be done within the critical habitat avoidance buffers as described above, the potential for indirect adverse effects on the plant community and soil and hydrology conditions, and thus critical habitat PCEs, is not discountable when treatments are conducted near the avoidance buffer. For instance, prescribed fire may escape treatment areas, herbicides, ash, or dust may drift outside of application areas, erosion and sedimentation from surface disturbance could affect off-site areas, and livestock may stray outside of targeted grazing areas. These effects are discussed in detail for the individual treatment methods in Effects Common to All Plant Species.

As discussed for the individual treatment methods above, implementing design features would reduce the potential for most indirect effects to a discountable level. When the design features are considered together with avoidance buffers under Conservation Measure Webber's Ivesia 1 and 3, adverse effects on Webber's ivesia critical habitat would be discountable. Further, the proposed action would have indirect beneficial impacts on critical habitat PCEs over time, because sagebrush communities and pollinator habitat would be protected and conserved.

With implementation of design features and conservation measures the BLM determines that all treatment methods ***not likely to adversely affect*** Webber's ivesia critical habitat for all treatment methods.

Cumulative Effects

The cumulative effects analysis area for ESA-listed plants is the focused action area. Of the approximately 15,634 acres of the species' range in the focused action area, approximately 26 percent of this is on private, tribal, and state lands, as follows: approximately 3,172 acres are on private lands, approximately 766 acres are on BIA-administered lands, and approximately 171 acres are on state-managed lands (USFWS and BLM GIS 2018). For critical habitat, of the approximately 276 acres in the focused action area, 34 acres are on BIA-managed lands, and 4 acres are on private lands (USFWS and BLM GIS 2018).

Reasonably foreseeable future private, tribal, and state actions that could affect Webber's ivesia would constitute cumulative effects. These include wildfire and wildfire suppression, livestock grazing, noxious weed and invasive plant treatments, OHV use, and development. These are briefly described below.

Webber's ivesia would likely continue to be affected by private and municipal development. Development generally causes habitat loss, degradation, or fragmentation. It may worsen other impacts, such as nonnative invasive plants, OHV use, and human-caused wildfire. There is ongoing or planned residential and commercial development in Webber's ivesia range, including in the greater Reno metropolitan area. Populations on non-federal lands may be extirpated or severely reduced as a result of planned or ongoing development.

Wildfire, wildfire suppression, and fuels treatments to reduce wildfire fuels will all continue to affect Webber's ivesia and its critical habitat. Wildfire could alter species composition in Webber's ivesia habitat, especially by increasing the presence of nonnative invasive annual grasses. Introducing these species can increase the frequency, extent, and severity of wildfire in Webber's ivesia habitat; effects of climate change would worsen this impact. Wildfire suppression and fuels reduction can affect individuals by trampling or surface disturbance, causing mortality and potentially increasing nonnative invasive annual grasses. These activities are expected to increase, given expected increased recurrence and severity of droughts that would exacerbating this effect (Scasta et al. 2016; Breshears et al. 2016).

Livestock grazing on non-federal lands could continue to affect Webber's ivesia in a number of ways. Examples are damage or destruction of individuals from trampling or soil disturbance and the spread of nonnative invasive plant species. Water developments have likely increased adverse livestock grazing and trampling impacts by allowing cattle to forage in areas they were previously unable to.

3.2.15 Wright Fishhook Cactus

Listing Status and Recovery Plan

The USFWS listed Wright fishhook cactus as an endangered species under the ESA in 1979 based on small population numbers and limited distribution, and on known and potential threats from factors including potential exploration and development of mineral resources and OHV use (USFWS 1979). No critical habitat has been designated for this species. The USFWS released a recovery plan in 1985, but a revision is recommended (USFWS 2008d).

Life History and Habitat Characteristics

Wright fishhook cactus is a small barrel-shaped cactus endemic to Utah. This species is almost completely self-incompatible, and the number of flowering individuals in an area is vital for outcrossing and reproductive success. Pollination is limited by the foraging distance of ground nesting bees. Plants reach reproductive maturity slowly, which thwarts quick recovery of sites damaged or lost to current threats (USFWS 2008d).

Greenhouse cacti have been propagated in soil mix of loam and small rocks, and 30 to 50 percent of seeds were estimated to have germinated over a 5-year period. 50 to 70 percent of plants transplanted into the wild survive their first year (USFWS 2008d).

Wright fishhook cactus grows in arid sites with widely spaced shrubs, perennial herbs, bunch grasses, or scattered pinyon and juniper. Vegetation provides very little surface coverage. It is associated with salt desert shrub and pinyon-juniper vegetation communities. Associated plant species include *Pinus edulis*, *Juniperus osteosperma*, *Atriplex cuneata*, *A. confertifolia*, *A. corrugata*, *Hilaria jamesi*, *Cryptantha flava*, *Eriogonum bicolor*, *Oryzopsis hymenoides*, and various *Opuntia* species (USFWS 1985).

Soil physiology appears to be the limiting factor for Wright fishhook cactus. At most location where the cactus is found, three of the following four habitat conditions prevail: 1) close proximity to fine textured, presumably saline and/or gypsiferous strata that have contributed both texturally and chemically to the soil; 2) close proximity to a sand-forming geologic stratum that contributes to the substrate; 3) fine- or medium-sized gravels, pebbles, or fossil oyster shells in (and particularly littering) the surface of the soil; and 4) level to gently sloping terrain (USFWS 2008d).

Status and Distribution

The species' estimated range is approximately 993,639 acres distributed across western Emery County, southeastern Sevier County, central Wayne County, and Garfield County in Utah. The estimated population size is 4,500 to 21,000 individuals, but the range-wide occupied area and number of plants is unknown. Surveys suggest the species predominately occurs in small, widely scattered pockets with most occupied sites totaling less than 50 individuals.

Approximately 31,219 acres, or 3 percent, of the species known range overlap the action area, and approximately 14,460 acres, or 1 percent, overlap the focused action area (**Figure A-30**; USFWS and BLM GIS 2018).

Threats

At the time of listing, potential exploration and development of mineral resources and OHV use were the main threats to Wright fishhook cactus. In addition to these factors, which remain potential threats across the species' range, livestock trampling, illegal collecting, predation by cactus borer beetles, restricted known localities and low population numbers, and climate change may threaten the species (USFWS 2008d).

Effects Analysis and Determinations

To prevent or minimize the potential for residual adverse effects on Wright fishhook cactus from the proposed treatments after implementation of the design features listed above, the BLM would be required to implement the following conservation measure:

- Conservation Measure Wright Fishhook Cactus 1—Establish a treatment avoidance buffer around individuals or populations to protect pollinator habitat. Individuals or populations would be avoided with a treatment buffer of 1,640 feet (Dawson 2012).
- Conservation Measure Wright Fishhook Cactus 2—To protect this species from adverse effects from livestock grazing, temporary fencing to prevent livestock entry would be placed 1640 feet from individuals or populations within the graduated use area for targeted grazing treatment areas.

Further, chemical treatments would adhere to applicable conservation measures identified in the Vegetation Treatments on Bureau of Land Management Lands in 17 Western States Biological Assessment (BLM 2007, pp. 4-129 to 4-134), as discussed in **Section 3.2.1**, Effects Common to All Plant Species.

Effects Analysis

Approximately 14,460 acres of the species' known range overlap the focused action area (**Figure A-30**; USFWS and BLM GIS 2018). This is 1 percent of the total current range of this species. This is the area that would be available for fuel break creation and maintenance within the species' range, with a half-mile buffer.

Implementation of design features for ESA-listed plant species as discussed in **Section 3.2.1**, Effects Common to All Plant Species, would reduce the potential for direct, adverse effects on Wright fishhook cactus. Design Feature 42 would require pre-treatment surveys in suitable habitat, and Design Feature 43 would require appropriate conservation strategies, such as site-specific avoidance buffers, to be implemented to avoid adverse impacts.

Residual direct adverse effects could occur if pre-treatment surveys failed to detect individuals in a fuel break treatment area. The potential effects would vary depending on the treatment type, but would generally be as described in **Section 3.2.1**, Effects Common to All Plant Species. However, the design features would minimize the potential for this residual effect to a discountable level for all treatment methods.

Where fuel breaks are constructed near known populations, ground-dwelling bees, a primary pollinator for this species, could be directly affected by habitat loss. Indirectly, this may affect Wright fishhook cactus reproductive success, ultimately affecting population persistence depending on the severity of pollinator effects, as discussed under *Effects Common to All Plant Species*. Implementing Conservation Measure Wright Fishhook Cactus 1 would minimize this effect to an insignificant level for all treatment methods by ensuring enough pollinator habitat is conserved to maintain listed plant populations.

If targeted livestock grazing treatments were carried out within ¼-mile of known populations, individuals could be directly adversely affected by trampling, as described in **Section 3.2.1**, Effects Common to All Plant Species. Implementing Conservation Measure Wright Fishhook Cactus 2 would lower the potential for this effect to a discountable level by preventing livestock entry to occupied habitat.

The proposed action would indirectly beneficially affect Wright fishhook cactus over time. It would do this by conserving landscape-scale vegetation communities by reducing the potential for community loss from wildfire. Further, conserving various habitats for pollinator species on a range-wide scale would increase the potential that pollinator habitat would likewise be conserved. This would also be an indirect beneficial effect.

Overall, the potential for adverse effects on Wright fishhook cactus from all treatment methods would be discountable due to design features, and conservation measures, while potential adverse effects on pollinators and their habitat would be insignificant. Further, indirect beneficial effects are expected over time from landscape-scale habitat conservation. The proposed action ***may affect, but is not likely to adversely affect*** Wright fishhook cactus for all treatment methods.

There is no critical habitat designated for this species, therefore, no effects on critical habitat would occur.

Cumulative Effects

The cumulative effects analysis area for ESA-listed plants is the focused action area. Of the approximately 14,460 acres of the species' range in the focused action area, approximately 605 acres are on private lands and 1,247 acres are on Utah state-managed lands (USFWS and BLM GIS 2018). Reasonably foreseeable future state, and private actions that could affect Wright fishhook cactus and its habitat are energy development, livestock grazing, and OHV use. In addition, there is a lack of adequate regulatory mechanisms as no laws in the State of Utah afford protection to this species on State or private lands. (USFWS 2008d).

Ongoing energy and mineral development remains a potential threat across the species' range by causing habitat destruction. Approximately 29% of the known Wright fishhook cactus range is underlain by coal deposits and approximately 12 is leased for oil and gas extraction. OHV use also remains a threat, and as a popular recreational activity, may occur across the species' range (USFWS 2008d).

Ninety-five percent of the species range occurs within livestock grazing allotments. Trampling by livestock may uproot the shallow-rooted cacti, cause mortality, and reduce population sizes (USFWS 2008d).

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Appendix A
Maps

Figure A-1
Fuel Breaks Proposed Action Potential Treatment Areas: Utah

Fuel Breaks PEIS project area
BLM District Office
Potential treatment area (1,088,000 total acres)

Vegetation States
- Perennial grasses and forbs
- Shrubs with perennial grasses and forbs
- Shrubs with depleted understory
- Invasive annual grassland
- Perennial grasses and forbs with invasive annual grasses
- Invasive annual grasses with shrubs
- Shrubs and perennial grasses and forbs with invasive annual grasses

Pinyon-Juniper Phase
- Phase I
- Phase II
- Phase III

N

0 50 100
Miles

Department of the Interior
Bureau of Land Management

Source: BLM GIS 2018
Print date: 12/5/2019
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Coordinate System and Map Projection:
NAD 1983 (2011) Contiguous USA Albers

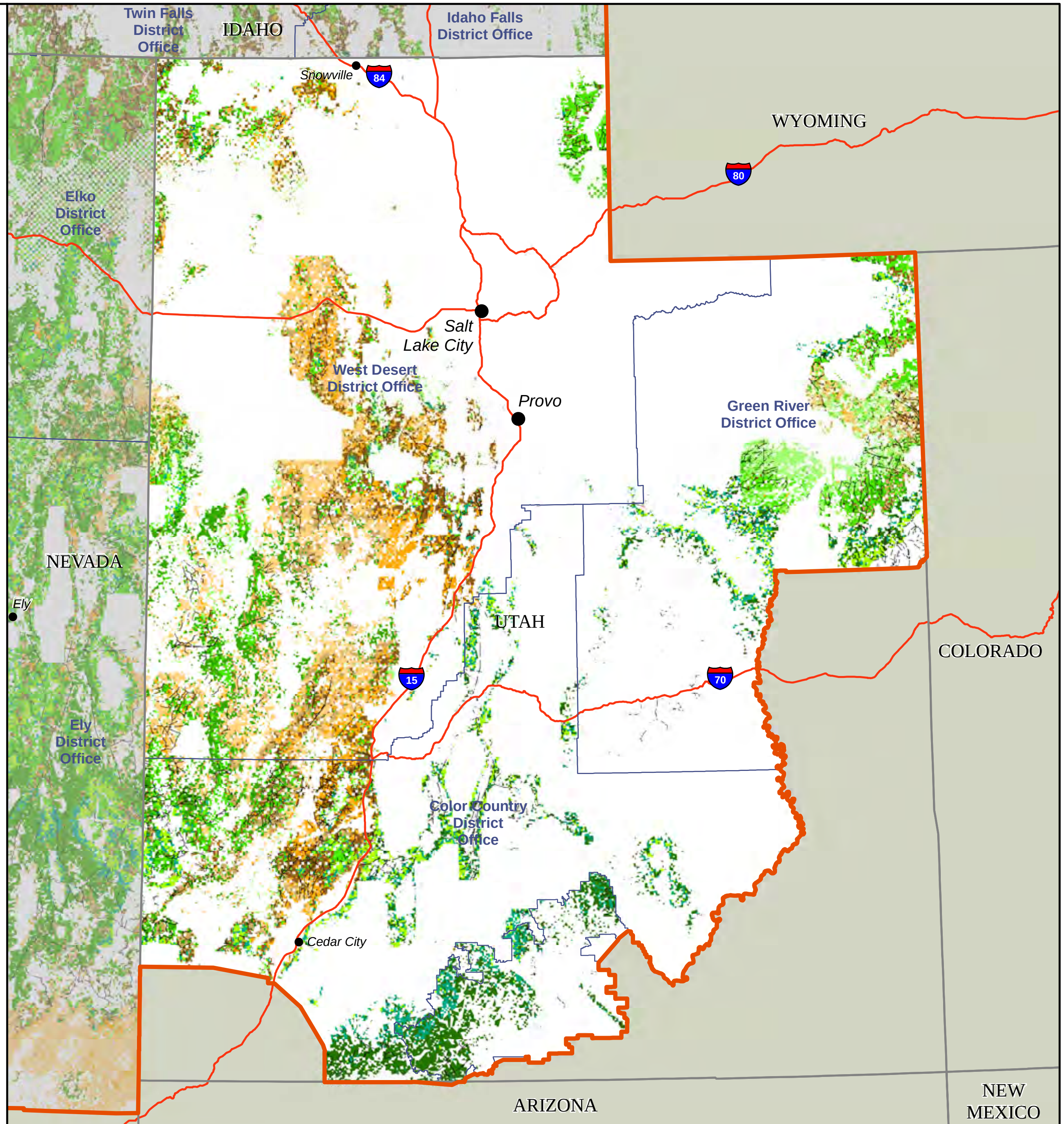

Figure A-2
Fuel Breaks Proposed Action Potential Treatment Areas: Nevada

- Fuel Breaks PEIS project area
- BLM District Office
- Potential treatment area (1,088,000 total acres)

Vegetation States
- Perennial grasses and forbs
- Shrubs with perennial grasses and forbs
- Shrubs with depleted understory
- Invasive annual grassland
- Perennial grasses and forbs with invasive annual grasses
- Invasive annual grasses with shrubs
- Shrubs and perennial grasses and forbs with invasive annual grasses

Pinyon-Juniper Phase
- Phase I
- Phase II
- Phase III

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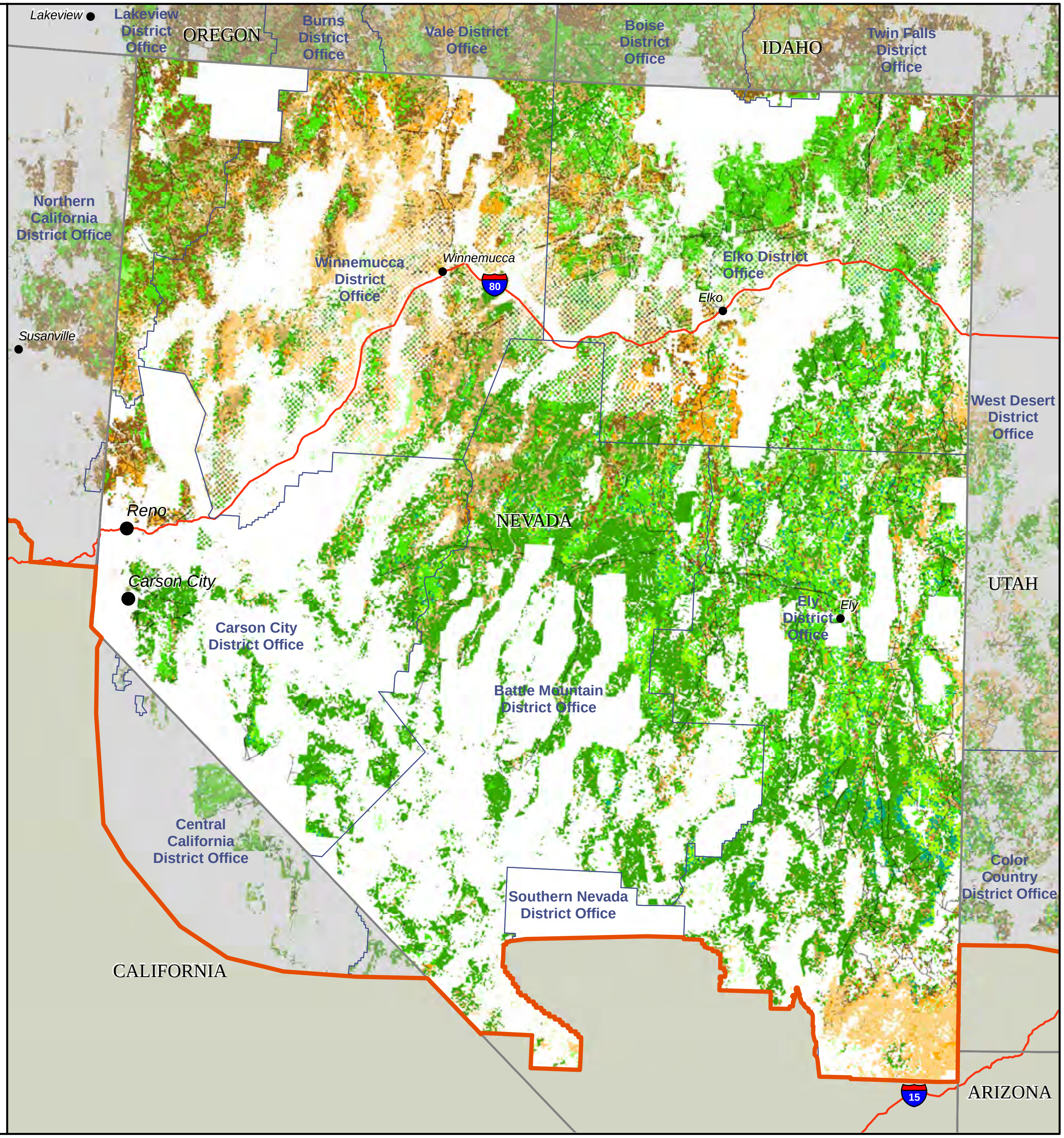

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Coordinate System and Map Projection:
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Figure A-3
Fuel Breaks Proposed Action Potential Treatment Areas: California

Fuel Breaks PEIS project area

BLM District Office

Potential treatment area (1,088,000 total acres)

Vegetation States

- Perennial grasses and forbs
- Shrubs with perennial grasses and forbs
- Shrubs with depleted understory
- Invasive annual grassland
- Perennial grasses and forbs with invasive annual grasses
- Invasive annual grasses with shrubs
- Shrubs and perennial grasses and forbs with invasive annual grasses

Pinyon-Juniper Phase

- Phase I
- Phase II
- Phase III

N

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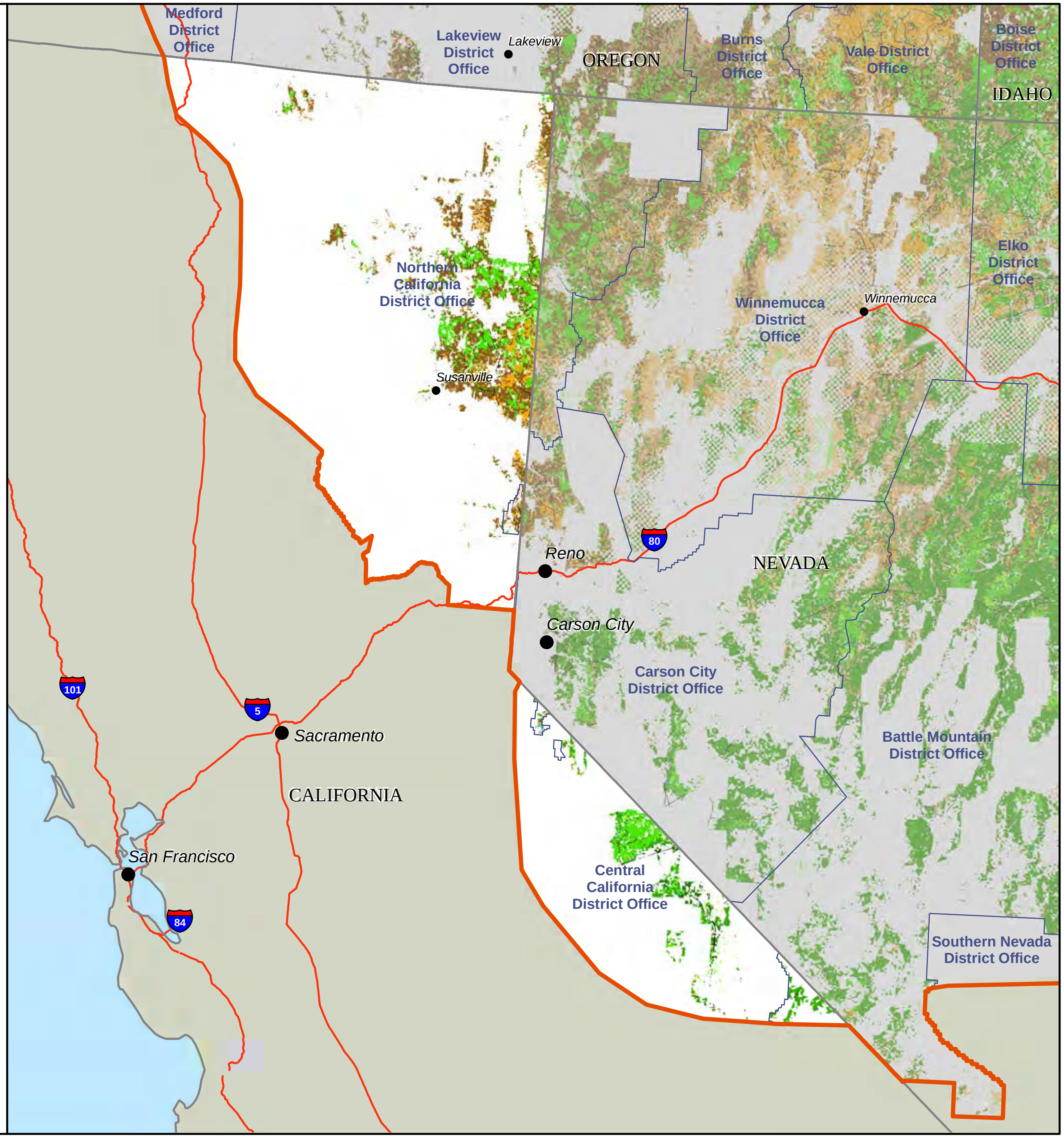

Figure A-4
Fuel Breaks Proposed Action Potential Treatment Areas: Oregon

Fuel Breaks PEIS project area

BLM District Office

Potential treatment area (1,088,000 total acres)

Vegetation States

- Perennial grasses and forbs
- Shrubs with perennial grasses and forbs
- Shrubs with depleted understory
- Invasive annual grassland
- Perennial grasses and forbs with invasive annual grasses
- Invasive annual grasses with shrubs
- Shrubs and perennial grasses and forbs with invasive annual grasses

Pinyon-Juniper Phase

- Phase I
- Phase II
- Phase III

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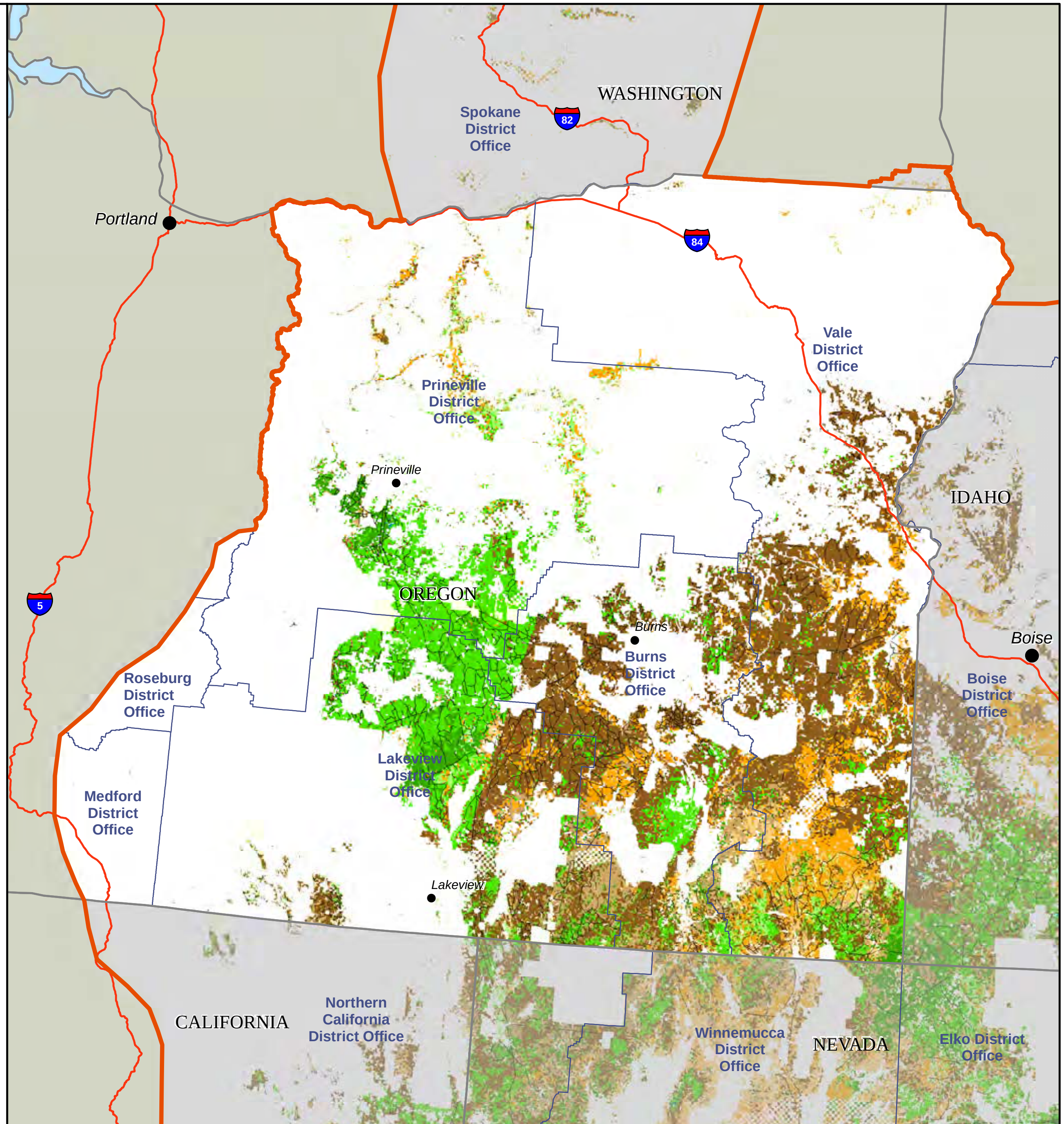

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Coordinate System and Map Projection:
NAD 1983 (2011) Contiguous USA Albers

Figure A-5
Fuel Breaks Proposed Action Potential Treatment Areas: Washington

Fuel Breaks PEIS project area

BLM District Office

Potential treatment area (1,088,000 total acres)

Vegetation States

- Perennial grasses and forbs
- Shrubs with perennial grasses and forbs
- Shrubs with depleted understory
- Invasive annual grassland
- Perennial grasses and forbs with invasive annual grasses
- Invasive annual grasses with shrubs
- Shrubs and perennial grasses and forbs with invasive annual grasses

Pinyon-Juniper Phase

- Phase I
- Phase II
- Phase III

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Miles

Department of the Interior
Bureau of Land Management

Source: BLM GIS 2018
Print date: 12/5/2019
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NAD 1983 (2011) Contiguous USA Albers

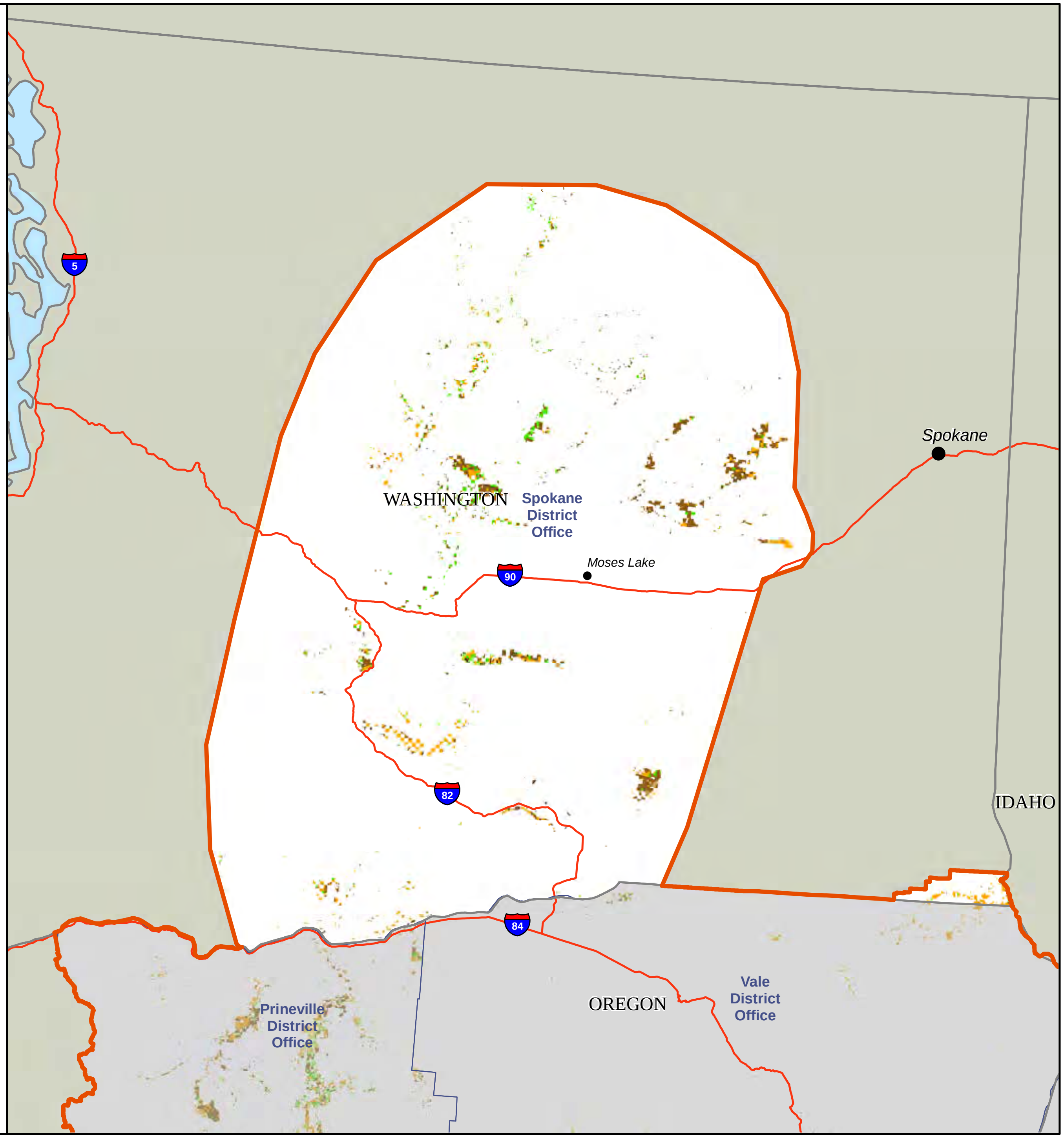

Figure A-6
Fuel Breaks Proposed Action Potential Treatment Areas: Idaho

Fuel Breaks PEIS project area
BLM District Office
Potential treatment area (1,088,000 total acres)

Vegetation States
- Perennial grasses and forbs
- Shrubs with perennial grasses and forbs
- Shrubs with depleted understory
- Invasive annual grassland
- Perennial grasses and forbs with invasive annual grasses
- Invasive annual grasses with shrubs
- Shrubs and perennial grasses and forbs with invasive annual grasses

Pinyon-Juniper Phase
- Phase I
- Phase II
- Phase III

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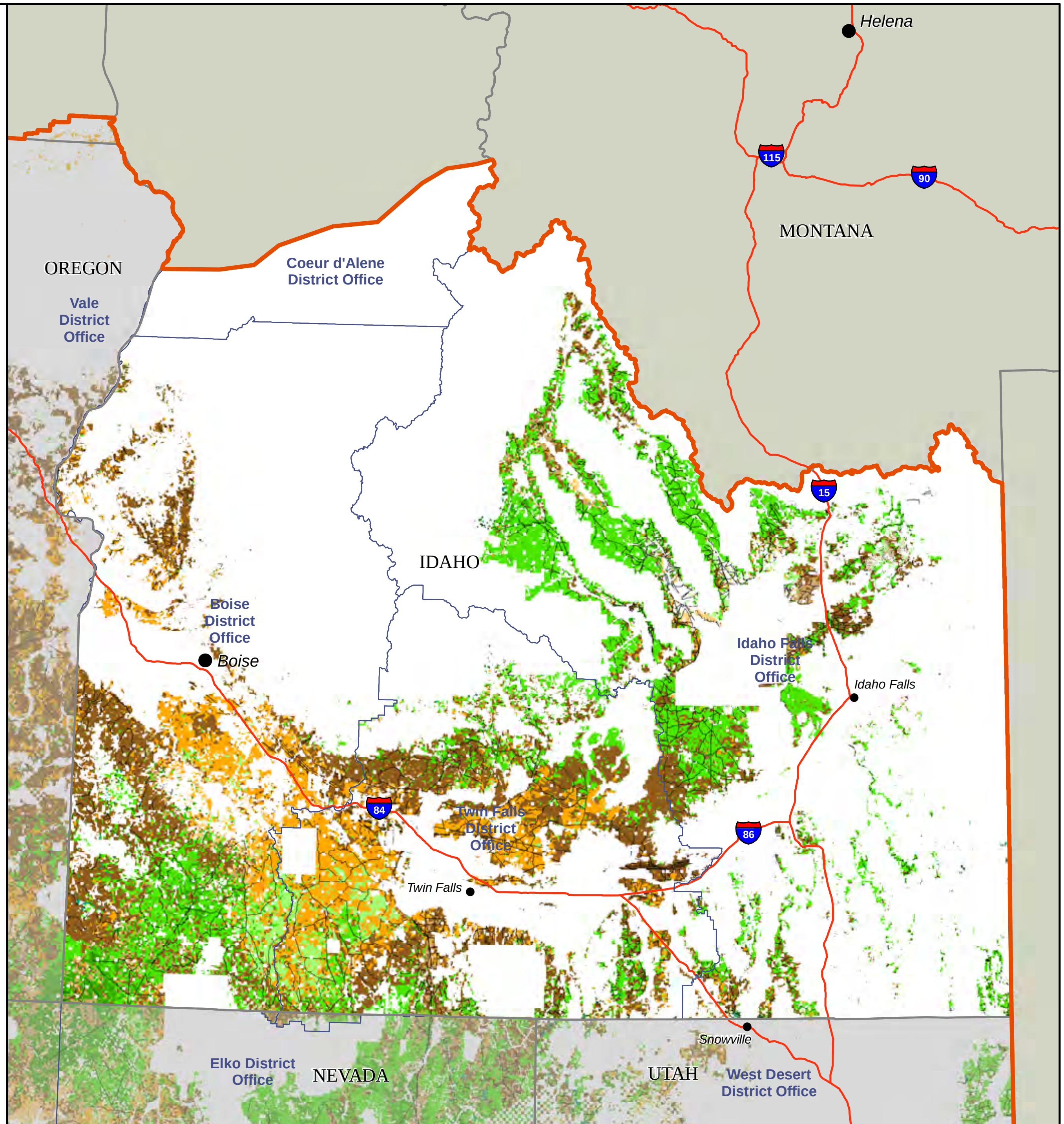

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Coordinate System and Map Projection:
NAD 1983 (2011) Contiguous USA Albers

Figure A-7
Fuel Breaks Action Area

- Fuel Breaks PEIS project area
- Fuel Breaks action area
- Fuel Breaks focused action area
- Bureau of Land Management (BLM)
- US Forest Service
- Military
- US Fish and Wildlife Service
- BIA or Indian Reservation
- Bureau of Reclamation
- National Park Service
- Bankhead-Jones Land Use Lands (Administered by DOI)
- National Grass Lands (Administered by USDA)
- Other Federal Land
- State
- Private

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Miles

Department of the Interior
Bureau of Land Management

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NAD 1983 (2011) Contiguous USA Albers

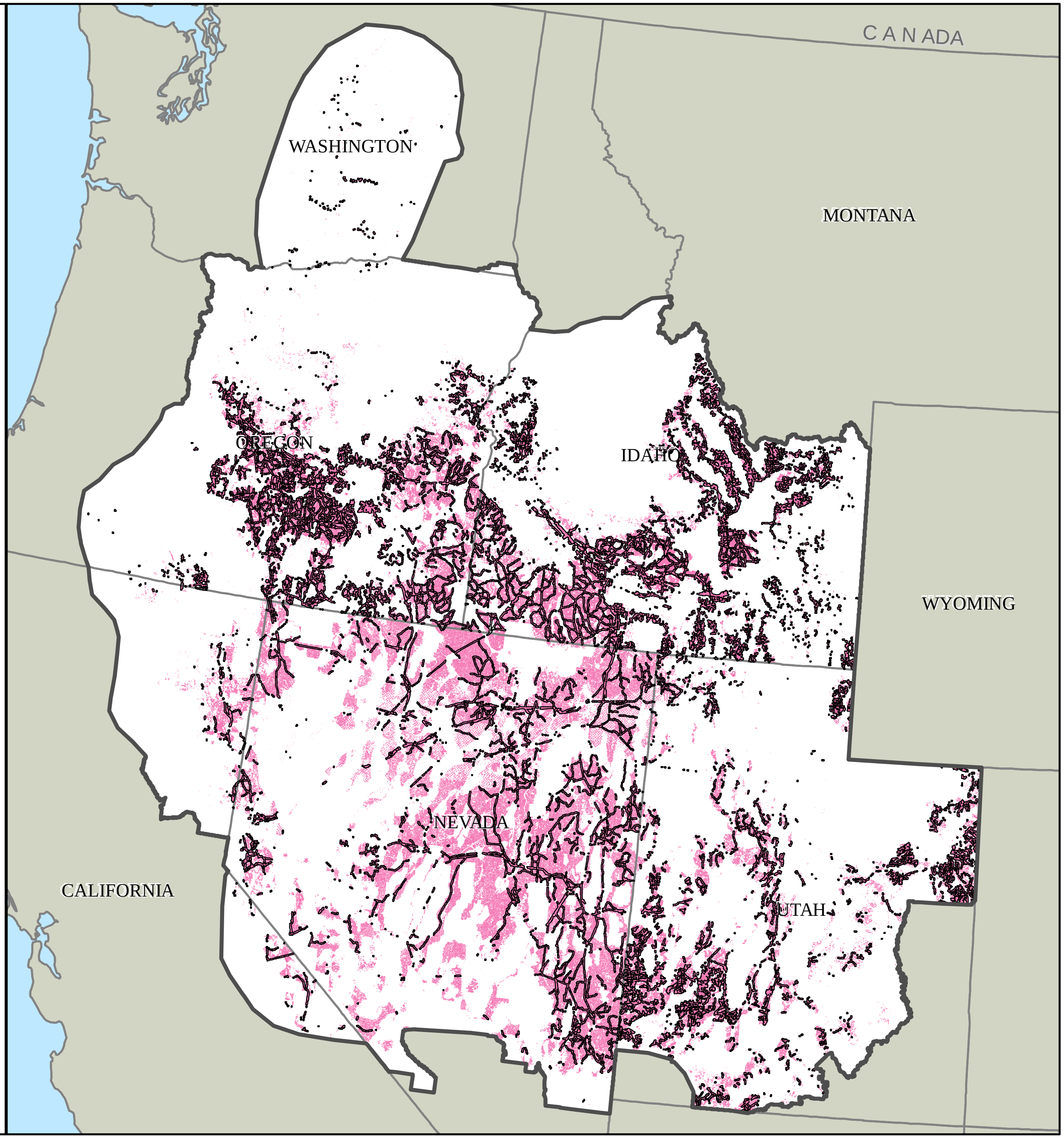

Figure A-8
Carson Wandering Skipper Range

- Fuel Breaks PEIS project area
- Fuel Breaks action area
- Fuel Breaks focused action area
- Range
- Bureau of Land Management (BLM)
- US Forest Service
- Military
- US Fish and Wildlife Service
- BIA or Indian Reservation
- National Park Service
- State
- Private

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Miles

Department of the Interior
Bureau of Land Management

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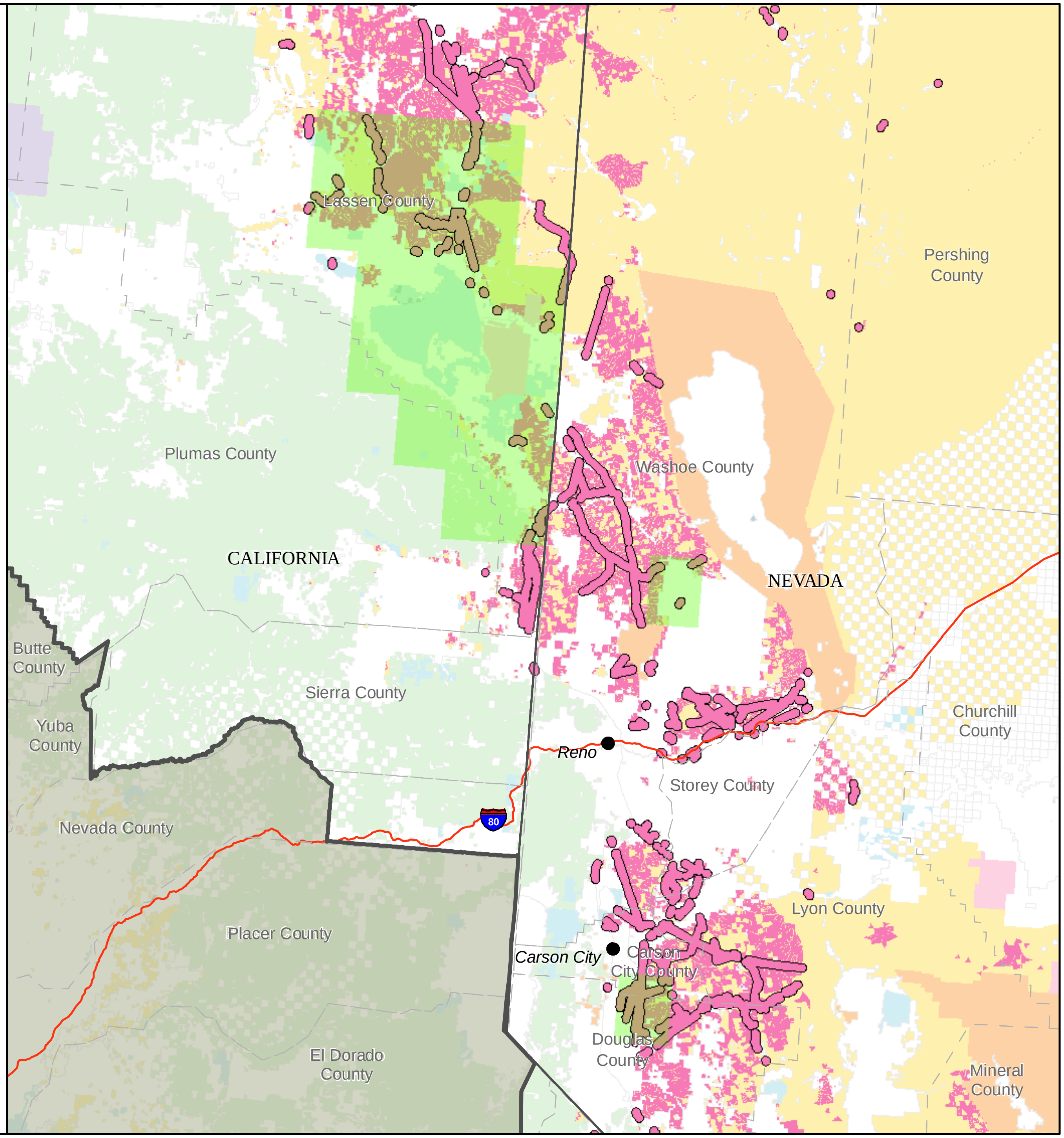

Figure A-9
Columbia Basin Pygmy Rabbit Recovery Areas, Recovery Emphasis Areas, Occupied Habitat, and Potentially Occupied Habitat

- Fuel Breaks PEIS project area
- Fuel Breaks action area
- Fuel Breaks focused action area
- Recovery area
- Recovery emphasis area
- Occupied habitat
- Potentially occupied habitat
- Bureau of Land Management (BLM)
- US Forest Service
- US Fish and Wildlife Service
- State
- Private

N

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Miles

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Coordinate System and Map Projection:
NAD 1983 (2011) Contiguous USA Albers

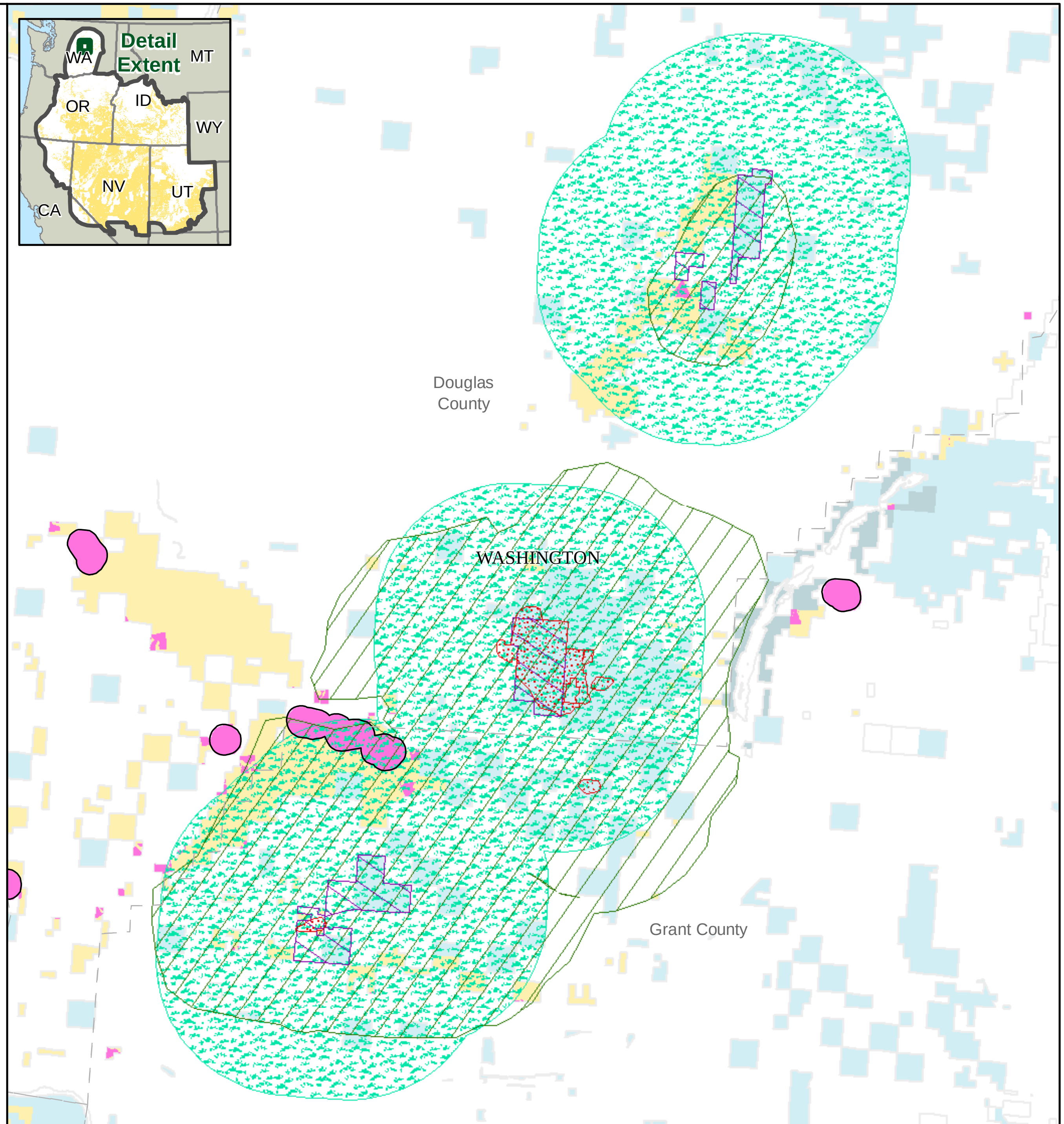
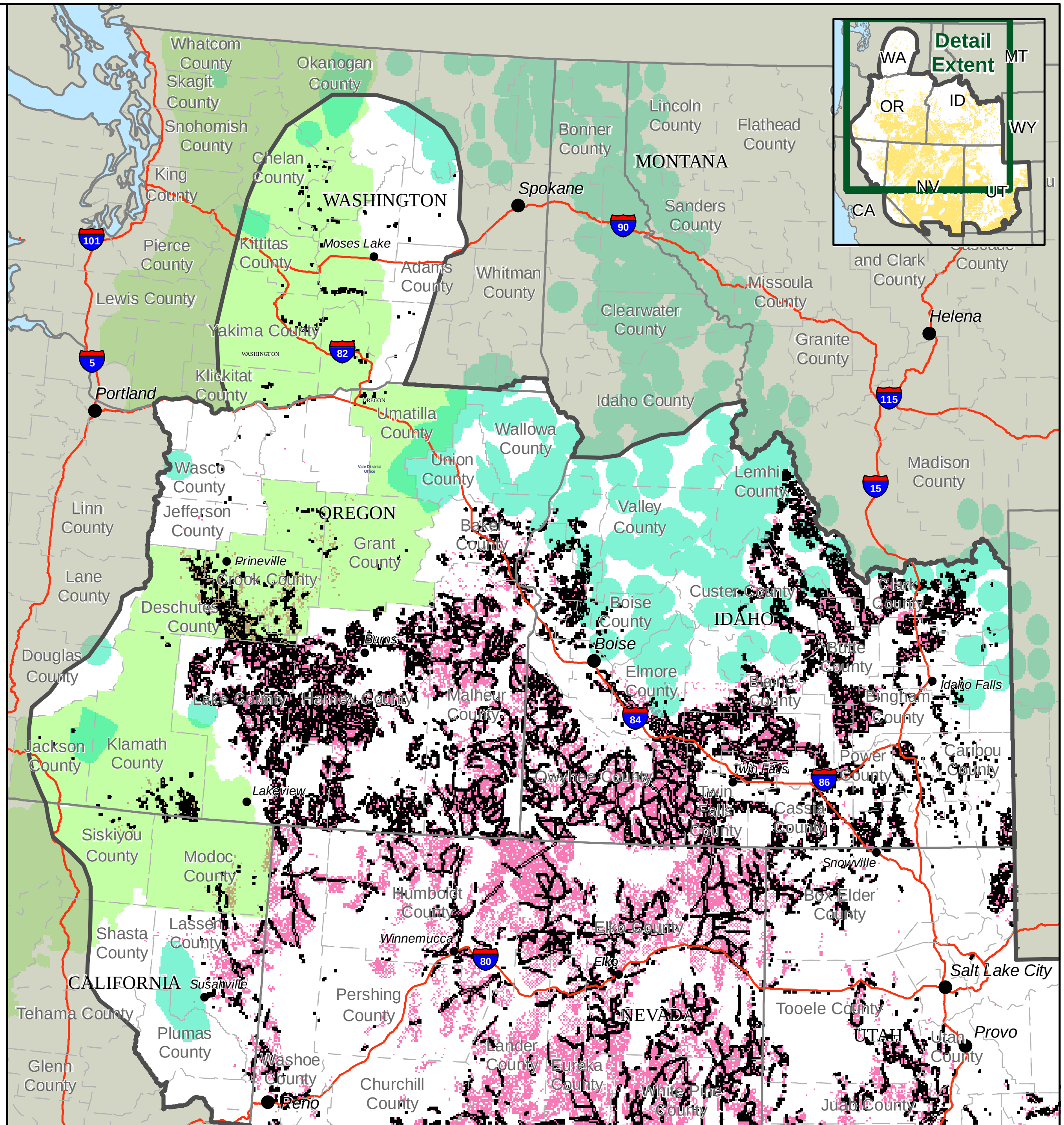


Figure A-10

Gray Wolf

Pack Boundaries/Territory and Range

- Fuel Breaks PEIS project area
- Fuel Breaks action area
- Fuel Breaks focused action area
- Pack boundary/territory
- Range



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Department of the Interior

Bureau of Land Management

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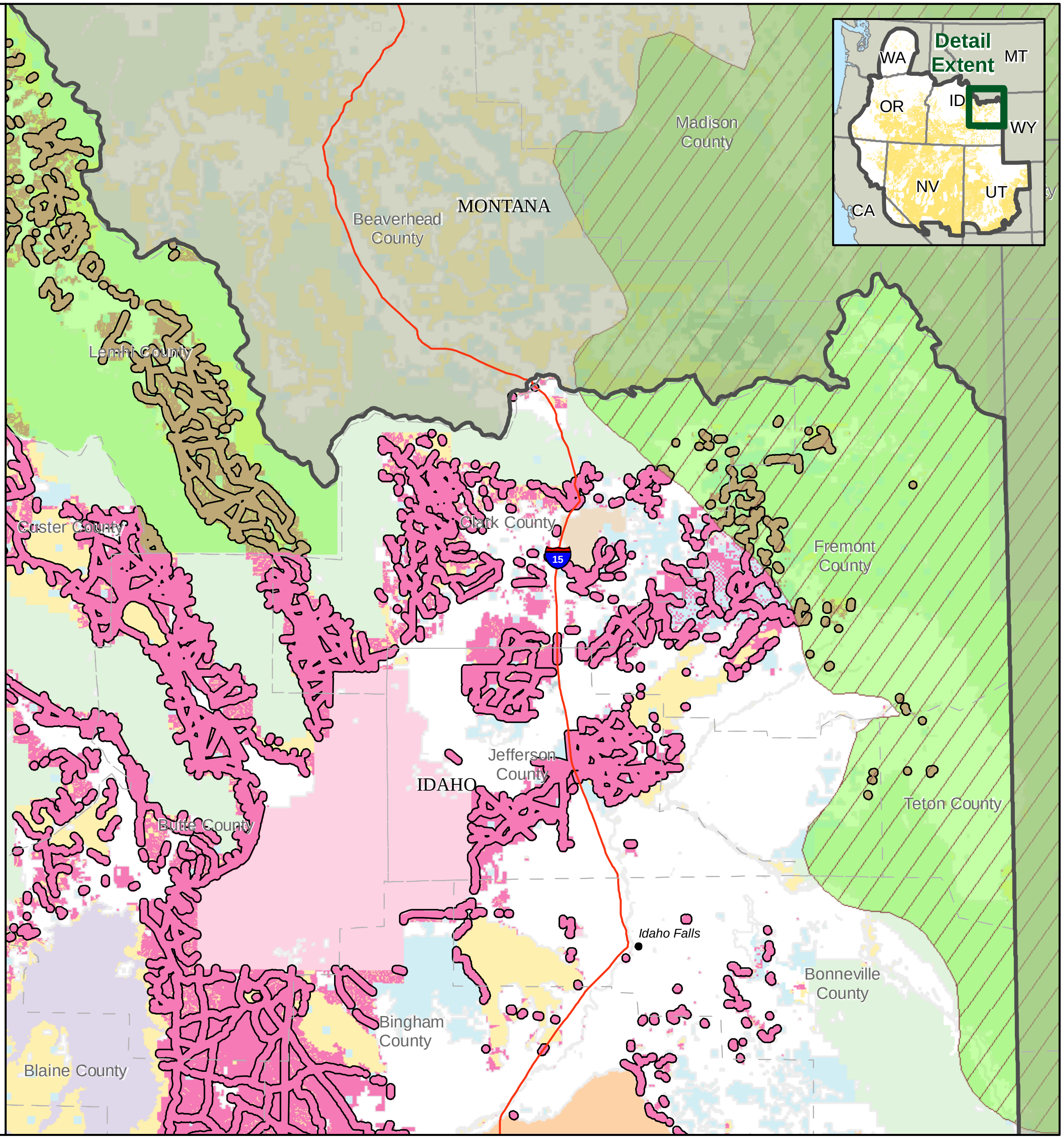
Coordinate System and Map Projection:

NAD 1983 (2011) Contiguous USA Albers

Figure A-11
Grizzly Bear
Occupied Range and Range

Fuel Breaks PEIS project area
Fuel Breaks action area
Fuel Breaks focused action area
Occupied range
Range
Bureau of Land Management (BLM)
US Forest Service
Military
US Fish and Wildlife Service
BIA or Indian Reservation
National Park Service
Other Federal Land
State
Private



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Department of the Interior
Bureau of Land Management

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Coordinate System and Map Projection:
NAD 1983 (2011) Contiguous USA Albers

Figure A-12
Mexican Spotted Owl Critical Habitat, Range and Protected Activity Centers

- Fuel Breaks PEIS project area
- Fuel Breaks action area
- Fuel Breaks focused action area
- Critical habitat
- Range
- Protected activity center
- Bureau of Land Management (BLM)
- US Forest Service
- Military
- US Fish and Wildlife Service
- BIA or Indian Reservation
- National Park Service
- State
- Private

N

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Miles

Department of the Interior
Bureau of Land Management

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Coordinate System and Map Projection:
NAD 1983 (2011) Contiguous USA Albers

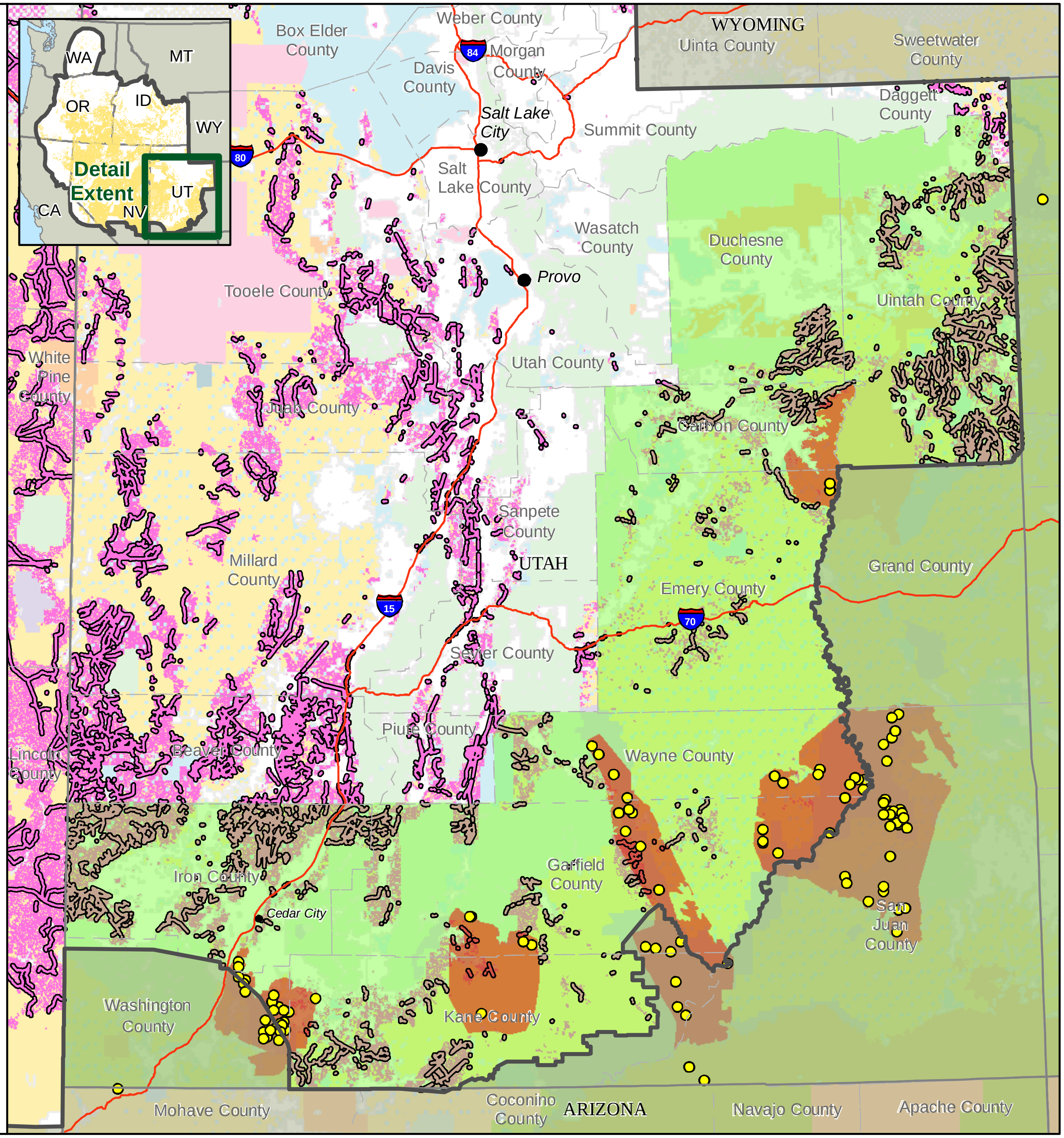

Figure A-13
Sierra Nevada Big Horn Sheep
Critical Habitat and Range

- Fuel Breaks PEIS project area
- Fuel Breaks action area
- Fuel Breaks focused action area
- Critical habitat
- Range
- Bureau of Land Management (BLM)
- US Forest Service
- BIA or Indian Reservation
- National Park Service
- State
- Private

0 10 20
Miles

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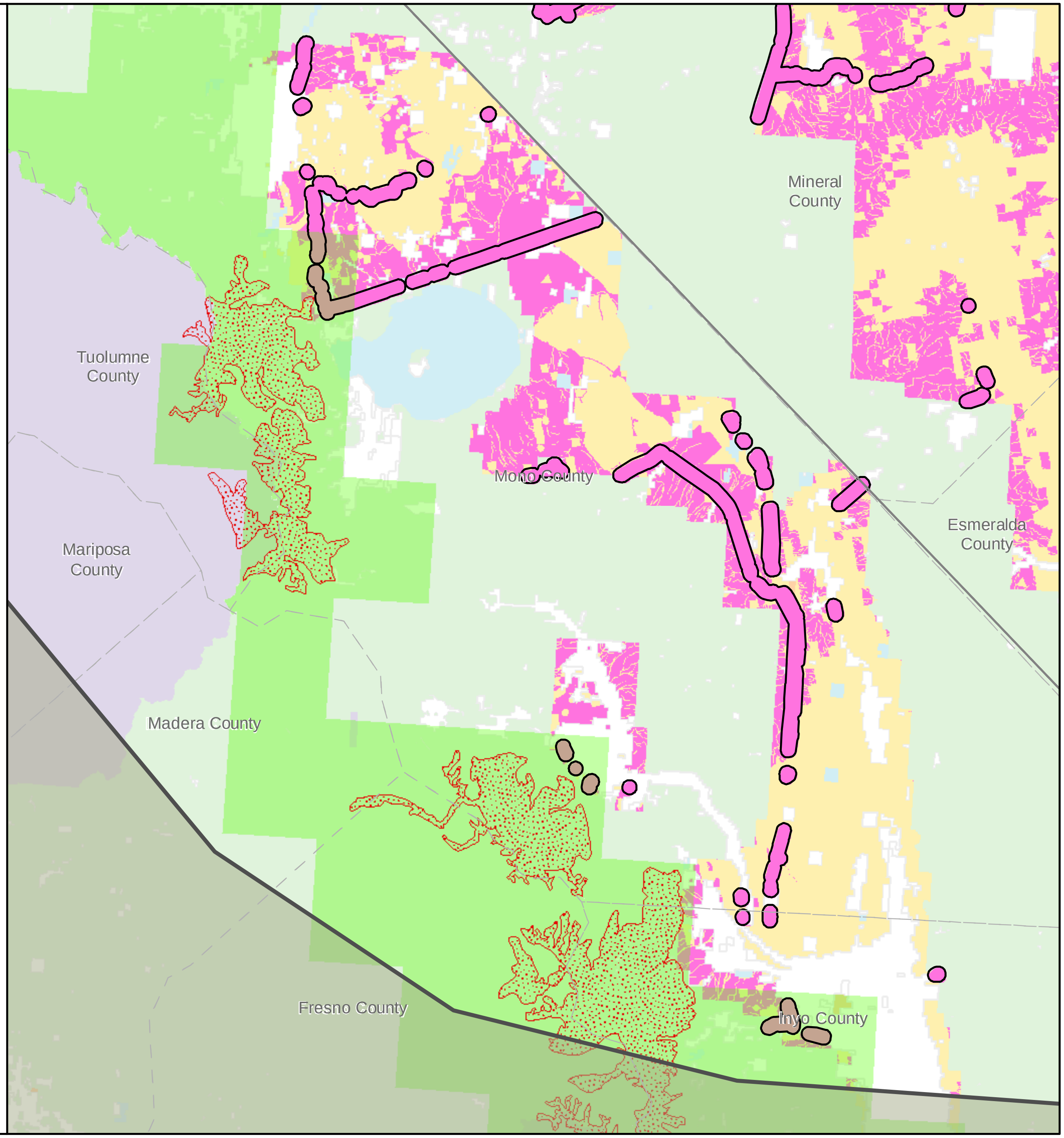
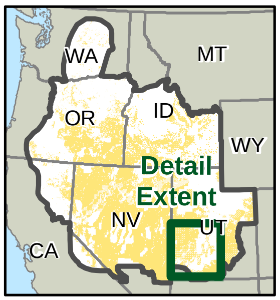


Figure A-14
Utah Prairie Dog Range

- Fuel Breaks PEIS project area
- Fuel Breaks action area
- Fuel Breaks focused action area
- Range
- Bureau of Land Management (BLM)
- US Forest Service
- Military
- BIA or Indian Reservation
- National Park Service
- State
- Private



0 25 50
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Bureau of Land Management

Source: BLM GIS 2018
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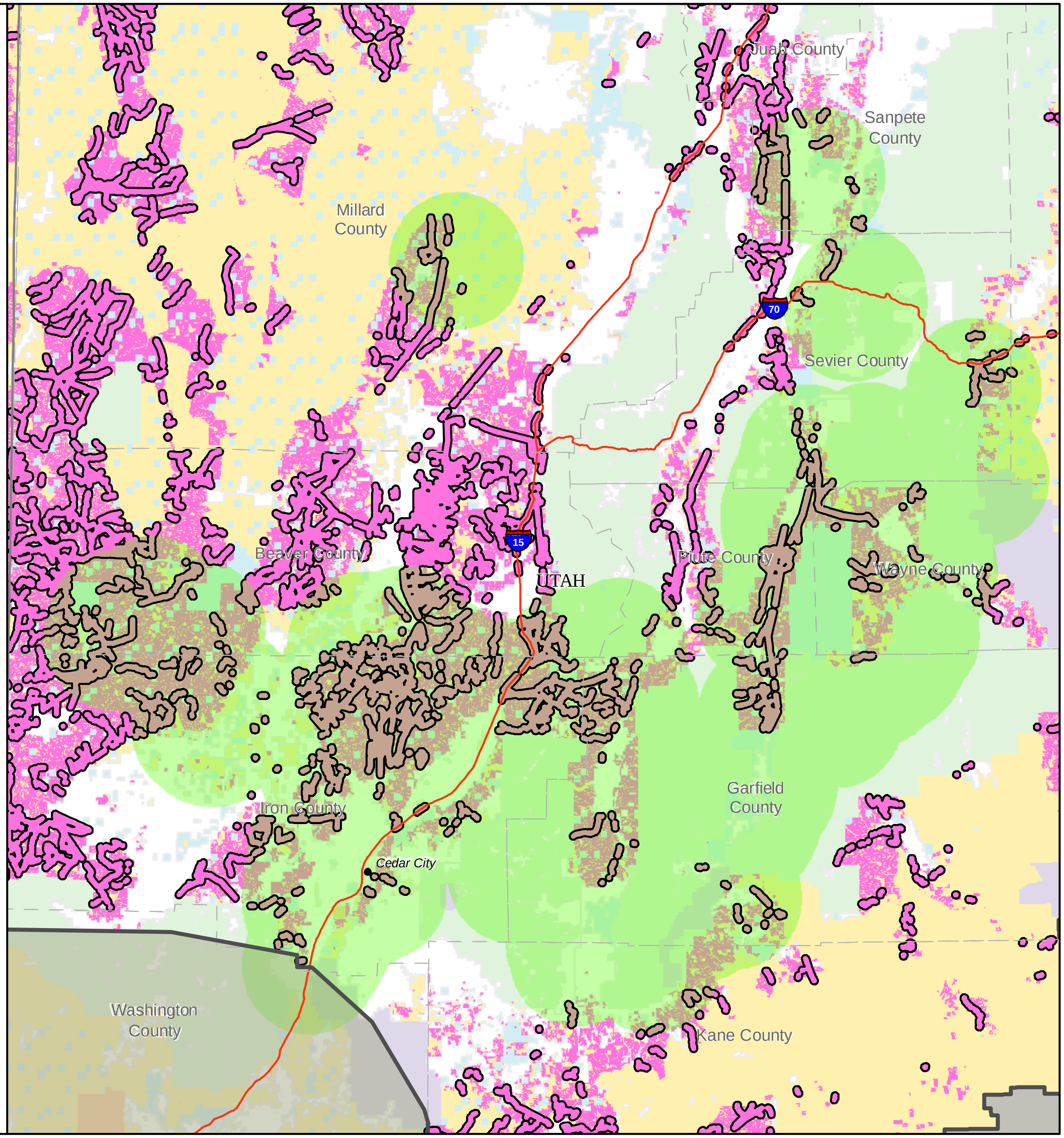
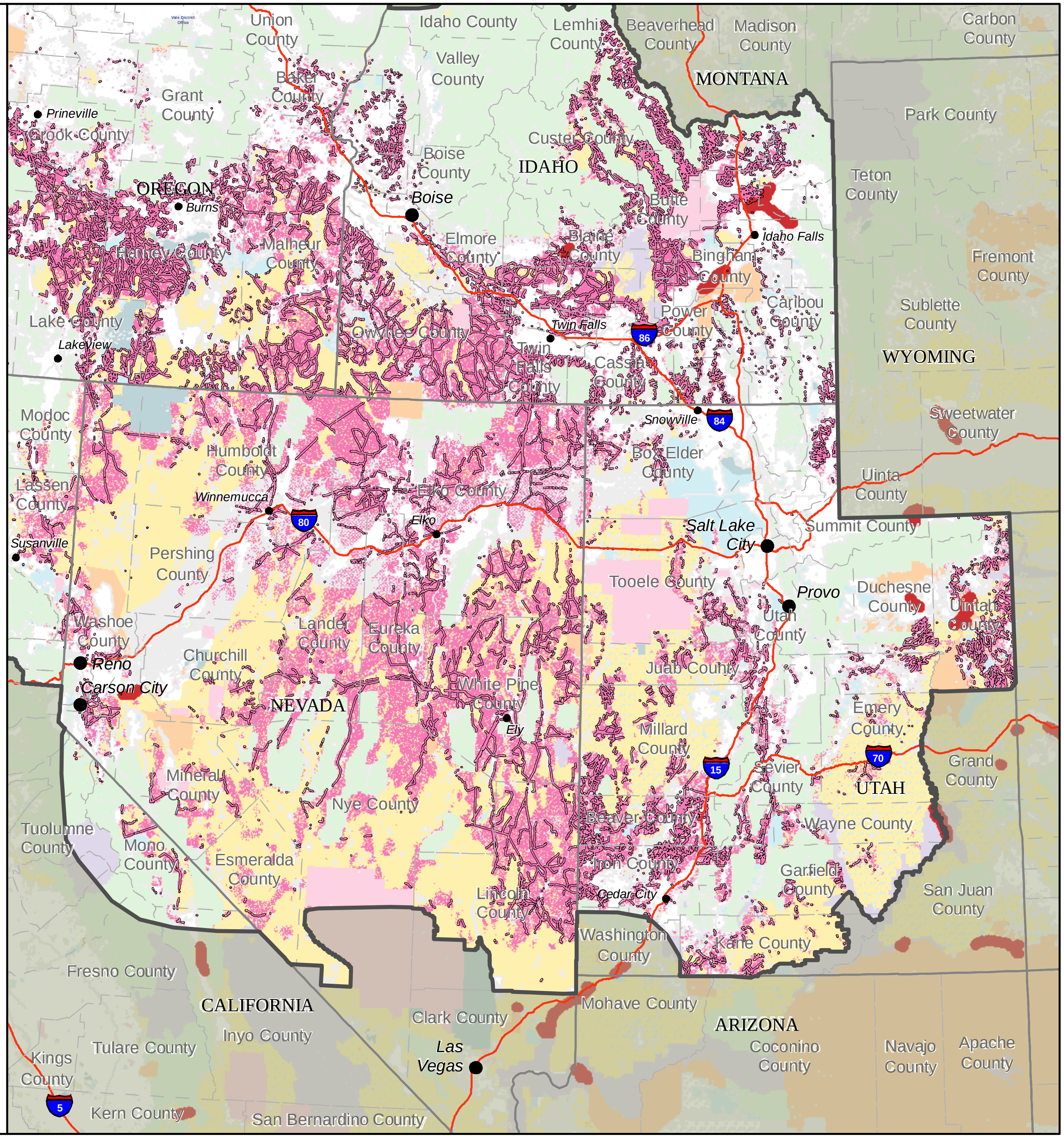


Figure A-15
Yellow-billed Cuckoo Critical Habitat

- Fuel Breaks PEIS project area
- Fuel Breaks action area
- Fuel Breaks focused action area
- Critical habitat
- Bureau of Land Management (BLM)
- US Forest Service
- Military
- US Fish and Wildlife Service
- BIA or Indian Reservation
- National Park Service
- Other Federal Land
- State
- Private

0 75 150
Miles

Department of the Interior
Bureau of Land Management



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Coordinate System and Map Projection:
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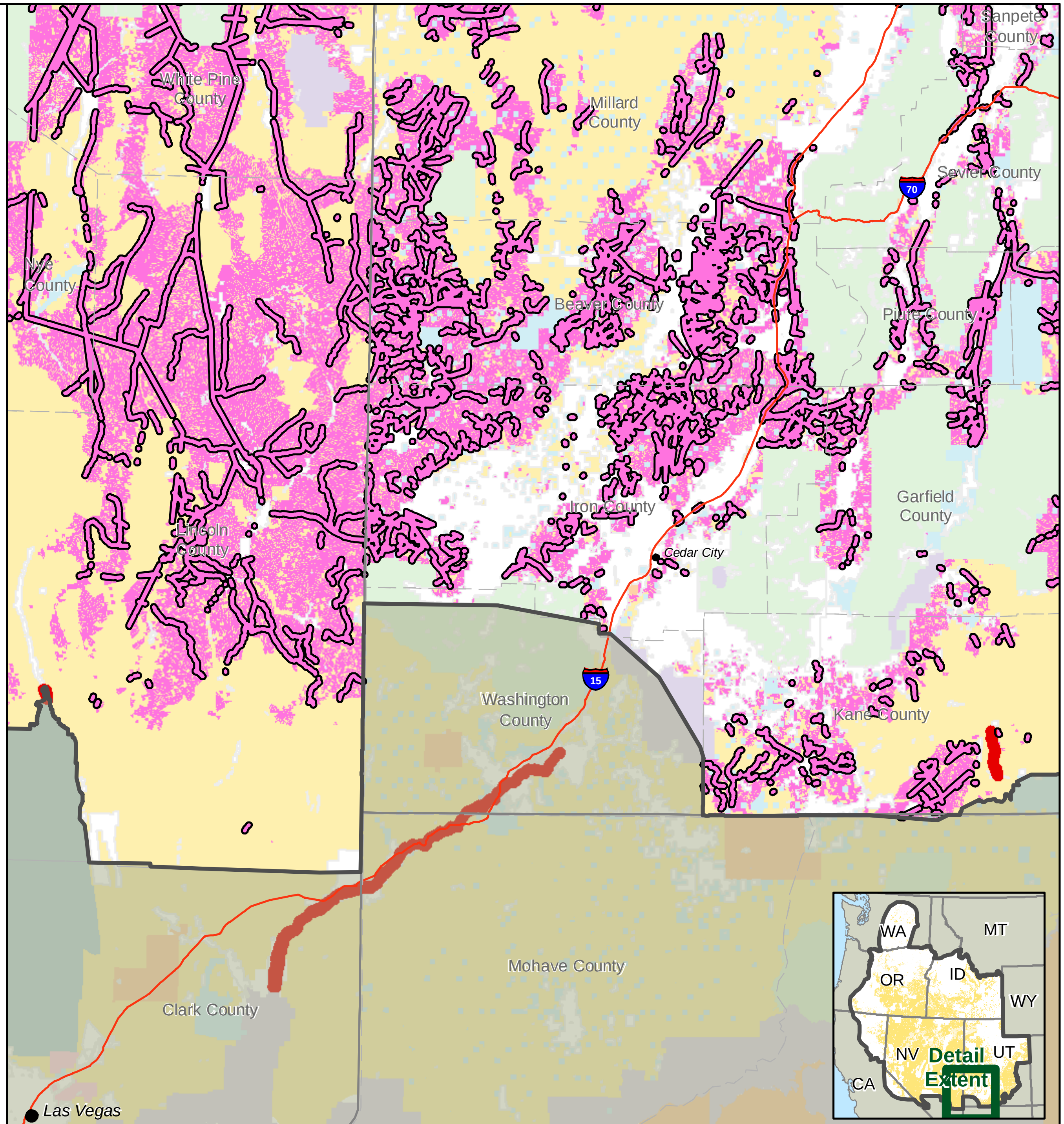
Figure A-16
Southwestern Willow Flycatcher Critical Habitat

- Fuel Breaks PEIS project area
- Fuel Breaks action area
- Fuel Breaks focused action area
- Critical habitat
- Bureau of Land Management (BLM)
- US Forest Service
- Military
- US Fish and Wildlife Service
- BIA or Indian Reservation
- National Park Service
- State
- Private



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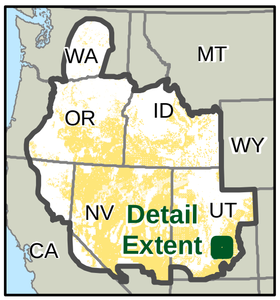
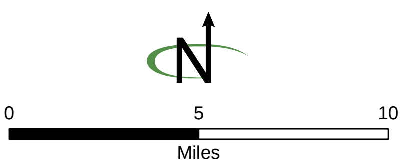
Coordinate System and Map Projection:
NAD 1983 (2011) Contiguous USA Albers

Figure A-17
Barneby Reed-mustard Range

- Fuel Breaks PEIS project area
- Fuel Breaks action area
- Fuel Breaks focused action area
- Range
- Bureau of Land Management (BLM)
- US Forest Service
- National Park Service
- State
- Private





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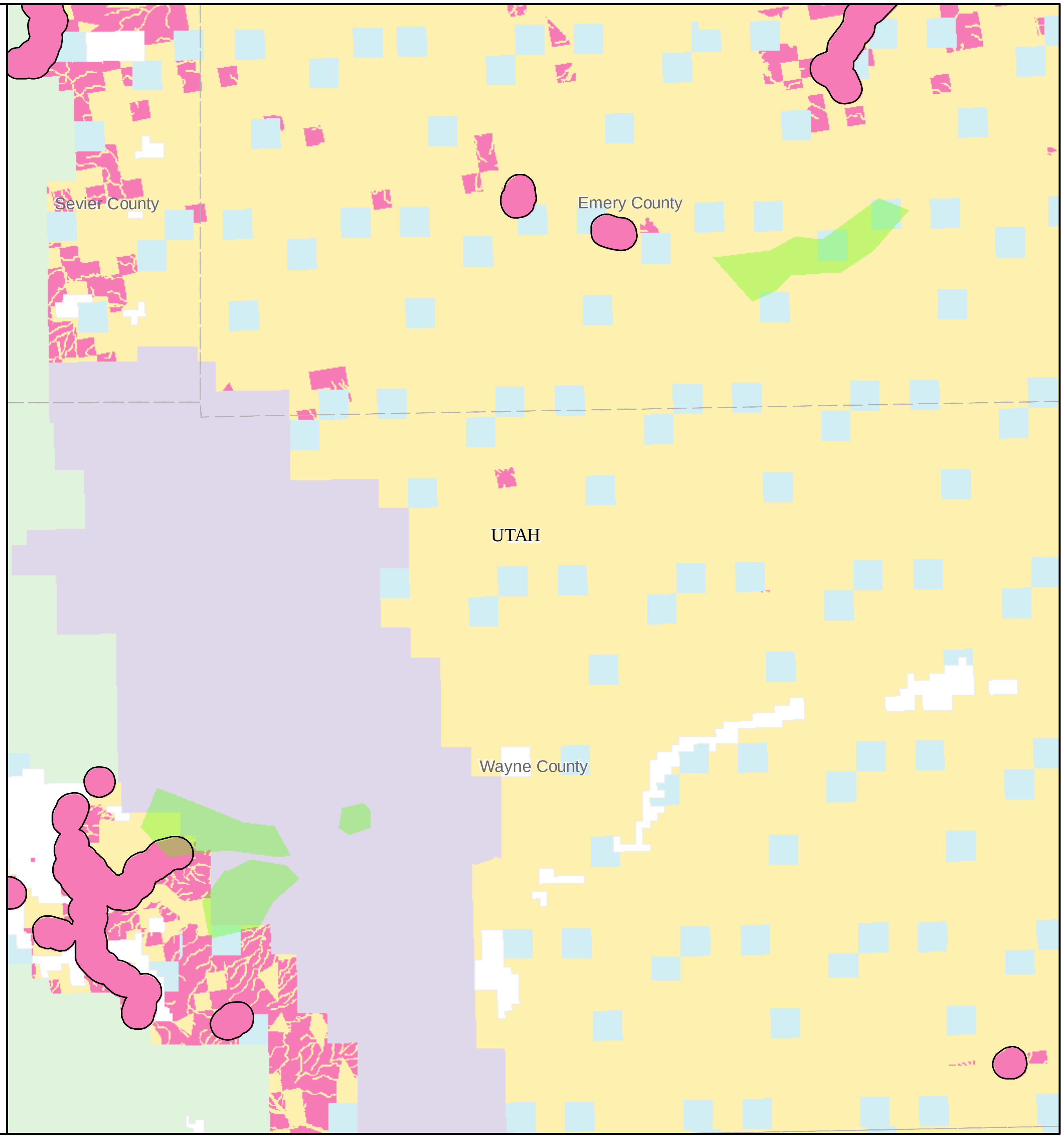

Figure A-18
Clay Phacelia
Range

- Fuel Breaks PEIS project area
- Fuel Breaks action area
- Fuel Breaks focused action area
- Range
- Bureau of Land Management (BLM)
- US Forest Service
- BIA or Indian Reservation
- State
- Private

0 4 8
Miles

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Bureau of Land Management

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NAD 1983 (2011) Contiguous USA Albers

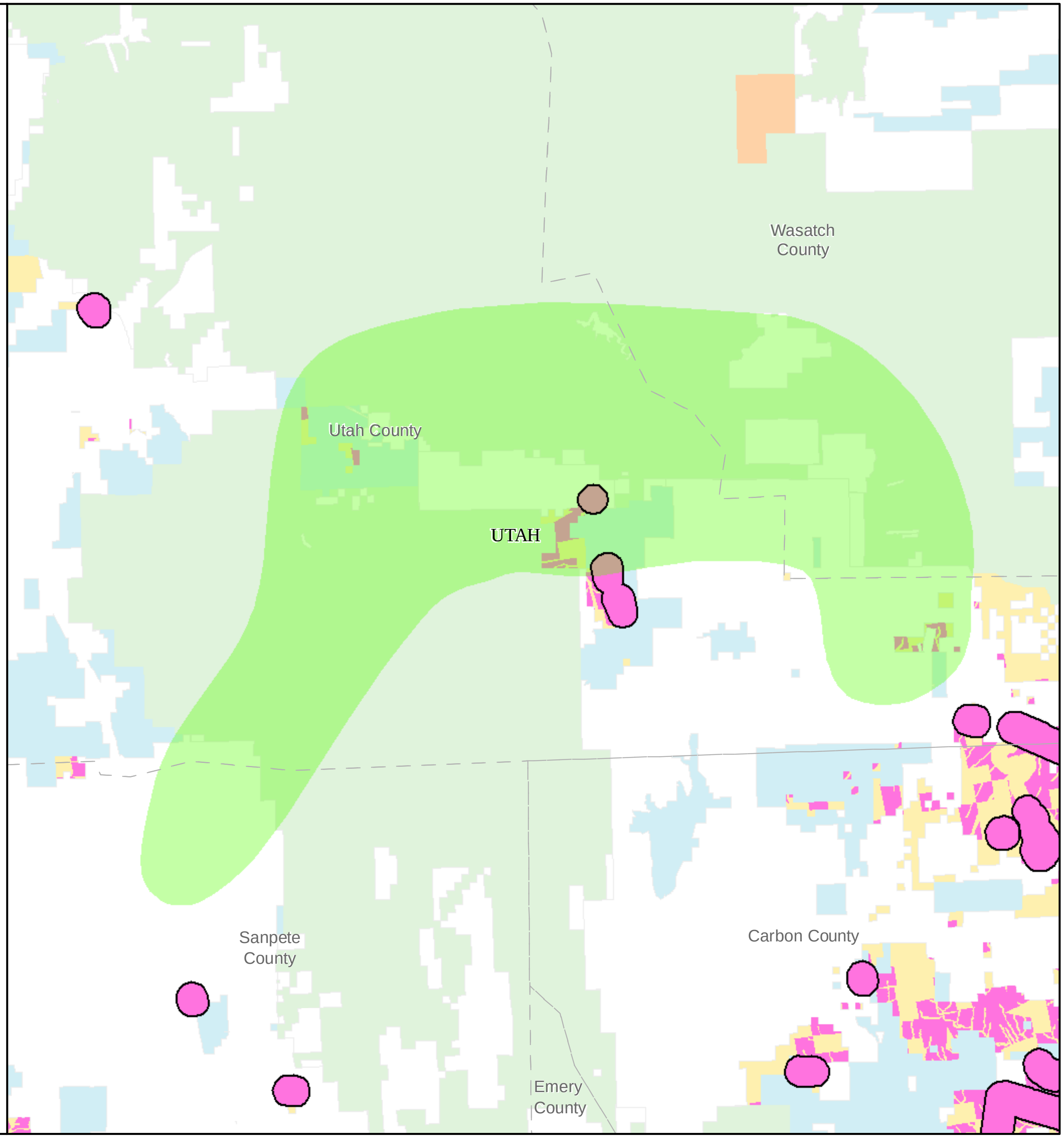

Figure A-19
Clay Reed-mustard Range

- Fuel Breaks PEIS project area
- Fuel Breaks action area
- Fuel Breaks focused action area
- Range
- Bureau of Land Management (BLM)
- BIA or Indian Reservation
- State
- Private

N

0 4 8
Miles

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Bureau of Land Management

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NAD 1983 (2011) Contiguous USA Albers

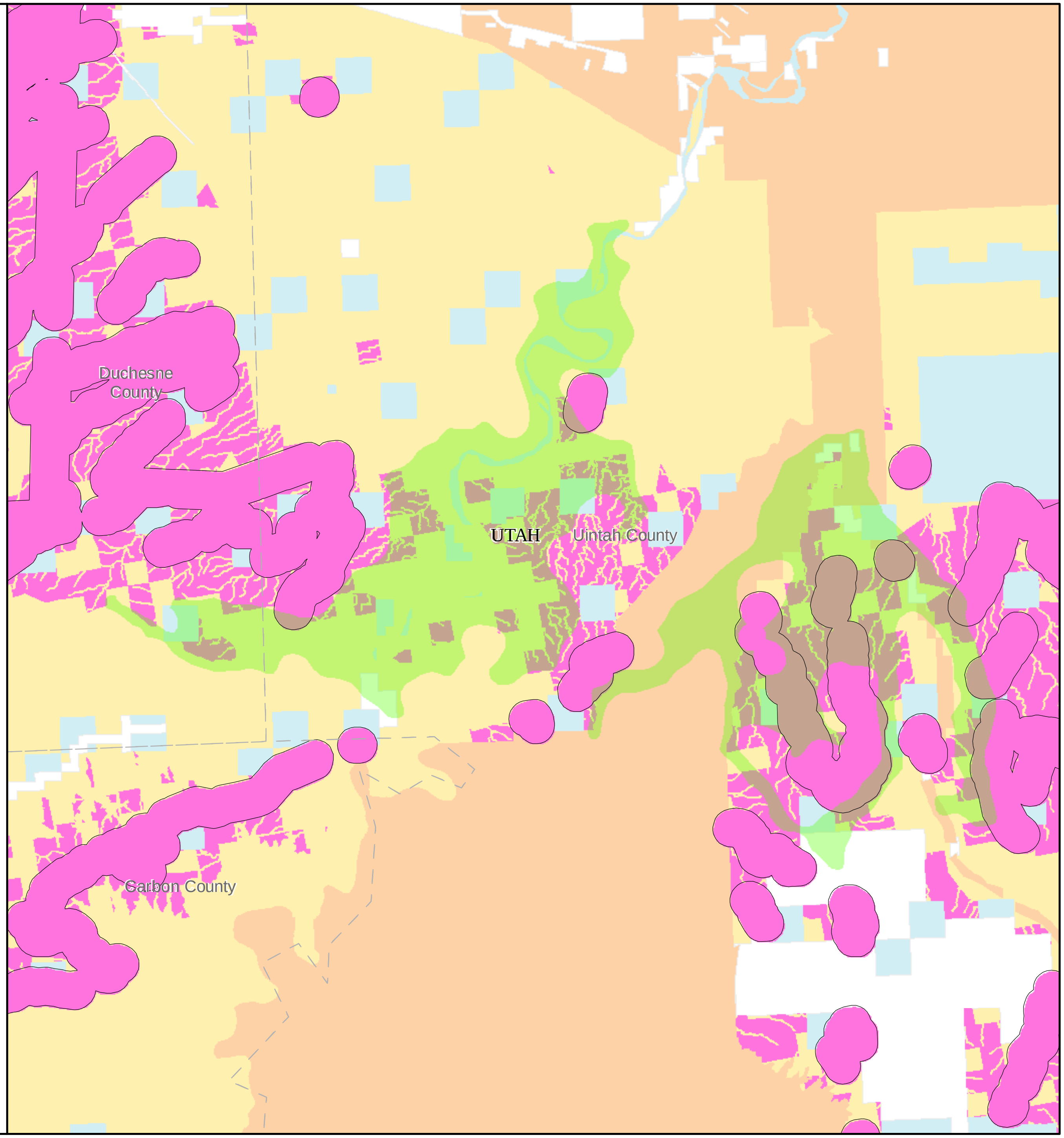

Figure A-20
Jones Cycladenia
Range

Fuel Breaks PEIS project area
Fuel Breaks action area
Fuel Breaks focused action area
Range
Bureau of Land Management (BLM)
US Forest Service
Military
US Fish and Wildlife Service
BIA or Indian Reservation
National Park Service
State
Private

N

0 40 80
Miles

Department of the Interior
Bureau of Land Management

Source: BLM GIS 2018
Print date: 12/4/2019
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NAD 1983 (2011) Contiguous USA Albers

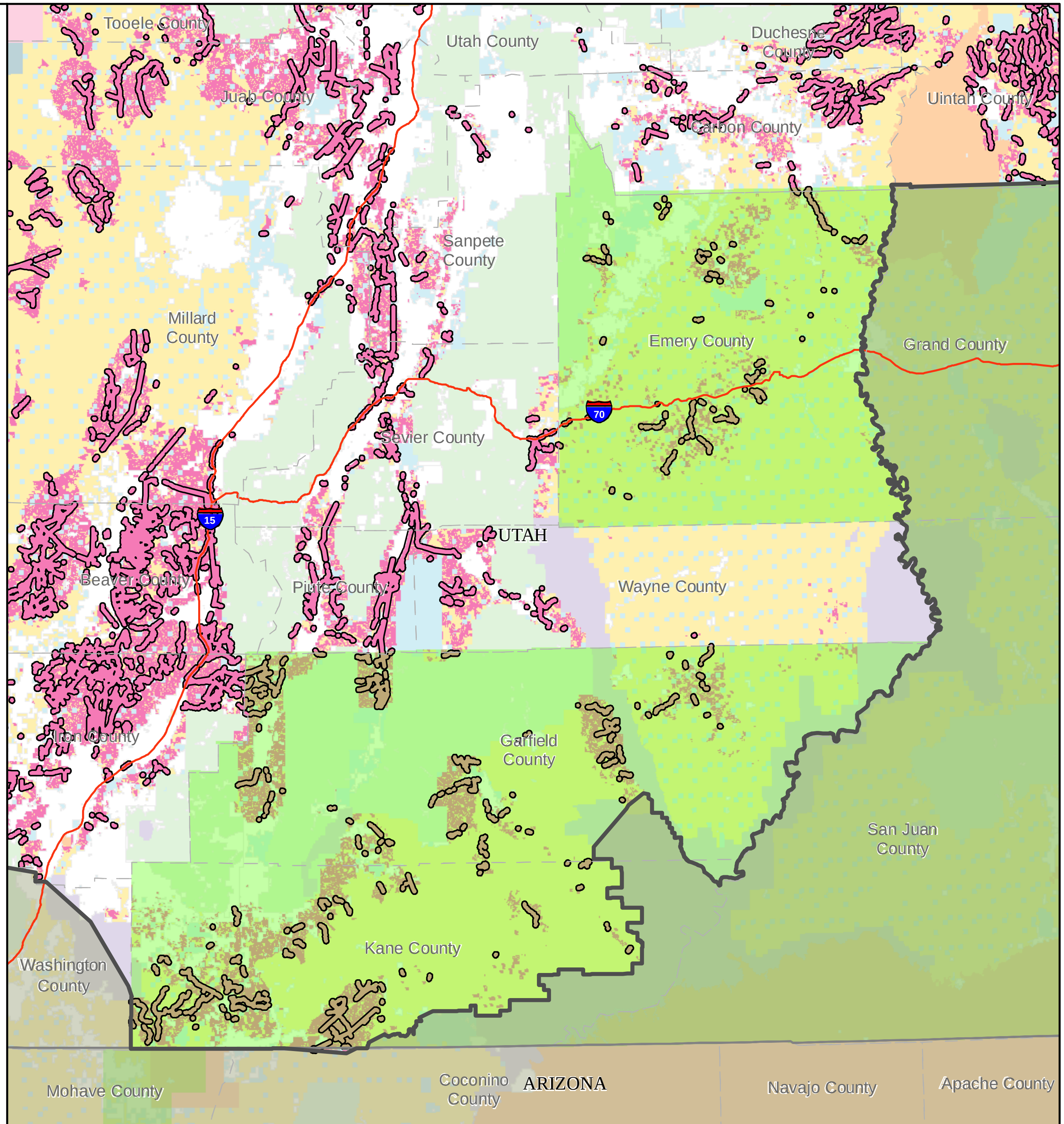
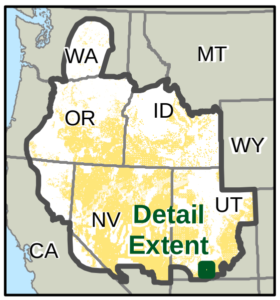


Figure A-21
Kodachrome Bladderpod Range

Fuel Breaks PEIS project area
Fuel Breaks action area
Fuel Breaks focused action area
Range
Bureau of Land Management (BLM)
US Forest Service
National Park Service
State
Private



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Bureau of Land Management

Source: BLM GIS 2018
Print date: 12/4/2019

Coordinate System and Map Projection:
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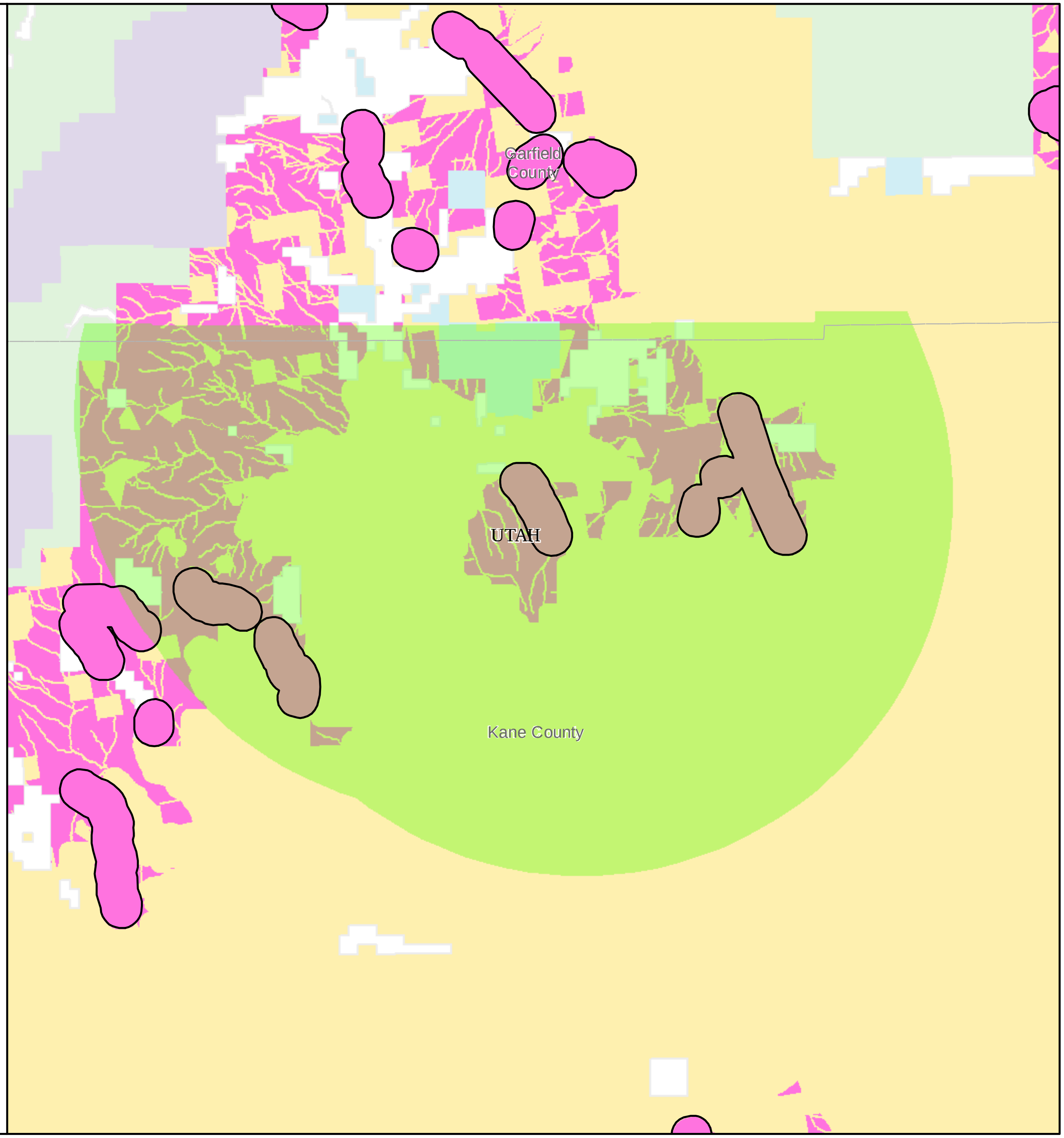
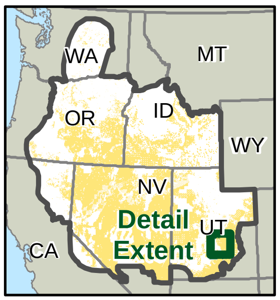


Figure A-22
Last Chance Townsendia Range

- Fuel Breaks PEIS project area
- Fuel Breaks action area
- Fuel Breaks focused action area
- Range
- Bureau of Land Management (BLM)
- US Forest Service
- National Park Service
- State
- Private



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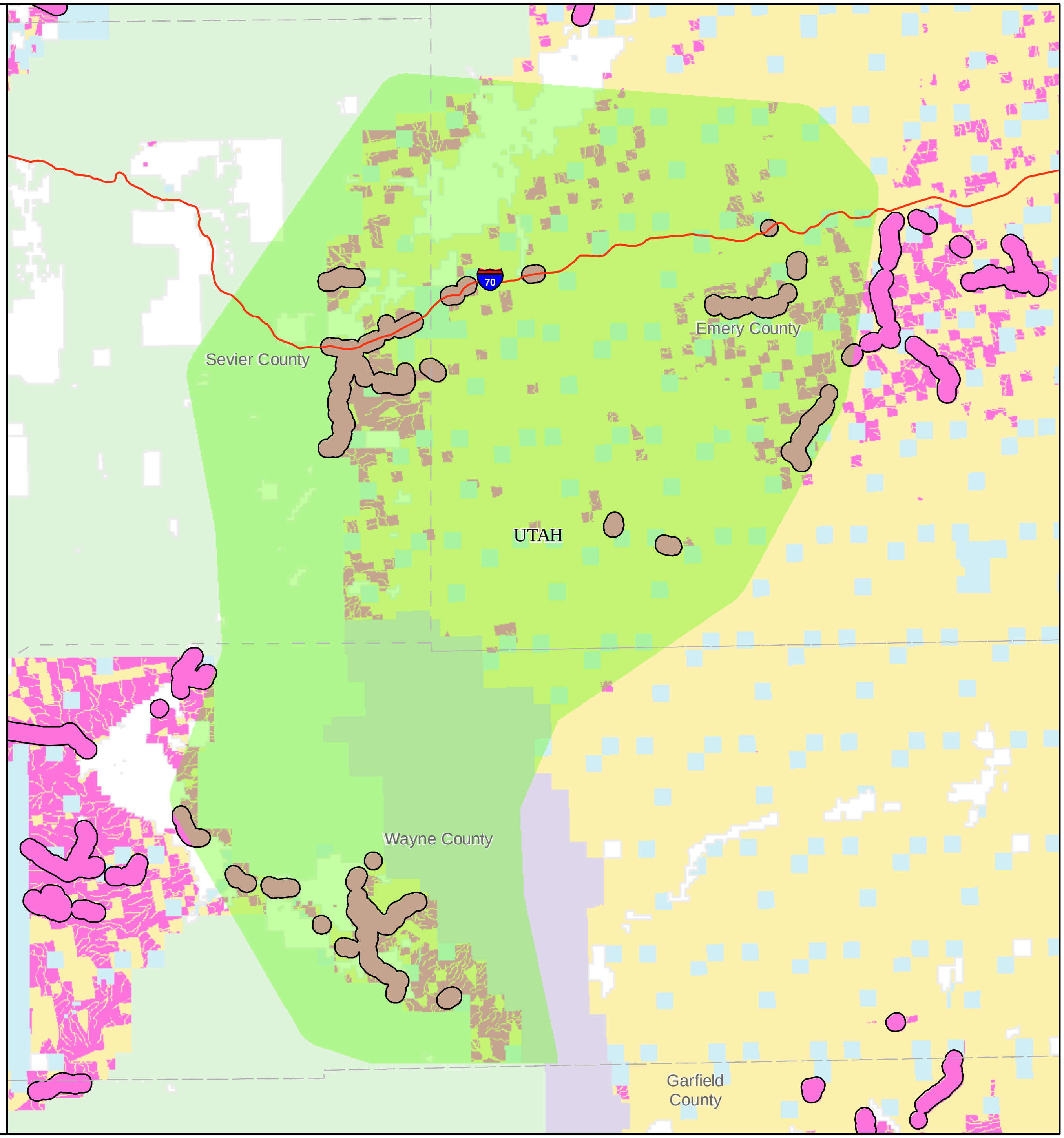
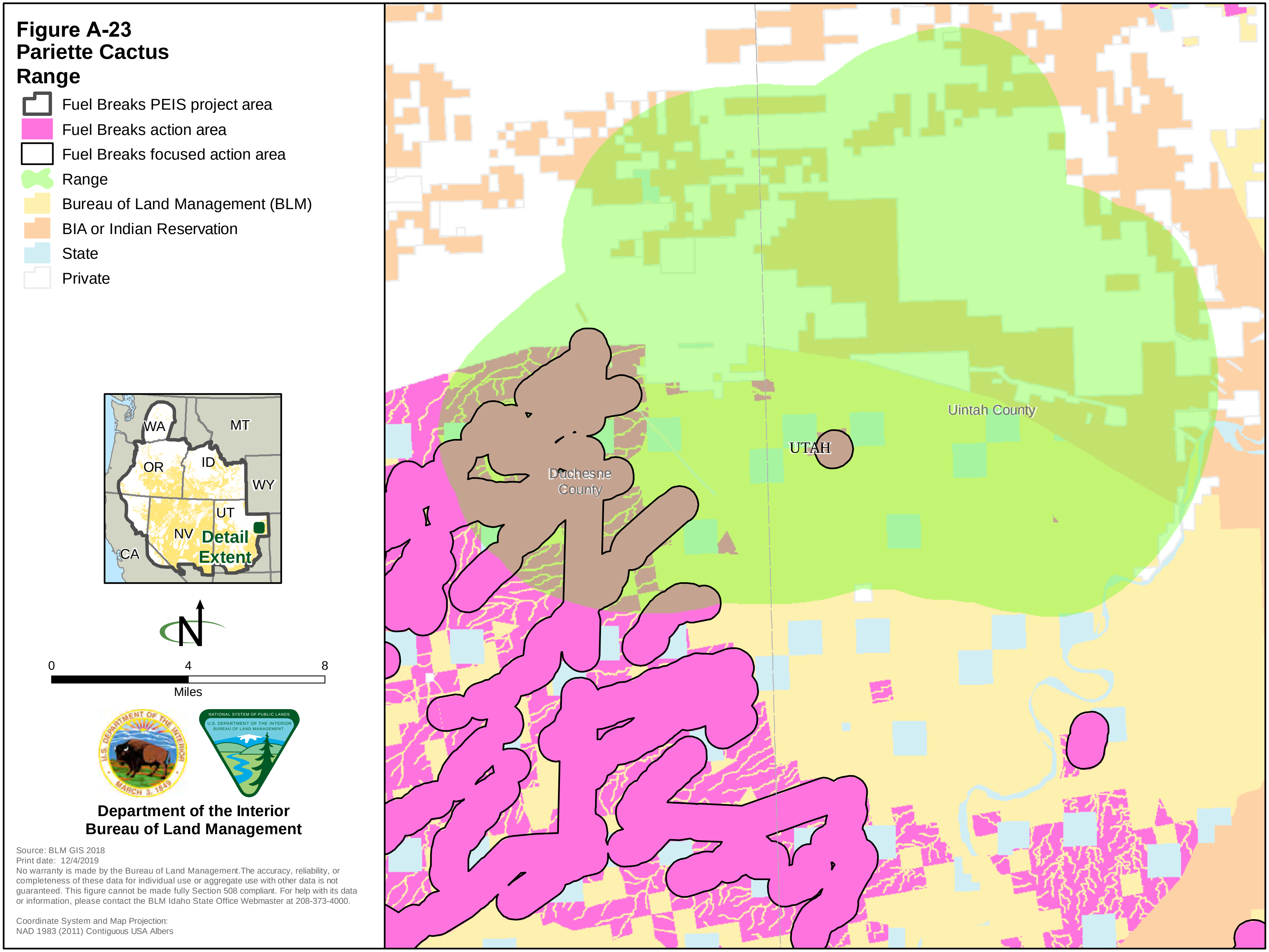


Figure A-23
Pariette Cactus Range



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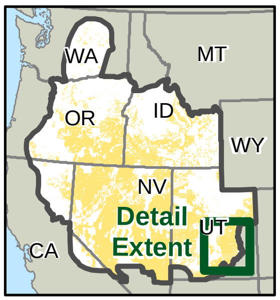
Coordinate System and Map Projection:
NAD 1983 (2011) Contiguous USA Albers

Figure A-24
San Rafael Cactus Range

- Fuel Breaks PEIS project area
- Fuel Breaks action area
- Fuel Breaks focused action area
- Range
- Bureau of Land Management (BLM)
- US Forest Service
- Military
- BIA or Indian Reservation
- National Park Service
- State
- Private



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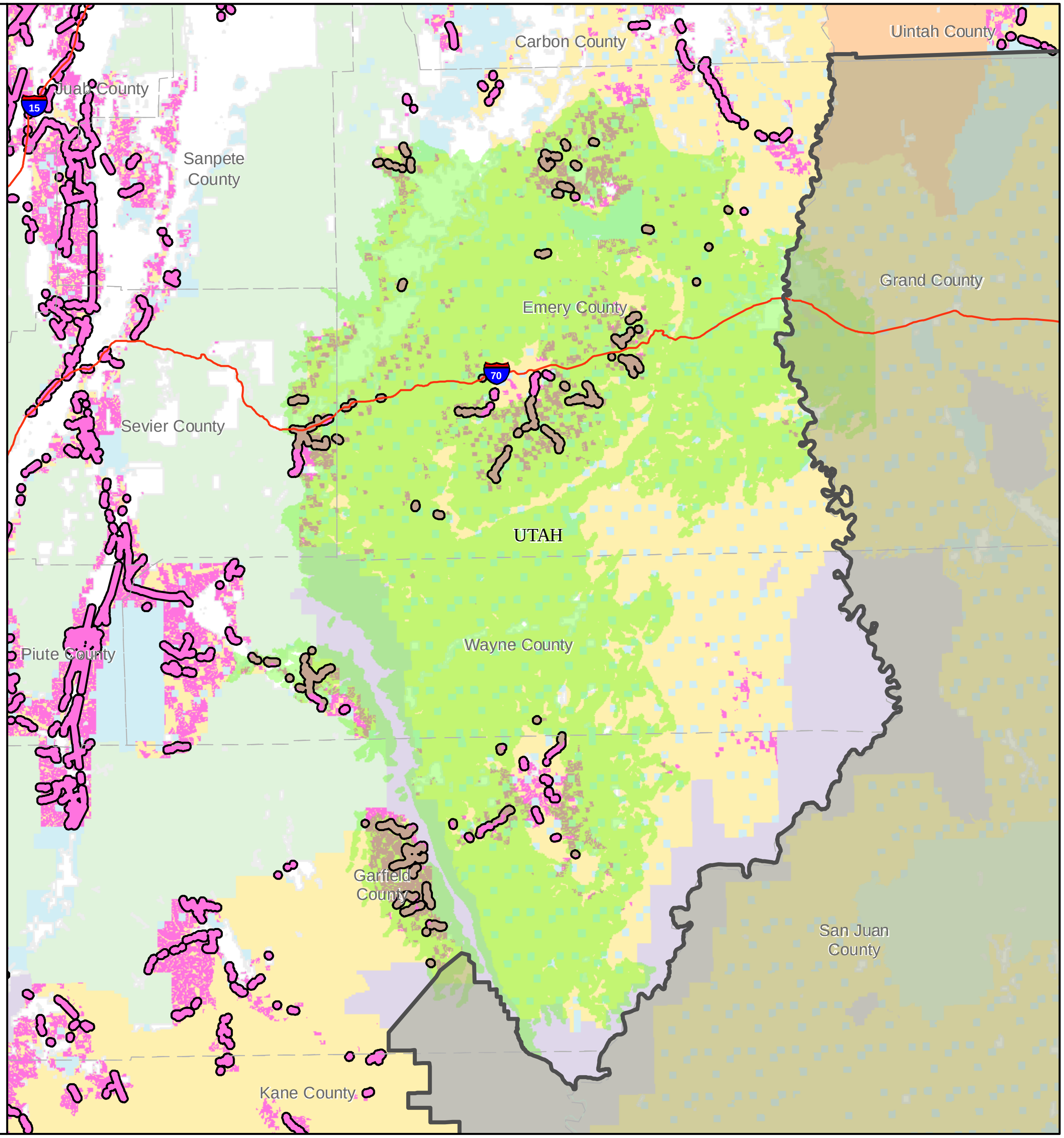

Figure A-25
Shrubby Reed-mustard Range

- Fuel Breaks PEIS project area
- Fuel Breaks action area
- Fuel Breaks focused action area
- Range
- Bureau of Land Management (BLM)
- BIA or Indian Reservation
- State
- Private

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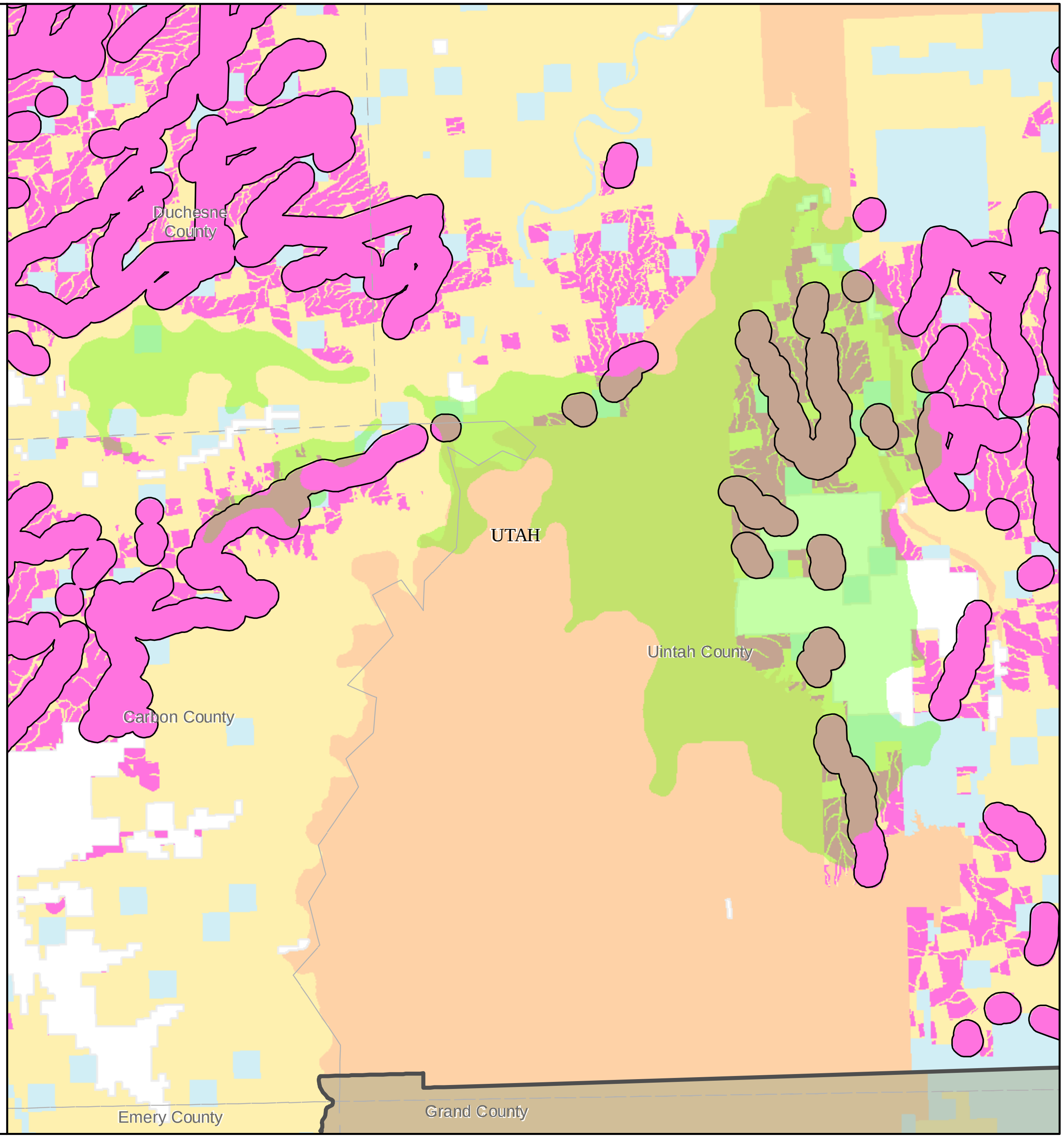


Source: BLM GIS 2018
Print date: 12/4/2019

Coordinate System and Map Projection:
NAD 1983 (2011) Contiguous USA Albers

Figure A-26
Slickspot Peppergrass Element Occurences and Proposed Critical Habitat

Fuel Breaks PEIS project area

Fuel Breaks action area

Fuel Breaks focused action area

Element occurence

Proposed critical habitat

Bureau of Land Management (BLM)

US Forest Service

Military

US Fish and Wildlife Service

BIA or Indian Reservation

National Park Service

Other Federal Land

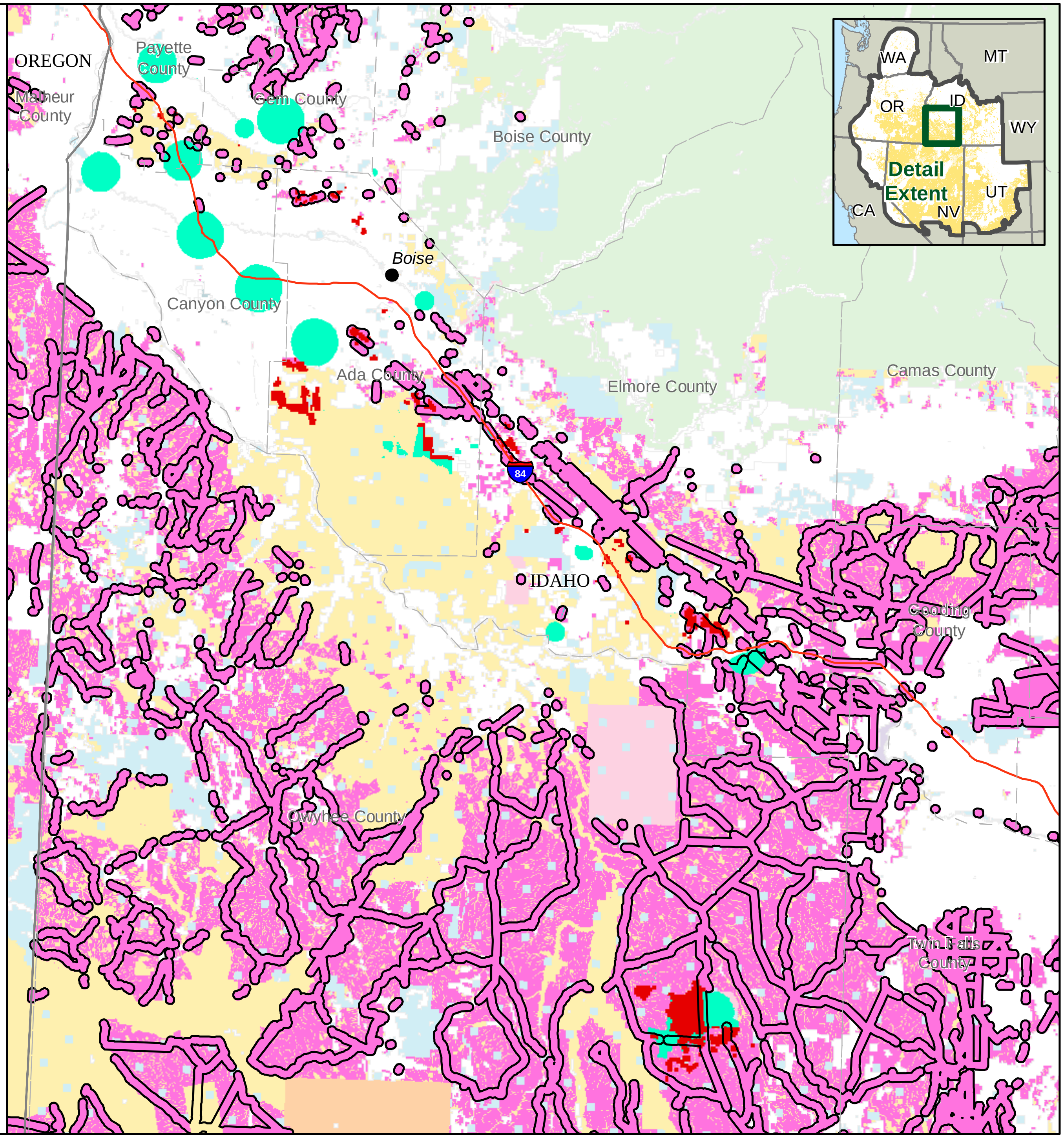
State

Private

N

0 25 50

Miles



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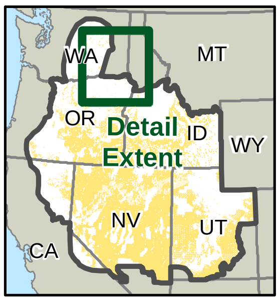
Coordinate System and Map Projection:
NAD 1983 (2011) Contiguous USA Albers

Figure A-27
Spalding's Catchfly Range

- Fuel Breaks PEIS project area
- Fuel Breaks action area
- Fuel Breaks focused action area
- Range
- Bureau of Land Management (BLM)
- US Forest Service
- Military
- US Fish and Wildlife Service
- BIA or Indian Reservation
- National Park Service
- State
- Private



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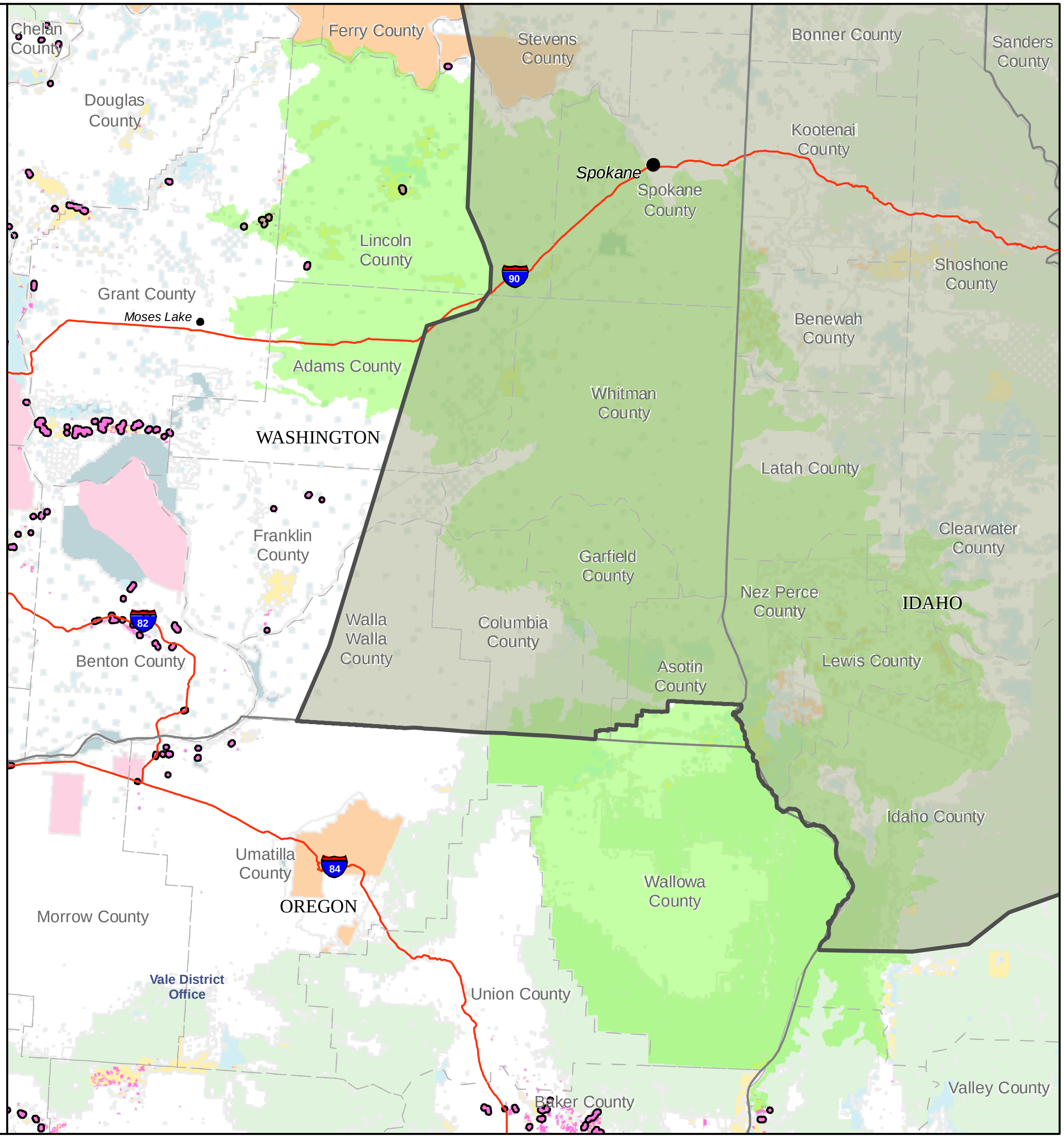

Figure A-28
Uinta Basin Hookless Cactus Range

Fuel Breaks PEIS project area
Fuel Breaks action area
Fuel Breaks focused action area
Range
Bureau of Land Management (BLM)
US Forest Service
US Fish and Wildlife Service
BIA or Indian Reservation
National Park Service
State
Private

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Miles

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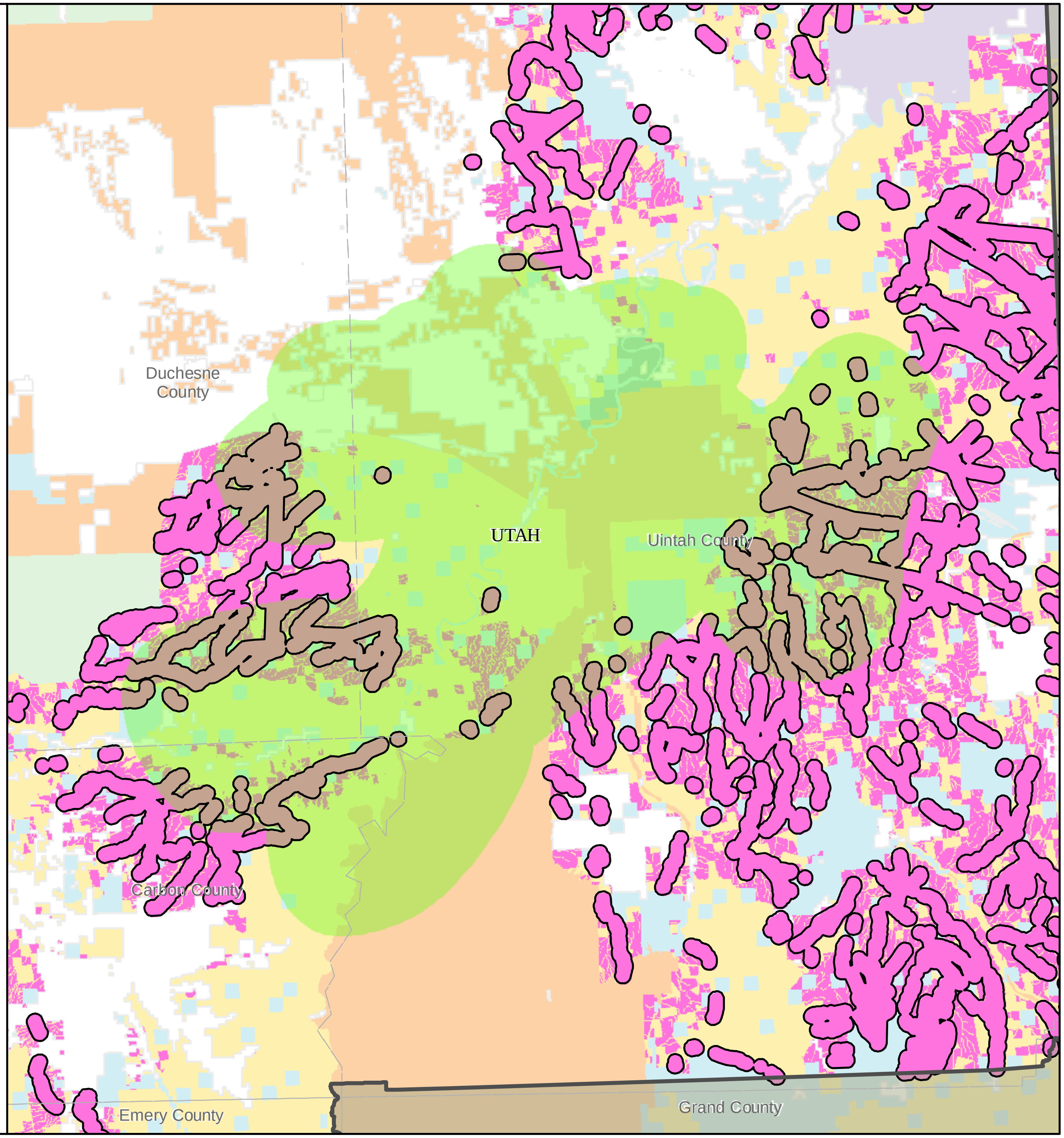
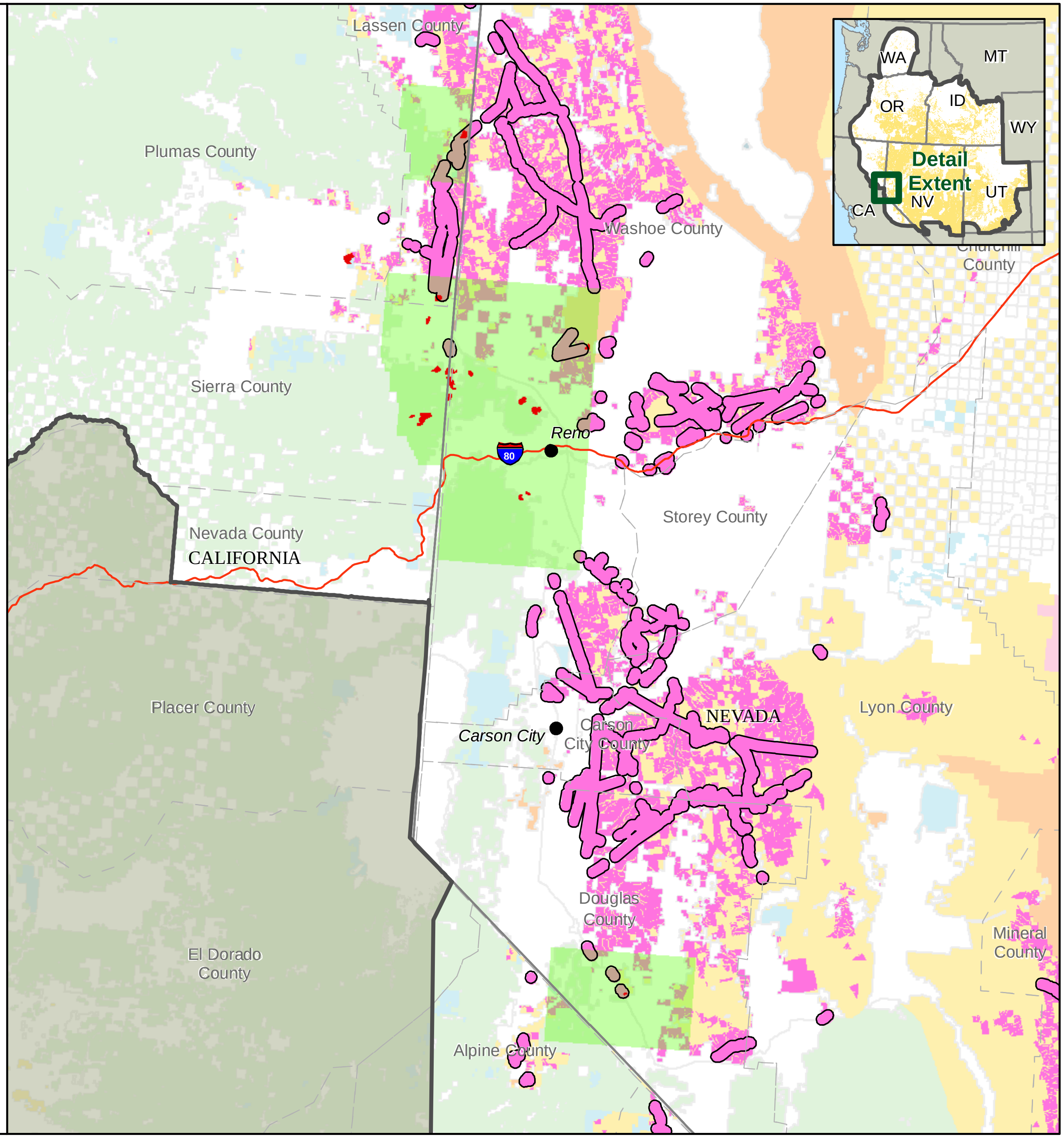


Figure A-29
Webber's Ivesia
Critical Habitat and Range

- Fuel Breaks PEIS project area
- Fuel Breaks action area
- Fuel Breaks focused action area
- Critical habitat
- Range
- Bureau of Land Management (BLM)
- US Forest Service
- Military
- US Fish and Wildlife Service
- BIA or Indian Reservation
- State
- Private



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Coordinate System and Map Projection:
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Figure A-30
Wright Fishhook Cactus Range

- Fuel Breaks PEIS project area
- Fuel Breaks action area
- Fuel Breaks focused action area
- Range
- Bureau of Land Management (BLM)
- US Forest Service
- National Park Service
- State
- Private

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Miles

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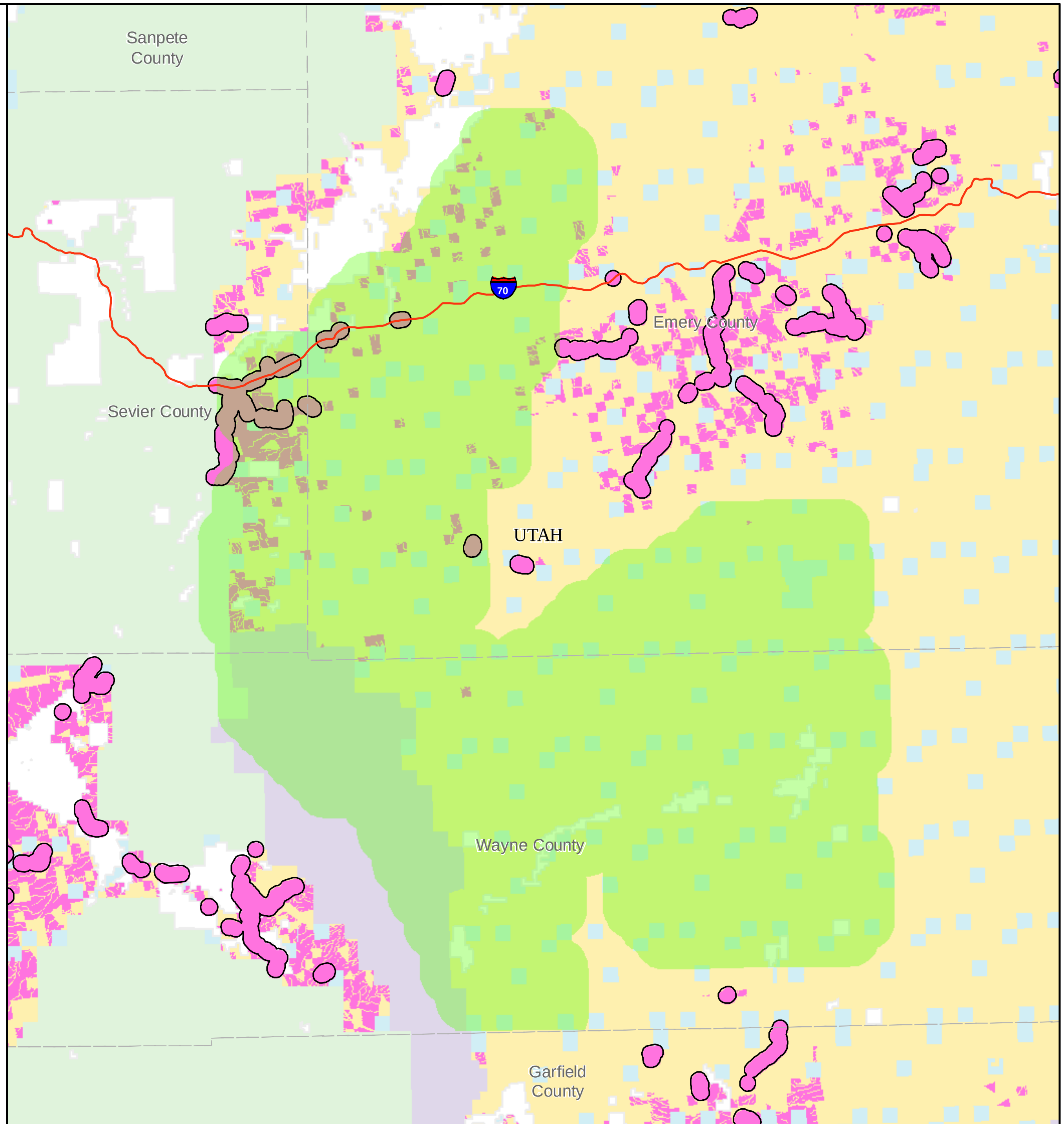

Appendix B

Listed Species Excluded from Detailed Analysis

Mammals			
Common Name	***Latin Name***	**Federal Status**	**Rationale for Exclusion**
Bi-State Greater Sage Grouse	*Centrocercus urophasianus*	Proposed	Conservation Measure Sage Grouse 1—No chemical, mechanical, prescribed fire, or targeted grazing treatments will be conducted within 0.8 mi of suitable Bi-State DPS breeding or nesting/ early brood-rearing habitat (areas with >10% sagebrush within the Bi-State DPS range) during the breeding (March 1–May 15) or nesting/early brood-rearing (mid-May–late June) seasons. When implementing targeted grazing outside of areas suitable for nesting, use temporary fencing to minimize livestock use in sage-grouse habitat. Conservation Measure Sage Grouse 2— When working in areas within 3.1 miles of Bi State DPS leks during the lekking season, avoid noise-generating activities during times when noise exposure is most likely to affect greater sage-grouse—nights and mornings (i.e., 6 pm – 9 am; Patricelli et al. 2012). Avoid or minimize any disturbance within 6 miles of known lek and nest sites during the breeding (March 1–May 15) or nesting/early brood-rearing (mid-May–late June) seasons. Conservation Measure Sage-Grouse 3—No mechanical treatment of sagebrush will be conducted within Bi-State DPS winter range during winter (November 1 to March 1). Conservation Measure Sage Grouse 4—Do not conduct treatments in proposed critical habitat that would destroy or adversely modify critical habitat PCEs. The action area overlaps 11 percent (1,151,268 acres) of the DPS's range and 19 percent 361,840 acres) of proposed critical habtiat. The focused action area overlaps approximately 3 percent (294,317 acres) of the DPS's range and 6 percent (119,605 acres) of proposed critical habitat. While effects to the DPS, such as visual and audial disturbance, loss of cover and forage, and potential for injury or mortality, could occur, adhering design features, conservation measures, and guidance in the 2016 ROD/LUPA would substantially reduce the likelihood and the magnitude of effects. Conservation measures that prohibit or provide buffers around suitable sage-grouse habitats during sensitive seasons (Conservation Measures Sage Grouse 1–3) would play a large part in preventing or minimizing impacts. Therefore, the proposed action is not likely to jeopardize the continued existence of the Bis-State greater sage grouse. No treatments would be conducted in proposed critical habitat that would destroy or adversely modify critical habitat PCEs (Conservation Measure Sage-Grouse 4). Therefore, the proposed action is not likely to destroy or adversely modify proposed critical habitat.

Mammals			
Common Name	***Latin Name***	**Federal Status**	**Rationale for Exclusion**
Black-footed Ferret	*Mustela nigripes*	Experimental	Conservation Measure Ferret 1— Within the range of the black-footed ferret, proposed treatments in prairie dog habitat would be surveyed in accordance with USFWS protocols. Avoid activities in prairie dog habitat whenever possible. Otherwise, design activities to impact the smallest area possible and/or those areas with the lowest prairie dog densities Conservation Measure Ferret 2—Prohibit fuel break treatments within 1/8 mile of known home ranges of female ferrets during the "critical" period from May 1 thru July 15. The home ranges will be determined from data obtained from radio collard animals The action area overlaps approximately 1 percent (92,519 acres) of the black-footed ferret's total range and 14 percent (14,995 acres) of its total habitat nationwide (USFWS GIS 2018). The focused action area overlaps approximately 1 percent (84,210 acres) of the black-footed ferret's total range and 19 percent (20,175 acres) of its total habitat nationwide (USFWS GIS 2018). Fuel breaks would not be established in occupied black-footed ferret habitat because they exclusively inhabit prairie dog colonies, relying on prairie dogs as prey and their burrows for shelter (USFWS 2012). These areas would likely be classified as analysis exclusion areas because fuel breaks are not being proposed in native, sparsely vegetated areas. Therefore, adverse effects to ferrets and to prairie dogs (which could indirectly affect ferrets due to the latter's reliance on prairie dogs) could only impact individuals that travel between colonies (e.g., during dispersal) and such effects are not expected because the likelihood of a black-footed ferret being injured due to treatment away from their burrows is low. Given avoidance measures and conservation measures that would establish a buffer of 1/8 mile of known home ranges of female ferrets during the "critical" period from May 1 thru July15, the likelihood of impacts occurring would be so low as to be discountable and the determination for the species is May Affect, Not Likely to Adversely Affect.
Canada Lynx	*Lynx canadensis*	Threatened	No effect determination. Areas in mapped Canada lynx distribution will be avoided and buffered from treatments.
North American Wolverine	*Gulo gulo luscus*	Proposed Threatened	No effect determination. North American wolverine primary habitat will be avoided and buffered from treatments.
Northern Idaho Ground Squirrel	*Urocitellus brunneus*	Threatened	No effect determination. Habitat is outside treatment areas.
Woodland Caribou	*Rangifer tarandus caribou*	Endangered	No effect determination. Range is over 1 mile outside focused action area.
Sierra Nevada Red Fox	*Vulpes vulpes necator*	Candidate	No effect determination. Habitat is outside treatment areas.

Birds			
Common Name	***Latin Name***	**Federal Status**	**Rationale for Exclusion**
California Condor	*Gymnogyps californicus*	Endangered, Experimental	Conservation Measure Condor 1–Within the range of the California condor, survey potential habitat within 2 weeks prior to treatments and establish a buffer of 1/2 mile around roosting habitat and 1 mile around nesting habitat. This applies to Endangered and non-essential experimental populations. The action area overlaps approximately 3 percent (2,624,897 acres) of the California condor's total range, and the focused action area overlaps approximately 2 percent (1,631,981 acres). These birds nest in various types of rock formations, such as crevices, overhung ledges, and potholes (USFWS 1996). Although such features occur within the action area and focused action area, fuel breaks would not be implemented in these areas. This is because rocky formations are not suitable treatment sites, and fuel breaks would only be constructed within sagebrush and pinyon-juniper habtiats. In addition, Conservation Measure Condor 1 would buffer nesting and roosting habitat, and therefore avoid effects to nests and nesting and roosting activities. The buffer is based on recommendations for avoidance of human activities provided in the most recent recovery plan (USFWS 1996). This would lead to a no effect determination for both the endangered and non-essential experimental populations.
California Least Tern	*Sterna antillarum browni*	Endangered	No effect determination. Range is over 1/2 mile outside project area.
Gunnison Sage-grouse	*Centrocercus minimus*	Threatened	No effect determination. Range is over 1 mile outside focused action area.
Marbled Murrelet	*Brachyramphus marmoratus*	Threatened	No effect determination. Habitat is outside treatment areas.
Northern Spotted Owl	*Strix occidentalis caurina*	Threatened	No effect determination. Habitat is outside treatment areas.
Western Snowy Plover	*Charadrius alexandrinus nivosus*	Threatened	No effect determination. Range is over 1 mile outside focused action area.
Whooping Crane	*Grus americana*	Endangered	No effect determination. Range is over 1 mile outside focused action area.
Yuma Clapper Rail	*Rallus longirostris yumanensis*	Endangered	No effect determination. Range is over 1 mile outside focused action area. Aquatic/riparian habitat will be avoided and buffered from treatments.

Reptiles			
Common Name	***Latin Name***	**Federal Status**	**Rationale for Exclusion**
Desert Tortoise	*Gopherus agassizi*	Threatened	No effect determination. No treatments will occur in occupied or potential desert tortoise habitat (Design Feature 68).
Northern Mexican Gartersnake	*Thamnophis eques megalops*	Threatened	No effect determination. Habitat is outside treatment areas. Aquatic/riparian habitat will be avoided and buffered from treatments.

Insects			
Common Name	***Latin Name***	**Federal Status**	**Rationale for Exclusion**
Ash Meadows Naucorid	*Ambrysus amargosus*	Threatened	No effect determination. Habitat is outside treatment areas. Aquatic/riparian habitat will be avoided and buffered from treatments.
Valley Elderberry Longhorn Beetle	*Desmocerus californicus dimorphus*	Threatened	No effect determination. Range is over 1 mile outside focused action area.

Crustaceans			
Common Name	***Latin Name***	**Federal Status**	**Rationale for Exclusion**
Conservancy Fairy Shrimp	*Branchinecta conservatio*	Endangered	No effect determination. Range is over 1 mile outside focused action area. Aquatic/riparian habitat will be avoided and buffered from treatments.
Shasta Crayfish	*Pacifastacus fortis*	Endangered	No effect determination. Range is over 1 mile outside focused action area. Aquatic/riparian habitat will be avoided and buffered from treatments.
Vernal Pool Fairy Shrimp	*Branchinecta lynchi*	Threatened	No effect determination. Habitat is outside treatment areas. Aquatic/riparian habitat will be avoided and buffered from treatments.
Vernal Pool Tadpole Shrimp	*Lepidurus packardi*	Endangered	No effect determination. Habitat is outside treatment areas. Aquatic/riparian habitat will be avoided and buffered from treatments.

Amphibians			
Common Name	***Latin Name***	**Federal Status**	**Rationale for Exclusion**
Oregon Spotted Frog	*Rana pretiosa*	Endangered	No effect determination. Habitat is outside treatment areas. Aquatic/riparian habitat is avoided and buffered from treatments.
California Red-legged Frog	*Rayna dratonii*	Threatened	No effect determination. Range is over 1 mile outside focused action area. Aquatic/riparian habitat is avoided and buffered from treatments.
Mountain Yellow-legged Frog	*Rana muscosa*	Endangered	No effect determination. Range is over 1 mile outside focused action area. Aquatic/riparian habitat is avoided and buffered from treatments.
Sierra Nevada Yellow-legged Frog	*Rana sierrae*	Endangered	No effect determination. Range is over 1 mile outside focused action area. Aquatic/riparian habitat is avoided and buffered from treatments.
Yosemite Toad	*Anaxyrus canorus*	Threatened	No effect determination. Habitat is outside treatment areas. Aquatic/riparian habitat is avoided and buffered from treatments.

Fish[1]			
Common Name	***Latin Name***	**Federal Status**	**Rationale for Exclusion**
Ash Meadows Amargosa Pupfish	*Cyprinodon nevadensis mionectes*	Endangered	No effect determination. Habitat is outside treatment areas. Aquatic habitat is avoided and buffered by at least 300 feet.

Fish[1]			
Common Name	***Latin Name***	**Federal Status**	**Rationale for Exclusion**
Ash Meadows Speckled Dace	*Rhinichthys osculus nevadensis*	Endangered	No effect determination. Habitat is outside treatment areas. Aquatic habitat is avoided and buffered by at least 300 feet.
Big Spring Spinedace	*Lepidomeda mollispinsis pratensis*	Endangered	No effect determination. Habitat is outside treatment areas. Aquatic habitat is avoided and buffered by at least 300 feet.
Bonytail Chub	*Gila elegans*	Endangered	No effect determination. Habitat is outside treatment areas. The 100-year floodplain of critical and occupied habitat is avoided and buffered by at least 1,312 feet. Conservation Measure Listed Fish 1–Avoid all treatments within 400 meters from the edge of bonytail chub, Colorado pikeminnow, humpback chub, razorback sucker, June sucker critical habitat or occupied habitat and Lahontan cutthroat trout occupied habitat.
Bony Tail Chub Final Critical Habitat	—	—	No effect determination. The 100-year floodplain of critical habitat is avoided and buffered by at least 1,312 feet. Conservation Measure Listed Fish 1–Avoid all treatments within 400 meters from the edge of the 100 year floodplain of bonytail chub, Colorado pikeminnow, humpback chub, razorback sucker, June sucker critical habitat or occupied habitat and Lahontan cutthroat trout occupied habitat.
Borax Lake Chub	*Gila boraxobius*	Endangered	No effect determination. Habitat is outside treatment areas. Aquatic habitat is avoided and buffered by at least 300 feet.
Bull Trout	*Slavelinus confluentus*	Threatened, Experimental	No effect determination. Habitat is outside treatment areas. Aquatic habitat is avoided and buffered by at least 300 feet.
Clover Valley Speckled Dace	*Rhinichthys osculus oligoporus*	Endangered	No effect determination. Habitat is outside treatment areas. Aquatic habitat is avoided and buffered by at least 300 feet.
Coho Salmon	*Oncorhynchus kisutch*	Threatened	No effect determination. Habitat is outside treatment areas. Aquatic habitat is avoided and buffered by at least 300 feet.
Colorado Pikeminnow	*Ptychocheilus lucius*	Endangered	No effect determination. Habitat is outside treatment areas. The 100-year floodplain of critical and occupied habitat is avoided and buffered by at least 1,312 feet. Conservation Measure Listed Fish 1–Avoid all treatments within 400 meters from the edge of the 100 year floodplain of bonytail chub, Colorado pikeminnow, humpback chub, razorback sucker, June sucker critical habitat or occupied habitat and Lahontan cutthroat trout occupied habitat.
Colorado Pikeminnow Final Critical Habitat	—	—	No effect determination. The 100-year floodplain of critical habitat is avoided and buffered by at least 1,312 feet. Conservation Measure Listed Fish 1–Avoid all treatments within 400 meters from the edge of the 100 year floodplain of bonytail chub, Colorado pikeminnow, humpback chub, razorback sucker, June sucker critical habitat or occupied habitat and Lahontan cutthroat trout occupied habitat.

Fish[1]			
Common Name	***Latin Name***	**Federal Status**	**Rationale for Exclusion**
Cui-ui	*Chasmistaes cujus*	Endangered	No effect determination. Habitat is outside treatment areas. Aquatic habitat is avoided and buffered by at least 300 feet.
Delta Smelt	*Hypomesus transpacificus*	Threatened	No effect determination. Habitat is outside treatment areas. Aquatic habitat is avoided and buffered by at least 300 feet.
Desert Dace	*Eremichthys acros*	Threatened	No effect determination. Habitat is outside treatment areas. Aquatic habitat is avoided and buffered by at least 300 feet.
Devils Hole Pupfish	*Cyprinodon diabolis*	Endangered	No effect determination. Habitat is outside treatment areas. Aquatic habitat is avoided and buffered by at least 300 feet.
Dolly Varden	*Salvelinus malma*	PSAT[2]	No effect determination. Range is over 1 mile outside focused action area. Aquatic habitat is avoided and buffered by at least 300 feet.
Foskett Speckled Dace	*Rhinichthys osculus ssp.*	Threatened	No effect determination. Habitat is outside treatment areas. Aquatic habitat is avoided and buffered by at least 300 feet.
Greenback Cutthroat Trout	*Oncorhynchus clarki stomias*	Threatened	No effect determination. Habitat is outside treatment areas. Aquatic habitat is avoided and buffered by at least 300 feet.
Hiko White River Springfish	*Crenichthus baileyi grandis*	Endangered	No effect determination. Range is over ½ mile outside focused action area. Aquatic habitat is avoided and buffered by at least 300 feet.
Humpback Chub	*Gila cypha*	Endangered	No effect determination. Habitat is outside treatment areas. The 100-year floodplain of critical and occupied habitat is avoided and buffered by at least 1,312 feet. Conservation Measure Listed Fish 1–Avoid all treatments within 400 meters from the edge of the 100 year floodplain of bonytail chub, Colorado pikeminnow, humpback chub, razorback sucker, June sucker critical habitat or occupied habitat and Lahontan cutthroat trout occupied habitat.
Humpback Chub Final Critical Habitat	—	—	No effect determination. The 100-year floodplain of critical habitat is avoided and buffered by at least 1,312 feet. Conservation Measure Listed Fish 1–Avoid all treatments within 400 meters from the edge of the 100 year floodplain of bonytail chub, Colorado pikeminnow, humpback chub, razorback sucker, June sucker critical habitat or occupied habitat and Lahontan cutthroat trout occupied habitat.
Hutton Tui Chub	*Gila bicolor ssp.*	Threatened	No effect determination. Habitat is outside treatment areas. Aquatic habitat is avoided and buffered by at least 300 feet.
Independence Valley Speckled Dace	*Rhinichthus osculus lethoporus*	Endangered	No effect determination. Habitat is outside treatment areas. Aquatic habitat is avoided and buffered by at least 300 feet.

Fish[1]			
Common Name	***Latin Name***	**Federal Status**	**Rationale for Exclusion**
June Sucker	*Chasmistaes liorus*	Endangered	No effect determination. Habitat is outside treatment areas. Critical and occupied habitat is avoided and buffered by at least 1,312 feet. Conservation Measure Listed Fish 1–Avoid all treatments within 400 meters from the edge of the 100 year floodplain of bonytail chub, Colorado pikeminnow, humpback chub, razorback sucker, June sucker critical habitat or occupied habitat and Lahontan cutthroat trout occupied habitat.
Lahontan Cutthroat Trout	*Oncorhynchus clarkii henshawi*	Threatened	No effect determination. Habitat is outside treatment areas. Occupied habitat is avoided and buffered by at least 1,312 feet. Conservation Measure Listed Fish 1–Avoid all treatments within 400 meters from the edge of the 100 year floodplain of bonytail chub, Colorado pikeminnow, humpback chub, razorback sucker, June sucker critical habitat or occupied habitat and Lahontan cutthroat trout occupied habitat.
Longfin Smelt	*Spirinchus thaleichthys*	Candidate	No effect determination. Habitat is outside treatment areas. Aquatic habitat is avoided and buffered by at least 300 feet.
Lost River Sucker	*Deltistes luxatus*	Endangered	No effect determination. Habitat is outside treatment areas. Aquatic habitat is avoided and buffered by at least 300 feet.
Moapa Dace	*Moapa coriacea*	Endangered	No effect determination. Range is over 1 mile outside focused action area. Aquatic habitat is avoided and buffered by at least 300 feet.
Owens Pupfish	*Cyprinodon radiosus*	Endangered	No effect determination. Habitat is outside treatment areas. Aquatic habitat is avoided and buffered by at least 300 feet.
Owens Tui Chub	*Gila bicolor ssp. snyderi*	Endangered	No effect determination. Habitat is outside treatment areas. Aquatic habitat is avoided and buffered by at least 300 feet.
Pahranagat Roundtail Chub	*Gila robusta jordani*	Endangered	No effect determination. Habitat is outside treatment areas. Aquatic habitat is avoided and buffered by at least 300 feet.
Pahrump Poolfish	*Empertrichthys latos*	Endangered	No effect determination. Range is over 1 mile outside focused action area. Aquatic habitat is avoided and buffered by at least 300 feet.
Paiute Cutthroat Trout	*Onchorhynchus clarkii seleniris*	Threatened	No effect determination. Habitat is outside treatment areas. Aquatic habitat is avoided and buffered by at least 300 feet.
Railroad Valley Springfish	*Crenichthus nevadae*	Threatened	No effect determination. Habitat is outside treatment areas. Aquatic habitat is avoided and buffered by at least 300 feet.

Fish[1]			
Common Name	***Latin Name***	**Federal Status**	**Rationale for Exclusion**
Razorback Sucker	*Xyrauchen texanus*	Endangered	No effect determination. Habitat is outside treatment areas. The 100-year floodplain of critical and occupied habitat is avoided and buffered by at least 1,312 feet. Conservation Measure Listed Fish 1–Avoid all treatments within 400 meters from the edge of the 100 year floodplain of bonytail chub, Colorado pikeminnow, humpback chub, razorback sucker, June sucker critical habitat or occupied habitat and Lahontan cutthroat trout occupied habitat.
Razorback Sucker Critical Habitat	—	—	No effect determination. The 100-year floodplain of critical habitat is avoided and buffered by at least 1,312 feet. Conservation Measure Listed Fish 1–Avoid all treatments within 400 meters from the edge of the 100 year floodplain of bonytail chub, Colorado pikeminnow, humpback chub, razorback sucker, June sucker critical habitat or occupied habitat and Lahontan cutthroat trout occupied habitat.
Roundtail Chub	*Gila robusta*	Proposed Threatened	No effect determination. Habitat is outside treatment areas. Aquatic habitat is avoided and buffered by at least 300 feet.
Shortnose Sucker	*Chasmistes brevirostris*	Endangered	No effect determination. Habitat is outside treatment areas. Aquatic habitat is avoided and buffered by at least 300 feet.
Steelhead	*Oncorhynchus mykiss*	Threatened	No effect determination. Habitat is outside treatment areas. Aquatic habitat is avoided and buffered by at least 300 feet.
Virgin River Chub	*Gila seminuda*	Endangered	No effect determination. Habitat is outside treatment areas. Aquatic habitat is avoided and buffered by at least 300 feet.
Warm Springs Pupfish	*Cyprinodon nevadensis pectoralis*	Endangered	No effect determination. Habitat is outside treatment areas. Aquatic habitat is avoided and buffered by at least 300 feet.
Warner Sucker	*Catostomus warnerensis*	Threatened	No effect determination. Habitat is outside treatment areas. Aquatic habitat is avoided and buffered by at least 300 feet.
White River Spinedace	*Lepidomeda albivallis*	Endangered	No effect determination. Habitat is outside treatment areas. Aquatic habitat is avoided and buffered by at least 300 feet.
White River Springfish	*Crenichthys baileyi baileyi*	Endangered	No effect determination. Habitat is outside treatment areas. Aquatic habitat is avoided and buffered by at least 300 feet.
Woundfin	*Plagopterus argentissimus*	Endangered	No effect determination. Habitat is outside treatment areas. Aquatic habitat is avoided and buffered by at least 300 feet.

Mollusks/Snails			
Common Name	***Latin Name***	**Federal Status**	**Rationale for Exclusion**
Banbury Springs Limpet	*Lanx sp.*	Endangered	No effect determination. Habitat is outside treatment areas. Aquatic/riparian habitat is avoided and buffered from treatments.

Mollusks/Snails			
Common Name	***Latin Name***	**Federal Status**	**Rationale for Exclusion**
Bliss Rapids Snail	*Taylorconcha serpenticola*	Threatened	No effect determination. Habitat is outside treatment areas. Aquatic/riparian habitat is avoided and buffered from treatments.
Bruneau Hot Springsnail	*Pyrgulopsis bruneauensis*	Endangered	No effect determination. Range is outside focused action area. Aquatic/riparian habitat is avoided and buffered from treatments.
Kanab Ambersnail	*Oxyloma hayden kanabensis*	Endangered	No effect determination. Habitat is outside treatment areas. Aquatic/riparian habitat is avoided and buffered from treatments.
Snake River Physa	*Physa natricina*	Endangered	No effect determination. Range is over 1 mile outside focused action area. Aquatic/riparian habitat is avoided and buffered from treatments.

Plants			
Common Name	***Latin Name***	**Federal Status**	**Rationale for Exclusion**
Applegate's Milk-vetch	*Astragalus applegatei*	Endangered	No effect determination. Habtiat is outside treatment areas. Occurs on non-BLM managed land only.
Ash Meadows Blazingstar	*Mentzelia leucophylla*	Threatened	No effect determination. Range is over 1 mile outside focused action area.
Ash Meadows Gumplant	*Grindelia fraxinipratensis*	Threatened	No effect determination. Range is over 1 mile outside focused action area.
Autumn Buttercup	*Ranunculus aestivalis*	Endangered	No effect determination. Habitat is outside treatment areas.
Barneby Ridge-cress	*Lepidium barnebyanum*	Endangered	No effect determination. Range is over 1 mile outside focused action area.
Cook's Lomatium	*Lomatium cookii*	Endangered	No effect determination. Range is over 1 mile outside focused action area. Aquatic/riparian habitat is avoided and buffered from treatments.
Dwarf Bear-poppy	*Arctomecon humilus*	Endangered	No effect determination. Range is over 1 mile outside focused action area.
Frisco Buckwheat	*Eriogonum soredium*	Candidate	No effect determination. Habtiat is outside treatment areas.
Gentner's Fritillary	*Fritillaria gentneri*	Endangered	No effect determination. Habtiat is outside treatment areas.
Gierisch Mallow	*Sphaeralcea gierischii*	Endangered	No effect determination. Range is over 1 mile outside focused action area.
Greene's Tuctoria	*Tuctoria greenei*	Endangered	No effect determination. Habitat is outside treatment areas. Aquatic/riparian habitat is avoided and buffered from treatments.
Heliotrope Milk-vetch	*Astragalus montii*	Threatened	No effect determination. Range is over 1 mile outside focused action area.
Holmgren Milk-vetch	*Astragalus holmgreniorum*	Endangered	No effect determination. Range is over 1 mile outside focused action area.
Hoover's Spurge	*Chamaesyce hooveri*	Threatened	No effect determination. Habitat is outside treatment areas. Aquatic/riparian habitat is avoided and buffered from treatments.
Howell's Spectacular Thelypody	*Thelypodium howellii spectabilis*	Threatened	No effect determination. Habtiat is outside treatment areas.

Plants			
Common Name	***Latin Name***	**Federal Status**	**Rationale for Exclusion**
Kincaid's Lupine	*Lupinus sulphureus ssp. kincaidii*	Threatened	No effect determination. Range is over 1 mile outside focused action area.
Large-flowered Woolly Meadowfoam	*Limnanthes pumila grandiflora*	Endangered	No effect determination. Habtiat is outside treatment areas.
Macfarlane's Four-o'clock	*Mirabilis macfarlanei*	Threatened	No effect determination. Range is over 1 mile outside focused action area.
Maguire Primrose	*Primula maguirei*	Threatened	No effect determination. Range is over 1 mile outside focused action area.
Malheur Wire-lettuce	*Stephanomeria malheurensis*	Endangered	No effect determination. Range is over 1 mile outside focused action area.
Navajo Sedge	*Carex specuicola*	Threatened	No effect determination. Habitat is outside treatment areas. Aquatic/riparian habitat is avoided and buffered from treatments.
Shivwits Milk-vetch	*Astragalus ampullarioides*	Endangered	No effect determination. Range is over 1 mile outside focused action area.
Showy Stickseed	*Hackelia venusta*	Endangered	No effect determination. Habitat is outside treatment areas.
Siler Pincushion Cactus	*Pediocactus sileri*	Threatened	No effect determination. Habitat is outside treatment areas.
Slender Orcutt Grass	*Orcuttia tenuis*	Threatened	No effect determination. Habitat is outside treatment areas.
Steamboat Buckwheat	*Eriogonum ovalifolium var. williamsiae*	Endangered	No effect determination. Habitat is outside treatment areas.
Umtanum Desert Buckwheat	*Eriogonum codium*	Threatened	No effect determination. Range is over 1 mile outside focused action area.
Ute's Ladies'-tresses	*Spiranthes diluvialis*	Threatened	No effect determination. Habitat is outside treatment areas. Aquatic/riparian habitat is avoided and buffered from treatments.
Water Howellia	*Howellia aquatilis*	Threatened	No effect determination. Range is over one mile outside focused action area. Aquatic/riparian habitat is avoided and buffered from treatments.
Wenatchee Mounatins Checkermallow	*Sidalcea organa var. calva*	Endangered	No effect determination. Range is over one mile outside focused action area. Aquatic/riparian habitat is avoided and buffered from treatments.
Welsh's Milkweed	*Asclepias welshii*	Threatened	No effect determination. Habitat is outside treatment areas.
White Bluffs Bladderpod	*Physaria douglasii ssp. Tuplashensis*	Threatened	No effect determination. Range is over 1 mile outside focused action area.
Whitebark Pine	*Pinus albicaulis*	Candidate	No effect determination. Habitat is outside treatment areas.
Winkler Cactus	*Pediocactus winkleri*	Threatened	No effect determination. Habitat is outside treatment areas.
Yreka Phlox	*Phlox hirsuta*	Endangered	No effect determination. Range is over 1 mile outside focused action area.

[1] Variation in aquatic habitat buffers is based on latitudinal differences in vegetation cover and climate. Conditions at lower latitudes (more frequent monsoonal rains and sparser vegetation) are more conducive to erosion (Patten 1998), whereas conditions at higher latitudes are less conducive to erosion.
[2] Proposed threatened because of similar appearance

Appendix C

Effects Analysis Summary Tables

C. EFFECTS ANALYSIS SUMMARY TABLES

C.1 CARSON WANDERING SKIPPER

None of the treatment methods are proposed within documented, occupied Carson Wandering Skipper habitat. Pre-construction surveys for occupied habitat would be conducted prior to disturbance, and occupied habitat would be subject to a 10-mile avoidance buffer.

Treatment Method	Potential Direct and Indirect Effects to Carson Wandering Skipper	Conservation Measures and Design Features for Avoiding or Reducing Adverse Effects	Effects Determination for Treatment Method	Rationale for the Effects Determination
Chemical Treatments	Exposure to chemicals during and after treatments.	Conservation Measure Carson Wandering Skipper 1—No treatments would occur within 10 mi of known occupied Carson wandering skipper population sites during the adult flight season (late May to mid-July). Conservation Measure Carson Wandering Skipper 2— No treatments would occur within 5 mi of known Carson wandering skipper population sites at any time of year. Conservation Measure Carson Wandering Skipper 3— • To protect host and nectar plants from herbicide treatments, follow recommended buffer zones and other conservation measures for TEP plants species when conducting herbicide treatments in areas where populations of host and nectar plants occur. • Do not broadcast spray herbicides in habitats occupied by TEP butterflies or moths; do not broadcast spray herbicides in areas adjacent to TEP butterfly/moth habitat under conditions when spray drift onto the habitat is likely. • Do not use 2,4-D in TEP butterfly/moth habitat. • When conducting herbicide treatments in or near habitat used by TEP butterflies or moths, avoid use of the following herbicides, where feasible: bromacil, clopyralid, diquat, diuron, glyphosate, hexazinone, imazapyr, picloram, tebuthiuron, and triclopyr. • If conducting manual spot applications of diquat, diuron, glyphosate, hexazinone, tebuthiuron, or triclopyr to vegetation in TEP butterfly or moth habitat, utilize the typical, rather than the maximum, application rate.	May affect but are not likely to adversely affect.	Implementation of design features, conservation measures and avoidance measures would reduce the potential for adverse effects, to be discountable.

Treatment Method	Potential Direct and Indirect Effects to Carson Wandering Skipper	Conservation Measures and Design Features for Avoiding or Reducing Adverse Effects	Effects Determination for Treatment Method	Rationale for the Effects Determination
Manual Methods	Increased potential of trampling or crushing – by human workers or vehicles. Behavioral disturbance from noise and human presence.	Conservation Measure Carson Wandering Skipper 1—No treatments would occur within 10 mi of known occupied Carson wandering skipper population sites during the adult flight season (late May to mid-July). Conservation Measure Carson Wandering Skipper 2— No treatments would occur within 5 mi of known Carson wandering skipper population sites at any time of year.	May affect but are not likely to adversely affect.	The species would have to travel up to 10 miles beyond the buffer of occupied sites into a treatment site. However, the implementation of design features, conservation measures, and avoidance measures would make the potential for adverse effects so low as to be discountable.
Mechanical Methods	Increased potential of trampling or crushing – by human workers, equipment or vehicles. Behavioral disturbance from noise and human presence. Dust from use of large equipment.	Conservation Measure Carson Wandering Skipper 1—No treatments would occur within 10 mi of known occupied Carson wandering skipper population sites during the adult flight season (late May to mid-July). Conservation Measure Carson Wandering Skipper 2— No treatments would occur within 5 mi of known Carson wandering skipper population sites at any time of year.	May affect but are not likely to adversely affect.	The species would have to travel up to 10 miles beyond the buffer of occupied sites into a treatment site. However, the implementation of design features, conservation measures, and avoidance measures would make the potential for adverse effects so low as to be discountable.

Treatment Method	Potential Direct and Indirect Effects to Carson Wandering Skipper	Conservation Measures and Design Features for Avoiding or Reducing Adverse Effects	Effects Determination for Treatment Method	Rationale for the Effects Determination
Prescribed Fire	Increased potential of trampling or crushing – by human workers, equipment or vehicles. Behavioral disturbance from noise and human presence. Smoke could interfere with foraging activities outside of occupied sites.	Conservation Measure Carson Wandering Skipper 1—No treatments would occur within 10 mi of known occupied Carson wandering skipper population sites during the adult flight season (late May to mid-July). Conservation Measure Carson Wandering Skipper 2— No treatments would occur within 5 mi of known Carson wandering skipper population sites at any time of year.	May affect but are not likely to adversely affect.	The species would have to travel up to 10 miles beyond the buffer of occupied sites into a treatment site. However, the implementation of design features, conservation measures, and avoidance measures would make the potential for adverse effects so low as to be discountable.
Revegetation	Planting and reseeding with native forbs or perennial grasses may improve habitat. Increased potential of trampling or crushing – by human workers, equipment or vehicles. Behavioral disturbance from noise and human presence.	Conservation Measure Carson Wandering Skipper 1—No treatments would occur within 10 mi of known occupied Carson wandering skipper population sites during the adult flight season (late May to mid-July). Conservation Measure Carson Wandering Skipper 2— No treatments would occur within 5 mi of known Carson wandering skipper population sites at any time of year.	May affect but are not likely to adversely affect.	The species would have to travel up to 10 miles beyond the buffer of occupied sites into a treatment site. However, the implementation of design features, conservation measures, and avoidance measures would make the potential for adverse effects so low as to be discountable.

Treatment Method	Potential Direct and Indirect Effects to Carson Wandering Skipper	Conservation Measures and Design Features for Avoiding or Reducing Adverse Effects	Effects Determination for Treatment Method	Rationale for the Effects Determination
Targeted Grazing	Potential for trampling and crushing by livestock and human presence.	Conservation Measure Carson Wandering Skipper 1—No treatments would occur within 10 mi of known occupied Carson wandering skipper population sites during the adult flight season (late May to mid-July). Conservation Measure Carson Wandering Skipper 2— No treatments would occur within 5 mi of known Carson wandering skipper population sites at any time of year.	May affect but are not likely to adversely affect.	The species would have to travel up to 10 miles beyond the buffer of occupied sites into a treatment site. However, the implementation of design features, conservation measures, and avoidance measures would make the potential for adverse effects so low as to be discountable.

C.2 COLUMBIA BASIN PYGMY RABBIT

None of the treatment methods are proposed within documented, occupied Columbia Basin Pygmy Rabbit habitat. Pre-construction surveys for occupied habitat and potential habitat would be conducted prior to activities. No fuel breaks would be constructed within Recovery Areas (REAs plus 5-mile buffer), and occupied burrows would be subject to a 1-mile avoidance buffer.

Treatment Method	Potential Direct and Indirect Effects to Columbia Basin Pygmy Rabbit	Conservation Measures and Design Features for Avoiding or Reducing Adverse Effects	Effects Determination for Treatment Method	Rationale for the Effects Determination
Chemical Treatments	Unintentional exposure to chemicals – through ingestion of treated foliage.	Conservation Measure Pygmy Rabbit 1—Survey all potential Columbia Basin pygmy rabbit habitat in areas considered for fuel break routes. Surveys will follow state survey protocols for establishing presence of pygmy rabbits and will be coordinated with the Washington Department of Fish and Wildlife (WDFW). No fuel breaks will be located within Recovery Areas (REAs plus a 5-mile buffer). Surveys will be conducted by a qualified biologist. Conservation Measure Pygmy Rabbit 2—Use of prescribed fire would not occur within 1 mile of RAs or occupied pygmy rabbit habitat outside of RAs. Conservation Measure Pygmy Rabbit 3—Do not create fuel breaks within Columbia Basin pygmy rabbit Recovery Areas (REA buffered by 5 mi) Conservation Measure Pygmy Rabbit 4—Have a qualified biologist conduct pre-treatment surveys for burrows within 14 days of treatment within potentially occupied habitat and in the range of Columbia Basin pygmy rabbits. If a burrow is discovered, an avoidance buffer of 1 mile will be established around the burrow. Conservation Measure Pygmy Rabbit 5—Solicit and consider expertise and ideas from local landowners, working groups, and other federal, state, county, and private organizations during development of fuel break projects.	May affect but are not likely to adversely affect.	The implementation of design features and conservation measures would make effects insignificant.

Treatment Method	Potential Direct and Indirect Effects to Columbia Basin Pygmy Rabbit	Conservation Measures and Design Features for Avoiding or Reducing Adverse Effects	Effects Determination for Treatment Method	Rationale for the Effects Determination
Chemical Treatments *(continued)*	*(see above)*	Conservation Measure Pygmy Rabbit 6—Where applicable, incorporate roads and natural fuel breaks into fuel break design to minimize loss of or impacts on shrub steppe habitat. Conservation Measure Pygmy Rabbit 7—Incorporate key habitats or important restoration areas (such as where investments in habitat restoration have already been made or protection of the Columbia Basin pygmy rabbit Recovery Emphasis Area) into fuel break project design. Conservation Measure Pygmy Rabbit 8—Where applicable, design fuel break treatment objectives to protect sagebrush ecosystems, modify fire behavior, restore/maintain native plants, and create landscape patterns that most benefit pygmy rabbits. Conservation Measure Pygmy Rabbit 9—Protect pygmy rabbit RAs, restoration areas, and previously restored areas by strategically placing and maintaining treated strips/areas by mowing and herbicide treatments. Conservation Measure Pygmy Rabbit 10—Do not create fuel breaks within 1 mile of occupied burrows. Conservation Measure Pygmy Rabbit 11—Locate on-site work/project camps and staging areas 0.25 miles away from REAs and occupied burrows. Establish a temporary "no entry" zone to protect rabbits from human disturbance. Do not allow dogs in the camps. Monitor workers on-site to keep them out of occupied habitat. Conservation Measure Pygmy Rabbit 12—Power wash all vehicles and equipment, including dozers, discs, engines, water tenders, personnel vehicles, and all-terrain vehicles (ATVs) before deploying them in or near pygmy rabbit habitat areas, to minimize spread of noxious weeds. Conservation Measure Pygmy Rabbit 13—Use vegetation management prescriptions in fuel breaks that minimize	*(see above)*	*(see above)*

Treatment Method	Potential Direct and Indirect Effects to Columbia Basin Pygmy Rabbit	Conservation Measures and Design Features for Avoiding or Reducing Adverse Effects	Effects Determination for Treatment Method	Rationale for the Effects Determination
Chemical Treatments *(continued)*	*(see above)*	undesirable effects on vegetation or soils; for example. minimize destruction of desirable perennial plant species and reduce risk of annual grass invasion by retaining biological crusts. Conservation Measure Pygmy Rabbit 14—In restoration projects, emphasize the use of native plant species. Conservation Measure Pygmy Rabbit 15—Use post-treatment control of annual grass and other invasive species Conservation Measure Pygmy Rabbit 16— • Do not create fuel breaks within 1 mile of occupied burrows • Do not use 2,4-D, diquat, or diuron in occupied pygmy rabbit habitats; do not broadcast-spray these herbicides within a quarter-mile of occupied Columbia Basin pygmy rabbit habitat • Where feasible, avoid use of the following herbicides in occupied pygmy rabbit habitat: bromacil, clopyralid, fluoridone, glyphosate, hexazinone, imazapyr, metsulfuron methyl, picloram, tebuthiuron, and triclopyr • Where feasible, spot treat vegetation in occupied Columbia Basin pygmy rabbit habitat, rather than broadcast-spraying • Do not broadcast-spray clopyralid, glyphosate, hexazinone, picloram, or triclopyr in occupied Columbia Basin pygmy rabbit habitat; do not broadcast-spray these herbicides within 0.25 miles of occupied habitat • If broadcast-spraying bromacil, imazapyr, fluoridone, metsulfuron methyl, or tebuthiuron in or within 0.25 mi of occupied Columbia Basin pygmy rabbit habitat, apply at the typical, rather than the maximum, rate • If conducting manual spot applications of bromacil, glyphosate, hexazinone, tebuthiuron, or triclopyr to vegetation in occupied Columbia Basin pygmy rabbit habitat, use the typical, rather than the maximum, application rate	*(see above)*	*(see above)*

Treatment Method	Potential Direct and Indirect Effects to Columbia Basin Pygmy Rabbit	Conservation Measures and Design Features for Avoiding or Reducing Adverse Effects	Effects Determination for Treatment Method	Rationale for the Effects Determination
Manual Methods	Disturbance from human presence and use of tools or equipment.	Conservation Measure Pygmy Rabbit 1—Survey all potential Columbia Basin pygmy rabbit habitat in areas considered for fuel break routes. Surveys will follow state survey protocols for establishing presence of pygmy rabbits and will be coordinated with the Washington Department of Fish and Wildlife (WDFW). No fuel breaks will be located within Recovery Areas (REAs plus a 5-mile buffer). Surveys will be conducted by a qualified biologist. Conservation Measure Pygmy Rabbit 2—Use of prescribed fire would not occur within 1 mile of RAs or occupied pygmy rabbit habitat outside of RAs. Conservation Measure Pygmy Rabbit 3—Do not create fuel breaks within Columbia Basin pygmy rabbit Recovery Areas (REA buffered by 5 mi) Conservation Measure Pygmy Rabbit 4—Have a qualified biologist conduct pre-treatment surveys for burrows within 14 days of treatment within potentially occupied habitat and in the range of Columbia Basin pygmy rabbits. If a burrow is discovered, an avoidance buffer of 1 mile will be established around the burrow. Conservation Measure Pygmy Rabbit 5—Solicit and consider expertise and ideas from local landowners, working groups, and other federal, state, county, and private organizations during development of fuel break projects. Conservation Measure Pygmy Rabbit 6—Where applicable, incorporate roads and natural fuel breaks into fuel break design to minimize loss of or impacts on shrub steppe habitat. Conservation Measure Pygmy Rabbit 7—Incorporate key habitats or important restoration areas (such as where investments in habitat restoration have already been made or protection of the Columbia Basin pygmy rabbit Recovery Emphasis Area) into fuel break project design.	May affect but are not likely to adversely affect.	With the implementation of design features and conservation measures, the risk of adverse effects to pygmy rabbits would be discountable.

Treatment Method	Potential Direct and Indirect Effects to Columbia Basin Pygmy Rabbit	Conservation Measures and Design Features for Avoiding or Reducing Adverse Effects	Effects Determination for Treatment Method	Rationale for the Effects Determination
Manual Methods *(continued)*	*(see above)*	Conservation Measure Pygmy Rabbit 8—Where applicable, design fuel break treatment objectives to protect sagebrush ecosystems, modify fire behavior, restore/maintain native plants, and create landscape patterns that most benefit pygmy rabbits. Conservation Measure Pygmy Rabbit 9—Protect pygmy rabbit RAs, restoration areas, and previously restored areas by strategically placing and maintaining treated strips/areas by mowing and herbicide treatments. Conservation Measure Pygmy Rabbit 10—Do not create fuel breaks within 1 mile of occupied burrows. Conservation Measure Pygmy Rabbit 11—Locate on-site work/project camps and staging areas 0.25 miles away from REAs and occupied burrows. Establish a temporary "no entry" zone to protect rabbits from human disturbance. Do not allow dogs in the camps. Monitor workers on-site to keep them out of occupied habitat. Conservation Measure Pygmy Rabbit 12—Power wash all vehicles and equipment, including dozers, discs, engines, water tenders, personnel vehicles, and all-terrain vehicles (ATVs) before deploying them in or near pygmy rabbit habitat areas, to minimize spread of noxious weeds. Conservation Measure Pygmy Rabbit 13—Use vegetation management prescriptions in fuel breaks that minimize undesirable effects on vegetation or soils; for example. minimize destruction of desirable perennial plant species and reduce risk of annual grass invasion by retaining biological crusts. Conservation Measure Pygmy Rabbit 14—In restoration projects, emphasize the use of native plant species. Conservation Measure Pygmy Rabbit 15—Use post-treatment control of annual grass and other invasive species	*(see above)*	*(see above)*

Treatment Method	Potential Direct and Indirect Effects to Columbia Basin Pygmy Rabbit	Conservation Measures and Design Features for Avoiding or Reducing Adverse Effects	Effects Determination for Treatment Method	Rationale for the Effects Determination
Mechanical Methods	Injury or mortality from the use of heavy equipment. Compaction of soil from equipment could make it more difficult to dig burrows. Heavy equipment may collapse burrows.	Conservation Measure Pygmy Rabbit 1—Survey all potential Columbia Basin pygmy rabbit habitat in areas considered for fuel break routes. Surveys will follow state survey protocols for establishing presence of pygmy rabbits and will be coordinated with the Washington Department of Fish and Wildlife (WDFW). No fuel breaks will be located within Recovery Areas (REAs plus a 5-mile buffer). Surveys will be conducted by a qualified biologist. Conservation Measure Pygmy Rabbit 2—Use of prescribed fire would not occur within 1 mile of RAs or occupied pygmy rabbit habitat outside of RAs. Conservation Measure Pygmy Rabbit 3—Do not create fuel breaks within Columbia Basin pygmy rabbit Recovery Areas (REA buffered by 5 mi) Conservation Measure Pygmy Rabbit 4—Have a qualified biologist conduct pre-treatment surveys for burrows within 14 days of treatment within potentially occupied habitat and in the range of Columbia Basin pygmy rabbits. If a burrow is discovered, an avoidance buffer of 1 mile will be established around the burrow. Conservation Measure Pygmy Rabbit 5—Solicit and consider expertise and ideas from local landowners, working groups, and other federal, state, county, and private organizations during development of fuel break projects. Conservation Measure Pygmy Rabbit 6—Where applicable, incorporate roads and natural fuel breaks into fuel break design to minimize loss of or impacts on shrub steppe habitat. Conservation Measure Pygmy Rabbit 7—Incorporate key habitats or important restoration areas (such as where investments in habitat restoration have already been made or protection of the Columbia Basin pygmy rabbit Recovery Emphasis Area) into fuel break project design.	May affect but are not likely to adversely affect.	With the implementation of design features and conservation measures, the risk of adverse effects to pygmy rabbits would be discountable.

Treatment Method	Potential Direct and Indirect Effects to Columbia Basin Pygmy Rabbit	Conservation Measures and Design Features for Avoiding or Reducing Adverse Effects	Effects Determination for Treatment Method	Rationale for the Effects Determination
Mechanical Methods *(continued)*	*(see above)*	Conservation Measure Pygmy Rabbit 8—Where applicable, design fuel break treatment objectives to protect sagebrush ecosystems, modify fire behavior, restore/maintain native plants, and create landscape patterns that most benefit pygmy rabbits. Conservation Measure Pygmy Rabbit 9—Protect pygmy rabbit RAs, restoration areas, and previously restored areas by strategically placing and maintaining treated strips/areas by mowing and herbicide treatments. Conservation Measure Pygmy Rabbit 10—Do not create fuel breaks within 1 mile of occupied burrows. Conservation Measure Pygmy Rabbit 11—Locate on-site work/project camps and staging areas 0.25 miles away from REAs and occupied burrows. Establish a temporary "no entry" zone to protect rabbits from human disturbance. Do not allow dogs in the camps. Monitor workers on-site to keep them out of occupied habitat. Conservation Measure Pygmy Rabbit 12—Power wash all vehicles and equipment, including dozers, discs, engines, water tenders, personnel vehicles, and all-terrain vehicles (ATVs) before deploying them in or near pygmy rabbit habitat areas, to minimize spread of noxious weeds. Conservation Measure Pygmy Rabbit 13—Use vegetation management prescriptions in fuel breaks that minimize undesirable effects on vegetation or soils; for example. minimize destruction of desirable perennial plant species and reduce risk of annual grass invasion by retaining biological crusts. Conservation Measure Pygmy Rabbit 14—In restoration projects, emphasize the use of native plant species. Conservation Measure Pygmy Rabbit 15—Use post-treatment control of annual grass and other invasive species	*(see above)*	*(see above)*

Treatment Method	Potential Direct and Indirect Effects to Columbia Basin Pygmy Rabbit	Conservation Measures and Design Features for Avoiding or Reducing Adverse Effects	Effects Determination for Treatment Method	Rationale for the Effects Determination
Prescribed Fire	Injury or mortality from prescribed fires.	Conservation Measure Pygmy Rabbit 1—Survey all potential Columbia Basin pygmy rabbit habitat in areas considered for fuel break routes. Surveys will follow state survey protocols for establishing presence of pygmy rabbits and will be coordinated with the Washington Department of Fish and Wildlife (WDFW). No fuel breaks will be located within Recovery Areas (REAs plus a 5-mile buffer). Surveys will be conducted by a qualified biologist. Conservation Measure Pygmy Rabbit 2—Use of prescribed fire would not occur within 1 mile of RAs or occupied pygmy rabbit habitat outside of RAs. Conservation Measure Pygmy Rabbit 3—Do not create fuel breaks within Columbia Basin pygmy rabbit Recovery Areas (REA buffered by 5 mi) Conservation Measure Pygmy Rabbit 4—Have a qualified biologist conduct pre-treatment surveys for burrows within 14 days of treatment within potentially occupied habitat and in the range of Columbia Basin pygmy rabbits. If a burrow is discovered, an avoidance buffer of 1 mile will be established around the burrow. Conservation Measure Pygmy Rabbit 5—Solicit and consider expertise and ideas from local landowners, working groups, and other federal, state, county, and private organizations during development of fuel break projects. Conservation Measure Pygmy Rabbit 6—Where applicable, incorporate roads and natural fuel breaks into fuel break design to minimize loss of or impacts on shrub steppe habitat. Conservation Measure Pygmy Rabbit 7—Incorporate key habitats or important restoration areas (such as where investments in habitat restoration have already been made or protection of the Columbia Basin pygmy rabbit Recovery Emphasis Area) into fuel break project design.	May affect but are not likely to adversely affect.	With the implementation of design features and conservation measures, the risk of adverse effects to pygmy rabbits would be discountable.

Treatment Method	Potential Direct and Indirect Effects to Columbia Basin Pygmy Rabbit	Conservation Measures and Design Features for Avoiding or Reducing Adverse Effects	Effects Determination for Treatment Method	Rationale for the Effects Determination
Prescribed Fire *(continued)*	*(see above)*	Conservation Measure Pygmy Rabbit 8—Where applicable, design fuel break treatment objectives to protect sagebrush ecosystems, modify fire behavior, restore/maintain native plants, and create landscape patterns that most benefit pygmy rabbits. Conservation Measure Pygmy Rabbit 9—Protect pygmy rabbit RAs, restoration areas, and previously restored areas by strategically placing and maintaining treated strips/areas by mowing and herbicide treatments. Conservation Measure Pygmy Rabbit 10—Do not create fuel breaks within 1 mile of occupied burrows. Conservation Measure Pygmy Rabbit 11—Locate on-site work/project camps and staging areas 0.25 miles away from REAs and occupied burrows. Establish a temporary "no entry" zone to protect rabbits from human disturbance. Do not allow dogs in the camps. Monitor workers on-site to keep them out of occupied habitat. Conservation Measure Pygmy Rabbit 12—Power wash all vehicles and equipment, including dozers, discs, engines, water tenders, personnel vehicles, and all-terrain vehicles (ATVs) before deploying them in or near pygmy rabbit habitat areas, to minimize spread of noxious weeds. Conservation Measure Pygmy Rabbit 13—Use vegetation management prescriptions in fuel breaks that minimize undesirable effects on vegetation or soils; for example. minimize destruction of desirable perennial plant species and reduce risk of annual grass invasion by retaining biological crusts. Conservation Measure Pygmy Rabbit 14—In restoration projects, emphasize the use of native plant species. Conservation Measure Pygmy Rabbit 15—Use post-treatment control of annual grass and other invasive species	*(see above)*	*(see above)*

Treatment Method	Potential Direct and Indirect Effects to Columbia Basin Pygmy Rabbit	Conservation Measures and Design Features for Avoiding or Reducing Adverse Effects	Effects Determination for Treatment Method	Rationale for the Effects Determination
Revegetation	Improved habitat. Reduction of the presence of nonnative species, would be expected to improve pygmy rabbit habitats. Injury or mortality from treatment methods.	Conservation Measure Pygmy Rabbit 1—Survey all potential Columbia Basin pygmy rabbit habitat in areas considered for fuel break routes. Surveys will follow state survey protocols for establishing presence of pygmy rabbits and will be coordinated with the Washington Department of Fish and Wildlife (WDFW). No fuel breaks will be located within Recovery Areas (REAs plus a 5-mile buffer). Surveys will be conducted by a qualified biologist. Conservation Measure Pygmy Rabbit 2—Use of prescribed fire would not occur within 1 mile of RAs or occupied pygmy rabbit habitat outside of RAs. Conservation Measure Pygmy Rabbit 3—Do not create fuel breaks within Columbia Basin pygmy rabbit Recovery Areas (REA buffered by 5 mi) Conservation Measure Pygmy Rabbit 4—Have a qualified biologist conduct pre-treatment surveys for burrows within 14 days of treatment within potentially occupied habitat and in the range of Columbia Basin pygmy rabbits. If a burrow is discovered, an avoidance buffer of 1 mile will be established around the burrow. Conservation Measure Pygmy Rabbit 5—Solicit and consider expertise and ideas from local landowners, working groups, and other federal, state, county, and private organizations during development of fuel break projects. Conservation Measure Pygmy Rabbit 6—Where applicable, incorporate roads and natural fuel breaks into fuel break design to minimize loss of or impacts on shrub steppe habitat. Conservation Measure Pygmy Rabbit 7—Incorporate key habitats or important restoration areas (such as where investments in habitat restoration have already been made or protection of the Columbia Basin pygmy rabbit Recovery Emphasis Area) into fuel break project design.	May affect but are not likely to adversely affect.	With the implementation of design features and conservation measures, the risk of adverse effects to pygmy rabbits would be discountable.

Treatment Method	Potential Direct and Indirect Effects to Columbia Basin Pygmy Rabbit	Conservation Measures and Design Features for Avoiding or Reducing Adverse Effects	Effects Determination for Treatment Method	Rationale for the Effects Determination
Revegetation *(continued)*	*(see above)*	Conservation Measure Pygmy Rabbit 8—Where applicable, design fuel break treatment objectives to protect sagebrush ecosystems, modify fire behavior, restore/maintain native plants, and create landscape patterns that most benefit pygmy rabbits. Conservation Measure Pygmy Rabbit 9—Protect pygmy rabbit RAs, restoration areas, and previously restored areas by strategically placing and maintaining treated strips/areas by mowing and herbicide treatments. Conservation Measure Pygmy Rabbit 10—Do not create fuel breaks within 1 mile of occupied burrows. Conservation Measure Pygmy Rabbit 11—Locate on-site work/project camps and staging areas 0.25 miles away from REAs and occupied burrows. Establish a temporary "no entry" zone to protect rabbits from human disturbance. Do not allow dogs in the camps. Monitor workers on-site to keep them out of occupied habitat. Conservation Measure Pygmy Rabbit 12—Power wash all vehicles and equipment, including dozers, discs, engines, water tenders, personnel vehicles, and all-terrain vehicles (ATVs) before deploying them in or near pygmy rabbit habitat areas, to minimize spread of noxious weeds. Conservation Measure Pygmy Rabbit 13—Use vegetation management prescriptions in fuel breaks that minimize undesirable effects on vegetation or soils; for example. minimize destruction of desirable perennial plant species and reduce risk of annual grass invasion by retaining biological crusts. Conservation Measure Pygmy Rabbit 14—In restoration projects, emphasize the use of native plant species. Conservation Measure Pygmy Rabbit 15—Use post-treatment control of annual grass and other invasive species	*(see above)*	*(see above)*

Treatment Method	Potential Direct and Indirect Effects to Columbia Basin Pygmy Rabbit	Conservation Measures and Design Features for Avoiding or Reducing Adverse Effects	Effects Determination for Treatment Method	Rationale for the Effects Determination
Targeted Grazing	Trampling by or presence of livestock.	Conservation Measure Pygmy Rabbit 1—Survey all potential Columbia Basin pygmy rabbit habitat in areas considered for fuel break routes. Surveys will follow state survey protocols for establishing presence of pygmy rabbits and will be coordinated with the Washington Department of Fish and Wildlife (WDFW). No fuel breaks will be located within Recovery Areas (REAs plus a 5-mile buffer). Surveys will be conducted by a qualified biologist. Conservation Measure Pygmy Rabbit 2—Use of prescribed fire would not occur within 1 mile of RAs or occupied pygmy rabbit habitat outside of RAs. Conservation Measure Pygmy Rabbit 3—Do not create fuel breaks within Columbia Basin pygmy rabbit Recovery Areas (REA buffered by 5 mi) Conservation Measure Pygmy Rabbit 4—Have a qualified biologist conduct pre-treatment surveys for burrows within 14 days of treatment within potentially occupied habitat and in the range of Columbia Basin pygmy rabbits. If a burrow is discovered, an avoidance buffer of 1 mile will be established around the burrow. Conservation Measure Pygmy Rabbit 5—Solicit and consider expertise and ideas from local landowners, working groups, and other federal, state, county, and private organizations during development of fuel break projects. Conservation Measure Pygmy Rabbit 6—Where applicable, incorporate roads and natural fuel breaks into fuel break design to minimize loss of or impacts on shrub steppe habitat. Conservation Measure Pygmy Rabbit 7—Incorporate key habitats or important restoration areas (such as where investments in habitat restoration have already been made or protection of the Columbia Basin pygmy rabbit Recovery Emphasis Area) into fuel break project design.	May affect but are not likely to adversely affect.	Implementation of design features and conservation measures would reduce effects.

Treatment Method	Potential Direct and Indirect Effects to Columbia Basin Pygmy Rabbit	Conservation Measures and Design Features for Avoiding or Reducing Adverse Effects	Effects Determination for Treatment Method	Rationale for the Effects Determination
Targeted Grazing *(continued)*	*(see above)*	Conservation Measure Pygmy Rabbit 8—Where applicable, design fuel break treatment objectives to protect sagebrush ecosystems, modify fire behavior, restore/maintain native plants, and create landscape patterns that most benefit pygmy rabbits. Conservation Measure Pygmy Rabbit 9—Protect pygmy rabbit RAs, restoration areas, and previously restored areas by strategically placing and maintaining treated strips/areas by mowing and herbicide treatments. Conservation Measure Pygmy Rabbit 10—Do not create fuel breaks within 1 mile of occupied burrows. Conservation Measure Pygmy Rabbit 11—Locate on-site work/project camps and staging areas 0.25 miles away from REAs and occupied burrows. Establish a temporary "no entry" zone to protect rabbits from human disturbance. Do not allow dogs in the camps. Monitor workers on-site to keep them out of occupied habitat. Conservation Measure Pygmy Rabbit 12—Power wash all vehicles and equipment, including dozers, discs, engines, water tenders, personnel vehicles, and all-terrain vehicles (ATVs) before deploying them in or near pygmy rabbit habitat areas, to minimize spread of noxious weeds. Conservation Measure Pygmy Rabbit 13—Use vegetation management prescriptions in fuel breaks that minimize undesirable effects on vegetation or soils; for example. minimize destruction of desirable perennial plant species and reduce risk of annual grass invasion by retaining biological crusts. Conservation Measure Pygmy Rabbit 14—In restoration projects, emphasize the use of native plant species. Conservation Measure Pygmy Rabbit 15—Use post-treatment control of annual grass and other invasive species	*(see above)*	*(see above)*

C.3 GRAY WOLF

Treatment Method	Potential Direct and Indirect Effects to Gray Wolf	Conservation Measures and Design Features for Avoiding or Reducing Adverse Effects	Effects Determination for Treatment Method	Rationale for the Effects Determination
Chemical Treatments	Dermal contact with treated foliage. Ingestion of prey species that had been in contact with spray or treated foliage.	Conservation Measure Gray Wolf 1—Vegetation treatments would be designed and implemented to minimize noise disturbance or habitat modifications within one mile of wolf dens or rendezvous sites from March 15 until the June 30. Conservation Measure Gray Wolf 2— • Avoid human disturbance or associated activities within 1 mile of a den site during the breeding period (as determined by a qualified biologist or by know den site information from state agencies and USFWS) • Avoid human disturbance or associated activities within 1 mile of a rendezvous site during the breeding period (as determined by a qualified biologist or by know den site information from state agencies and USFWS) • Do not use 2,4-D in dens and rendezvous sites; do not broadcast-spray within a quarter-mile of dens and rendezvous sites • Where feasible, avoid use of the following herbicides in dens and rendezvous sites: bromacil, clopyralid, diquat, diuron, glyphosate, hexazinone, imazapyr, metsulfuron methyl, picloram, and triclopyr • Do not broadcast-spray clopyralid, diuron, glyphosate, hexazinone, picloram, or triclopyr in dens and rendezvous sites; do not broadcast-spray these herbicides next to dens and rendezvous sites under conditions when spray drift into the habitat is likely • If broadcast-spraying bromacil, diquat, imazapyr, or metsulfuron methyl in or near dens and rendezvous sites, apply at the typical, rather than the maximum rate • If conducting manual spot applications of glyphosate, hexazinone, or triclopyr to vegetation in dens and rendezvous sites, use the typical, rather than the maximum, application rate	May affect but are not likely to adversely affect.	Given the gray wolf's high mobility and large range and with the implementation of design features and conservation measures, the risk of effects would be reduced and make them discountable.

Treatment Method	Potential Direct and Indirect Effects to Gray Wolf	Conservation Measures and Design Features for Avoiding or Reducing Adverse Effects	Effects Determination for Treatment Method	Rationale for the Effects Determination
Manual Methods	Disturbance from human presence and use of tools or equipment. Vegetation removal or alteration could alter habitat for prey species.	Conservation Measure Gray Wolf 1—Vegetation treatments would be designed and implemented to minimize noise disturbance or habitat modifications within one mile of wolf dens or rendezvous sites from March 15 until the June 30. Conservation Measure Gray Wolf 2— • Avoid human disturbance or associated activities within 1 mile of a den site during the breeding period (as determined by a qualified biologist or by know den site information from state agencies and USFWS) • Avoid human disturbance or associated activities within 1 mile of a rendezvous site during the breeding period (as determined by a qualified biologist or by know den site information from state agencies and USFWS)	May affect but are not likely to adversely affect.	Given the gray wolf's high mobility and large range and with the implementation of design features and conservation measures, the risk of effects would be reduced and make them discountable.
Mechanical Methods	Disturbance from human presence and use of tools or equipment. Increase in herbaceous cover and thus forage for prey species.	Conservation Measure Gray Wolf 1—Vegetation treatments would be designed and implemented to minimize noise disturbance or habitat modifications within one mile of wolf dens or rendezvous sites from March 15 until the June 30. Conservation Measure Gray Wolf 2— • Avoid human disturbance or associated activities within 1 mile of a den site during the breeding period (as determined by a qualified biologist or by know den site information from state agencies and USFWS) • Avoid human disturbance or associated activities within 1 mile of a rendezvous site during the breeding period (as determined by a qualified biologist or by know den site information from state agencies and USFWS)	May affect but are not likely to adversely affect.	Given the gray wolf's high mobility and large range and with the implementation of design features and conservation measures, the risk of effects would be reduced and make them discountable.

Treatment Method	Potential Direct and Indirect Effects to Gray Wolf	Conservation Measures and Design Features for Avoiding or Reducing Adverse Effects	Effects Determination for Treatment Method	Rationale for the Effects Determination
Prescribed Fire	Disturbance from human presence and use of tools or equipment. Implementation of prescribed fire. Interference with foraging.	Conservation Measure Gray Wolf 1—Vegetation treatments would be designed and implemented to minimize noise disturbance or habitat modifications within one mile of wolf dens or rendezvous sites from March 15 until the June 30. Conservation Measure Gray Wolf 2— • Avoid human disturbance or associated activities within 1 mile of a den site during the breeding period (as determined by a qualified biologist or by know den site information from state agencies and USFWS) • Avoid human disturbance or associated activities within 1 mile of a rendezvous site during the breeding period (as determined by a qualified biologist or by know den site information from state agencies and USFWS)	May affect but are not likely to adversely affect.	Given the gray wolf's high mobility and large range and with the implementation of design features and conservation measures, the risk of effects would be reduced and make them discountable.
Revegetation	Disturbance from human presence and use of tools or equipment.	Conservation Measure Gray Wolf 1—Vegetation treatments would be designed and implemented to minimize noise disturbance or habitat modifications within one mile of wolf dens or rendezvous sites from March 15 until the June 30. Conservation Measure Gray Wolf 2— • Avoid human disturbance or associated activities within 1 mile of a den site during the breeding period (as determined by a qualified biologist or by know den site information from state agencies and USFWS) • Avoid human disturbance or associated activities within 1 mile of a rendezvous site during the breeding period (as determined by a qualified biologist or by know den site information from state agencies and USFWS)	May affect but are not likely to adversely affect.	Given the gray wolf's high mobility and large range and with the implementation of design features and conservation measures, the risk of effects would be reduced and make them discountable.

Treatment Method	Potential Direct and Indirect Effects to Gray Wolf	Conservation Measures and Design Features for Avoiding or Reducing Adverse Effects	Effects Determination for Treatment Method	Rationale for the Effects Determination
Targeted Grazing	It is possible that the presence of livestock could directly displace ungulate prey species from treated areas; however, competition for forage would be unlikely.	Conservation Measure Gray Wolf 1—Vegetation treatments would be designed and implemented to minimize noise disturbance or habitat modifications within one mile of wolf dens or rendezvous sites from March 15 until the June 30. Conservation Measure Gray Wolf 2— • Avoid human disturbance or associated activities within 1 mile of a den site during the breeding period (as determined by a qualified biologist or by know den site information from state agencies and USFWS) • Avoid human disturbance or associated activities within 1 mile of a rendezvous site during the breeding period (as determined by a qualified biologist or by know den site information from state agencies and USFWS)	May affect but are not likely to adversely affect.	Given the gray wolf's high mobility and large range and with the implementation of design features and conservation measures, the risk of effects would be reduced and make them discountable.

C.4 GRIZZLY BEAR

Treatment Method	Potential Direct and Indirect Effects to Grizzly Bear	Conservation Measures and Design Features for Avoiding or Reducing Adverse Effects	Effects Determination for Treatment Method	Rationale for the Effects Determination
Chemical Treatments	Disturbance from human presence and use of tools or equipment.	Conservation Measure Grizzly Bear 2— Take the following measures in recovery zones to minimize the likelihood that grizzly bears would suffer adverse health effects as a result of exposure to herbicides: • Do not use 2,4-D in the zone, and do not broadcast-spray 2,4-D within a quarter-mile of the zone • Where feasible, avoid use of bromacil, clopyralid, diquat, diuron, glyphosate, hexazinone, imazapyr, metsulfuron methyl, Overdrive, picloram, tebuthiuron, and triclopyr • Do not broadcast-spray bromacil, clopyralid, diquat, diuron, glyphosate, hexazinone, Overdrive, picloram, or triclopyr in the recovery zone; do not broadcast-spray these herbicides in areas next to the recovery zone under conditions when spray drift into zone is likely • If broadcast-spraying imazapyr, metsulfuron methyl, or tebuthiuron in or near the recovery zone, apply at the typical, rather than the maximum, application rate • If conducting manual spot applications of glyphosate, hexazinone, imazapyr, metsulfuron methyl, tebuthiuron, or triclopyr to vegetation in the recovery zone, use the typical, rather than the maximum, application rate	May affect but are not likely to adversely affect.	Given the Grizzly Bear's high mobility and large range and with the implementation of design features and conservation measures, the risk of effects would be reduced and make them discountable.
Manual Methods	Disturbance from human presence and use of tools or equipment.	Conservation Measure Grizzly Bear 2— • Ensure that all treatment activities adhere to interagency grizzly bear guidelines or local interagency grizzly bear standards for sanitation measures and storage of potential attractants	May affect but are not likely to adversely affect.	Given the Grizzly Bear's high mobility and large range and with the implementation of design features and conservation measures, the risk of effects would be reduced and make them discountable.

Treatment Method	Potential Direct and Indirect Effects to Grizzly Bear	Conservation Measures and Design Features for Avoiding or Reducing Adverse Effects	Effects Determination for Treatment Method	Rationale for the Effects Determination
Mechanical Methods	Disturbance from human presence and use of tools or equipment. Changes in forage availability for bears and prey.	Conservation Measure Grizzly Bear 2— • Ensure that all treatment activities adhere to interagency grizzly bear guidelines or local interagency grizzly bear standards for sanitation measures and storage of potential attractants	May affect but are not likely to adversely affect.	Given the Grizzly Bear's high mobility and large range and with the implementation of design features and conservation measures, the risk of effects would be reduced and make them discountable.
Prescribed Fire	Disturbance from human presence and use of tools or equipment. Changes in forage availability for bears and prey.	Conservation Measure Grizzly Bear 2— • Ensure that all treatment activities adhere to interagency grizzly bear guidelines or local interagency grizzly bear standards for sanitation measures and storage of potential attractants	May affect but are not likely to adversely affect.	Given the Grizzly Bear's high mobility and large range and with the implementation of design features and conservation measures, the risk of effects would be reduced and make them discountable.
Revegetation	Disturbance from human presence and use of tools or equipment. Changes in forage availability for bears and prey.	Conservation Measure Grizzly Bear 2— • Ensure that all treatment activities adhere to interagency grizzly bear guidelines or local interagency grizzly bear standards for sanitation measures and storage of potential attractants • Do not plant or seed highly palatable forage species near roads or facilities used by humans	May affect but are not likely to adversely affect.	Given the Grizzly Bear's high mobility and large range and with the implementation of design features and conservation measures, the risk of effects would be reduced and make them discountable.
Targeted Grazing	Maintain vegetation species diversity and thus forage availability.	Conservation Measure Grizzly Bear 1—No targeted grazing would be allowed within grizzly bear habitat. Conservation Measure Grizzly Bear 2— • Ensure that all treatment activities adhere to interagency grizzly bear guidelines or local interagency grizzly bear standards for sanitation measures and storage of potential attractants	May affect but are not likely to adversely affect.	Given the Grizzly Bear's high mobility and large range and with the implementation of design features and conservation measures, the risk of effects would be reduced and make them discountable.

C.5 Mexican Spotted Owl

Treatment Method	Potential Direct and Indirect Effects to Mexican Spotted Owl	Conservation Measures and Design Features for Avoiding or Reducing Adverse Effects	Effects Determination for Treatment Method	Rationale for the Effects Determination
All Treatments	Disturbance to foraging owls	Conservation Measure Spotted Owl 1—Within 0.5 mile of project activity, habitat suitability will be assessed for nesting and foraging using accepted habitat models in conjunction with field reviews. Conservation Measure Spotted Owl 2—Protocol level surveys will be required prior to activity unless species occupancy and distribution information is complete and available. All surveys must be conducted by qualified individual(s). Conservation Measure Spotted Owl 3—Activities will be monitored for compliance with conservation measures throughout the duration of the project. Conservation Measure Spotted Owl 4—All Mexican spotted owl final critical habitat will be avoided and buffered as determined by local conditions, a qualified biologist, and treatment method. Conservation Measure Spotted Owl 5—Activity will not occur within 0.5 mile of an identified nest site or within a designated Protected Activity Center (PAC). Conservation Measure Spotted Owl 6—Avoid noise-generating activity and permanent structures within 0.5 mi of suitable habitat unless surveyed and not occupied. Conservation Measure Spotted Owl 7—Reduce noise emissions (e.g., use hospital-grade mufflers, electric pump motors) to 45 dBA at 0.5 mile from suitable habitat, including canyon rims. Placement of permanent noise-generating facilities should be determined by a noise analysis to ensure noise does not encroach upon a 0.5 mile buffer for suitable habitat, including canyon rims.	May affect but are not likely to adversely affect.	According to management recommendations in the Recovery Plan, management of pinyon-juniper is not a limiting factor for the Mexican spotted owl's recovery. Since fuel breaks would only be built within sagebrush and pinyon-juniper areas, activities mostly likely would not have substantial effects on Mexican spotted owl PACs or recovery habitats. In the off-chance that a fuel break treatment were proposed in an area used for nesting, Conservation Measure Spotted Owl 6 would avoid impacts to nesting owls. Conservation Measure Spotted Owl 4 would avoid treatment in all Mexican spotted owl final critical habitat, so no impacts would occur. If treatments are required within critical habitat to create effective and necessary fuels breaks further site-specific consultation would be required per Design Feature 42.

Treatment Method	Potential Direct and Indirect Effects to Mexican Spotted Owl	Conservation Measures and Design Features for Avoiding or Reducing Adverse Effects	Effects Determination for Treatment Method	Rationale for the Effects Determination
All Treatments *(continued)*	*(see above)*	Conservation Measure Spotted Owl 8—Limit disturbances to suitable habitat by staying on approved routes. Conservation Measure Spotted Owl 9—Limit new access routes created by the project. Conservation Measure Spotted Owl 10—Limit habitat loss by locating new facilities within existing rights-of-way. Conservation Measure Spotted Owl 11—Additional measures to avoid or minimize effects to the Mexican spotted owl may be developed and implemented in consultation with the U.S. Fish and Wildlife Service.	*(see above)*	*(see above)*

C.6 Sierra Nevada Bighorn Sheep

Treatment Method	Potential Direct and Indirect Effects to Sierra Nevada Bighorn Sheep	Conservation Measures and Design Features for Avoiding or Reducing Adverse Effects	Effects Determination for Treatment Method	Rationale for the Effects Determination
Chemical Treatments	Contact with treated foliage. Reduction of forage amount. Reduction of nonnative species, improving plant diversity and forage conditions.	Design Feature 48—Restrict activities in big game habitat during the following periods, unless short-term exemption is granted by the BLM field office manager, in coordination with the appropriate state wildlife agency (dates may be determined based on local conditions): big game wintering, elk/deer calving/fawning, pronghorn calving/fawning; and bighorn sheep lambing (See Design Feature 59 relating to Sierra Nevada Bighorn). Conservation Measure Bighorn Sheep 1— • Before treatment, survey suitable habitat for evidence of use by bighorn sheep • When planning vegetation treatments, minimize the creation of linear openings that could result in permanent travel ways for competitors and humans • Obliterate any linear openings constructed in bighorn sheep habitat in order to deter uses by humans and competitive species • Where feasible, time vegetation treatments such that they do not coincide with seasonal use of the treatment area by bighorn sheep • Do not broadcast-spray herbicides in key bighorn sheep foraging habitats • Do not use 2,4-D in bighorn sheep habitat; do not broadcast-spray 2,4-D within a quarter-mile of bighorn sheep habitat • Where feasible, avoid use of the following herbicides in bighorn sheep habitat: bromacil, clopyralid, diquat, diuron, glyphosate, hexazinone, imazapyr, metsulfuron methyl, Overdrive, picloram, and tebuthiuron, and triclopyr • Do not broadcast-spray bromacil, clopyralid, diquat, diuron, glyphosate, hexazinone, Overdrive, picloram, or	May affect but are not likely to adversely affect.	Implementation of design features and conservation measures would substantially reduce the risk of effects.

Treatment Method	Potential Direct and Indirect Effects to Sierra Nevada Bighorn Sheep	Conservation Measures and Design Features for Avoiding or Reducing Adverse Effects	Effects Determination for Treatment Method	Rationale for the Effects Determination
		triclopyr in bighorn sheep habitat; do not broadcast-spray these herbicides in areas next to bighorn sheep habitat		
Chemical Treatments *(continued)*	*(see above)*	under conditions when spray is likely to drift onto the habitat • If broadcast-spraying imazapyr, metsulfuron methyl, or tebuthiuron in or near bighorn sheep habitat, apply at the typical, rather than the maximum, application rate • If conducting manual spot applications of glyphosate, hexazinone, imazapyr, metsulfuron methyl, tebuthiuron, or triclopyr to vegetation in bighorn sheep habitat, use the typical, rather than the maximum, application rate Design Feature 59 – No Activities would occur in Sierra Nevada bighorn sheep critical habitat during lambing periods (April-July)	*(see above)*	*(see above)*

Treatment Method	Potential Direct and Indirect Effects to Sierra Nevada Bighorn Sheep	Conservation Measures and Design Features for Avoiding or Reducing Adverse Effects	Effects Determination for Treatment Method	Rationale for the Effects Determination
Manual Methods	Disturbance from human presence and use of tools or equipment. Alteration of forage.	Design Feature 48—Restrict activities in big game habitat during the following periods, unless short-term exemption is granted by the BLM field office manager, in coordination with the appropriate state wildlife agency (dates may be determined based on local conditions): big game wintering, elk/deer calving/fawning, pronghorn calving/fawning; and bighorn sheep lambing (See Design Feature 59 relating to Sierra Nevada Bighorn). Conservation Measure Bighorn Sheep 1— •Before treatment, survey suitable habitat for evidence of use by bighorn sheep •When planning vegetation treatments, minimize the creation of linear openings that could result in permanent travel ways for competitors and humans •Obliterate any linear openings constructed in bighorn sheep habitat in order to deter uses by humans and competitive species •Where feasible, time vegetation treatments such that they do not coincide with seasonal use of the treatment area by bighorn sheep Design Feature 59 – No Activities would occur in Sierra Nevada bighorn sheep critical habitat during lambing periods (April-July)	May affect but are not likely to adversely affect.	The small scale of most manual treatments and because bighorn sheep would be able to avoid the work areas, would reduce the effects of human presence. Although some forage might be removed, the level would be minor and the area affected would be less than 1 percent of the Sierra Nevada bighorn sheep's range

Treatment Method	Potential Direct and Indirect Effects to Sierra Nevada Bighorn Sheep	Conservation Measures and Design Features for Avoiding or Reducing Adverse Effects	Effects Determination for Treatment Method	Rationale for the Effects Determination
Mechanical Methods	Disturbance from human presence and use of tools or equipment. Removal of trees would improve habitat and increase visibility and forage.	Design Feature 48—Restrict activities in big game habitat during the following periods, unless short-term exemption is granted by the BLM field office manager, in coordination with the appropriate state wildlife agency (dates may be determined based on local conditions): big game wintering, elk/deer calving/fawning, pronghorn calving/fawning; and bighorn sheep lambing(See Design Feature 59 relating to Sierra Nevada Bighorn). Conservation Measure Bighorn Sheep 1— • Before treatment, survey suitable habitat for evidence of use by bighorn sheep • When planning vegetation treatments, minimize the creation of linear openings that could result in permanent travel ways for competitors and humans • Obliterate any linear openings constructed in bighorn sheep habitat in order to deter uses by humans and competitive species • Where feasible, time vegetation treatments such that they do not coincide with seasonal use of the treatment area by bighorn sheep Design Feature 59 – No Activities would occur in Sierra Nevada bighorn sheep critical habitat during lambing periods (April-July)	May affect but are not likely to adversely affect.	Although some forage might be removed, the level would be minor and the area affected would be less than 1 percent of the Sierra Nevada bighorn sheep's range

Treatment Method	Potential Direct and Indirect Effects to Sierra Nevada Bighorn Sheep	Conservation Measures and Design Features for Avoiding or Reducing Adverse Effects	Effects Determination for Treatment Method	Rationale for the Effects Determination
Prescribed Fire	Positive effects by opening the canopy. Improve winter range by increasing visibility and allowing improved detection of predators. Shrub reduction would increase forage.	Design Feature 48—Restrict activities in big game habitat during the following periods, unless short-term exemption is granted by the BLM field office manager, in coordination with the appropriate state wildlife agency (dates may be determined based on local conditions): big game wintering, elk/deer calving/fawning, pronghorn calving/fawning; and bighorn sheep lambing (See Design Feature 59 relating to Sierra Nevada Bighorn). Conservation Measure Bighorn Sheep 1— • Before treatment, survey suitable habitat for evidence of use by bighorn sheep • When planning vegetation treatments, minimize the creation of linear openings that could result in permanent travel ways for competitors and humans • Obliterate any linear openings constructed in bighorn sheep habitat in order to deter uses by humans and competitive species • Where feasible, time vegetation treatments such that they do not coincide with seasonal use of the treatment area by bighorn sheep Design Feature 59 – No Activities would occur in Sierra Nevada bighorn sheep critical habitat during lambing periods (April-July)	May affect but are not likely to adversely affect.	Although some forage might be removed, the level would be minor and the area affected would be less than 1 percent of the Sierra Nevada bighorn sheep's range. Implementation of design features and conservation measures would reduce effects.

Treatment Method	Potential Direct and Indirect Effects to Sierra Nevada Bighorn Sheep	Conservation Measures and Design Features for Avoiding or Reducing Adverse Effects	Effects Determination for Treatment Method	Rationale for the Effects Determination
Revegetation	Disturbance from human presence and use of tools or equipment. Increase in forage.	Design Feature 48—Restrict activities in big game habitat during the following periods, unless short-term exemption is granted by the BLM field office manager, in coordination with the appropriate state wildlife agency (dates may be determined based on local conditions): big game wintering, elk/deer calving/fawning, pronghorn calving/fawning; and bighorn sheep lambing (See Design Feature 59 relating to Sierra Nevada Bighorn). Conservation Measure Bighorn Sheep 1— • Before treatment, survey suitable habitat for evidence of use by bighorn sheep • When planning vegetation treatments, minimize the creation of linear openings that could result in permanent travel ways for competitors and humans • Obliterate any linear openings constructed in bighorn sheep habitat in order to deter uses by humans and competitive species • Where feasible, time vegetation treatments such that they do not coincide with seasonal use of the treatment area by bighorn sheep Design Feature 59 – No Activities would occur in Sierra Nevada bighorn sheep critical habitat during lambing periods (April-July)	May affect but are not likely to adversely affect.	Although some forage might be removed, the level would be minor and the area affected would be less than 1 percent of the Sierra Nevada bighorn sheep's range. Implementation of design features and conservation measures would reduce effects.

Treatment Method	Potential Direct and Indirect Effects to Sierra Nevada Bighorn Sheep	Conservation Measures and Design Features for Avoiding or Reducing Adverse Effects	Effects Determination for Treatment Method	Rationale for the Effects Determination
Targeted Grazing	Transfer of viruses, parasites and bacteria from domestic animals.	Design Feature 21 (bullet 5)—Use of domestic sheep or goats for targeted grazing would not occur within 30 miles of Sierra Nevada bighorn sheep Critical Habitat. Design Feature 21 (bullet 6)—Use of domestic sheep or goats for targeted grazing would be avoided within 30 miles of bighorn sheep habitat; if targeted grazing is desired in this area, the BLM would prepare a separation and response plan. It would include this in the targeted grazing plan, coordinated with the appropriate state agency, for sufficient separation to minimize the risk of contact and disease transmission from domestic sheep or goats to bighorn sheep (Does not apply to Sierra Nevada bighorn sheep). The BLM would consult the USFWS if listed bighorn sheep may be affected. Design Feature 49—Manage domestic sheep grazing to minimize contact between domestic sheep and desert and bighorn sheep, using the currently accepted peer-reviewed modeling techniques and best available data, such as the Bighorn/Domestic Sheep Risk of Contact Model, in accordance with BLM Manual 1730, Management of Domestic Sheep and Goats to Sustain Wild Sheep. Conservation Measure Bighorn Sheep 1— • Do not use domestic animals as a vegetation treatment in bighorn sheep habitat	May affect but are not likely to adversely affect.	Targeted grazing treatments would not be allowed within 30 miles of habitat. Implementation of design features and conservation measures would reduce effects.

C.7 Utah Prairie Dog

Treatment Method	Potential Direct and Indirect Effects to Utah Prairie Dog	Conservation Measures and Design Features for Avoiding or Reducing Adverse Effects	Effects Determination for Treatment Method	Rationale for the Effects Determination
Chemical Treatments	Contact or ingestion of sprayed foliage.	Conservation Measure Prairie Dog 8—Spot applications would be used to apply herbicides in Utah prairie dog habitat, where possible, to limit the probability of contaminating nontarget food and water sources and the elimination of vegetation necessary to support the species, especially vegetation over large areas.	May affect but are not likely to adversely affect.	Habitat would not be proposed for treatments. Implementation of design features, SOPs, and avoidance measures.
Manual Methods	Disturbance from human presence and use of tools or equipment.	Conservation Measure Prairie Dog 1—Proposed treatments in suitable Utah prairie dog habitat would be surveyed by certified individuals in accordance with USFWS protocols and in coordination with BLM and USFWS before implementation. Conservation Measure Prairie Dog 2—All staging areas for vehicles, trailers, and materials would be outside of a 350-foot disturbance buffer of Utah prairie dog habitat. Conservation Measure Prairie Dog 3—Project-related vehicles would not exceed 15 miles per hour in occupied Utah prairie dog habitat. Conservation Measure Prairie Dog 4—A qualified Utah prairie dog biologist, approved by the BLM and USFWS, would be required to be on-site during all work in occupied Utah prairie dog habitat. The biologist would document compliance with design features and any take that may occur and would have the authority to halt activities that may be in violation of these stipulations. Conservation Measure Prairie Dog 5—All vehicles would be maintained in maintenance facilities or, in the event of emergency, at least 350 feet from mapped Utah prairie dog habitat in previously disturbed areas. Precautions would be taken to ensure that contamination of maintenance sites by fuels, motor oils, and grease does not occur and that such materials are contained and properly disposed of off-site. Inadvertent spills of petroleum-based or other toxic	May affect but are not likely to adversely affect.	Habitat would not be proposed for treatments. Implementation of design features, SOPs, and avoidance measures.

Treatment Method	Potential Direct and Indirect Effects to Utah Prairie Dog	Conservation Measures and Design Features for Avoiding or Reducing Adverse Effects	Effects Determination for Treatment Method	Rationale for the Effects Determination
Manual Methods *(continued)*	*(see above)*	materials would be cleaned up and removed immediately or on completion of the project. In coordination with USFWS and Utah Division of Wildlife Resources, habitat treatments in occupied Utah prairie dog habitat would occur during the extended active season (April 1 to September 30). Conservation Measure Prairie Dog 6—All project employees would be informed of any Utah prairie dogs in the general area and the threatened status of the species. Employees would be advised of the definition of take and the potential penalties (up to $200,000 in fines and 1 year in prison) for taking a species listed under the ESA. Project personnel would not be permitted to have firearms or pets in their possession while on the project site. The rules on firearms and pets would be explained to all personnel involved with the project. Conservation Measure Prairie Dog 7—If a dead or injured Utah prairie dog is located, initial notification must be made to the USFWS Division of Law Enforcement, Salt Lake City, Utah, at (801) 975-3330; to the Utah Division of Wildlife Resources at (435) 865-6100; and to the BLM Authorized Officer at (435) 865-3000. Instruction for proper handling and disposition of such specimens would be issued by the Division of Law Enforcement. Care must be taken in handling sick or injured animals to ensure effective treatment and care and in handling dead specimens to preserve biological material in the best possible state.	*(see above)*	*(see above)*

Treatment Method	Potential Direct and Indirect Effects to Utah Prairie Dog	Conservation Measures and Design Features for Avoiding or Reducing Adverse Effects	Effects Determination for Treatment Method	Rationale for the Effects Determination
Mechanical Methods	Audio and visual disturbance in adjacent areas.	Conservation Measure Prairie Dog 1—Proposed treatments in suitable Utah prairie dog habitat would be surveyed by certified individuals in accordance with USFWS protocols and in coordination with BLM and USFWS before implementation. Conservation Measure Prairie Dog 2—All staging areas for vehicles, trailers, and materials would be outside of a 350-foot disturbance buffer of Utah prairie dog habitat. Conservation Measure Prairie Dog 3—Project-related vehicles would not exceed 15 miles per hour in occupied Utah prairie dog habitat. Conservation Measure Prairie Dog 4—A qualified Utah prairie dog biologist, approved by the BLM and USFWS, would be required to be on-site during all work in occupied Utah prairie dog habitat. The biologist would document compliance with design features and any take that may occur and would have the authority to halt activities that may be in violation of these stipulations. Conservation Measure Prairie Dog 5—All vehicles would be maintained in maintenance facilities or, in the event of emergency, at least 350 feet from mapped Utah prairie dog habitat in previously disturbed areas. Precautions would be taken to ensure that contamination of maintenance sites by fuels, motor oils, and grease does not occur and that such materials are contained and properly disposed of off-site. Inadvertent spills of petroleum-based or other toxic materials would be cleaned up and removed immediately or on completion of the project. In coordination with USFWS and Utah Division of Wildlife Resources, habitat treatments in occupied Utah prairie dog habitat would occur during the extended active season (April 1 to September 30).	May affect but are not likely to adversely affect.	Habitat would not be proposed for treatments. Implementation of design features, SOPs, and avoidance measures.

Treatment Method	Potential Direct and Indirect Effects to Utah Prairie Dog	Conservation Measures and Design Features for Avoiding or Reducing Adverse Effects	Effects Determination for Treatment Method	Rationale for the Effects Determination
Mechanical Methods *(continued)*	*(see above)*	Conservation Measure Prairie Dog 6—All project employees would be informed of any Utah prairie dogs in the general area and the threatened status of the species. Employees would be advised of the definition of take and the potential penalties (up to $200,000 in fines and 1 year in prison) for taking a species listed under the ESA. Project personnel would not be permitted to have firearms or pets in their possession while on the project site. The rules on firearms and pets would be explained to all personnel involved with the project. Conservation Measure Prairie Dog 7—If a dead or injured Utah prairie dog is located, initial notification must be made to the USFWS Division of Law Enforcement, Salt Lake City, Utah, at (801) 975-3330; to the Utah Division of Wildlife Resources at (435) 865-6100; and to the BLM Authorized Officer at (435) 865-3000. Instruction for proper handling and disposition of such specimens would be issued by the Division of Law Enforcement. Care must be taken in handling sick or injured animals to ensure effective treatment and care and in handling dead specimens to preserve biological material in the best possible state.	*(see above)*	*(see above)*

Treatment Method	Potential Direct and Indirect Effects to Utah Prairie Dog	Conservation Measures and Design Features for Avoiding or Reducing Adverse Effects	Effects Determination for Treatment Method	Rationale for the Effects Determination
Prescribed Fire	Injury or mortality if travel into treatment site during prescribed burn.	Conservation Measure Prairie Dog 1—Proposed treatments in suitable Utah prairie dog habitat would be surveyed by certified individuals in accordance with USFWS protocols and in coordination with BLM and USFWS before implementation. Conservation Measure Prairie Dog 2—All staging areas for vehicles, trailers, and materials would be outside of a 350-foot disturbance buffer of Utah prairie dog habitat. Conservation Measure Prairie Dog 3—Project-related vehicles would not exceed 15 miles per hour in occupied Utah prairie dog habitat. Conservation Measure Prairie Dog 4—A qualified Utah prairie dog biologist, approved by the BLM and USFWS, would be required to be on-site during all work in occupied Utah prairie dog habitat. The biologist would document compliance with design features and any take that may occur and would have the authority to halt activities that may be in violation of these stipulations. Conservation Measure Prairie Dog 5—All vehicles would be maintained in maintenance facilities or, in the event of emergency, at least 350 feet from mapped Utah prairie dog habitat in previously disturbed areas. Precautions would be taken to ensure that contamination of maintenance sites by fuels, motor oils, and grease does not occur and that such materials are contained and properly disposed of off-site. Inadvertent spills of petroleum-based or other toxic materials would be cleaned up and removed immediately or on completion of the project. In coordination with USFWS and Utah Division of Wildlife Resources, habitat treatments in occupied Utah prairie dog habitat would occur during the extended active season (April 1 to September 30).	May affect but are not likely to adversely affect.	Habitat would not be proposed for treatments. Avoidance of human presence, activity and fire. Implementation of design features, SOPs, and avoidance measures.

Treatment Method	Potential Direct and Indirect Effects to Utah Prairie Dog	Conservation Measures and Design Features for Avoiding or Reducing Adverse Effects	Effects Determination for Treatment Method	Rationale for the Effects Determination
Prescribed Fire *(continued)*	*(see above)*	Conservation Measure Prairie Dog 6—All project employees would be informed of any Utah prairie dogs in the general area and the threatened status of the species. Employees would be advised of the definition of take and the potential penalties (up to $200,000 in fines and 1 year in prison) for taking a species listed under the ESA. Project personnel would not be permitted to have firearms or pets in their possession while on the project site. The rules on firearms and pets would be explained to all personnel involved with the project. Conservation Measure Prairie Dog 7—If a dead or injured Utah prairie dog is located, initial notification must be made to the USFWS Division of Law Enforcement, Salt Lake City, Utah, at (801) 975-3330; to the Utah Division of Wildlife Resources at (435) 865-6100; and to the BLM Authorized Officer at (435) 865-3000. Instruction for proper handling and disposition of such specimens would be issued by the Division of Law Enforcement. Care must be taken in handling sick or injured animals to ensure effective treatment and care and in handling dead specimens to preserve biological material in the best possible state.	*(see above)*	*(see above)*

Treatment Method	Potential Direct and Indirect Effects to Utah Prairie Dog	Conservation Measures and Design Features for Avoiding or Reducing Adverse Effects	Effects Determination for Treatment Method	Rationale for the Effects Determination
Revegetation	Disturbance from human presence and use of tools or equipment.	Conservation Measure Prairie Dog 1—Proposed treatments in suitable Utah prairie dog habitat would be surveyed by certified individuals in accordance with USFWS protocols and in coordination with BLM and USFWS before implementation. Conservation Measure Prairie Dog 2—All staging areas for vehicles, trailers, and materials would be outside of a 350-foot disturbance buffer of Utah prairie dog habitat. Conservation Measure Prairie Dog 3—Project-related vehicles would not exceed 15 miles per hour in occupied Utah prairie dog habitat. Conservation Measure Prairie Dog 4—A qualified Utah prairie dog biologist, approved by the BLM and USFWS, would be required to be on-site during all work in occupied Utah prairie dog habitat. The biologist would document compliance with design features and any take that may occur and would have the authority to halt activities that may be in violation of these stipulations. Conservation Measure Prairie Dog 5—All vehicles would be maintained in maintenance facilities or, in the event of emergency, at least 350 feet from mapped Utah prairie dog habitat in previously disturbed areas. Precautions would be taken to ensure that contamination of maintenance sites by fuels, motor oils, and grease does not occur and that such materials are contained and properly disposed of off-site. Inadvertent spills of petroleum-based or other toxic materials would be cleaned up and removed immediately or on completion of the project. In coordination with USFWS and Utah Division of Wildlife Resources, habitat treatments in occupied Utah prairie dog habitat would occur during the extended active season (April 1 to September 30).	May affect but are not likely to adversely affect.	Habitat would not be proposed for treatments. Implementation of design features, SOPs, and avoidance measures.

Treatment Method	Potential Direct and Indirect Effects to Utah Prairie Dog	Conservation Measures and Design Features for Avoiding or Reducing Adverse Effects	Effects Determination for Treatment Method	Rationale for the Effects Determination
Revegetation *(continued)*	*(see above)*	Conservation Measure Prairie Dog 6—All project employees would be informed of any Utah prairie dogs in the general area and the threatened status of the species. Employees would be advised of the definition of take and the potential penalties (up to $200,000 in fines and 1 year in prison) for taking a species listed under the ESA. Project personnel would not be permitted to have firearms or pets in their possession while on the project site. The rules on firearms and pets would be explained to all personnel involved with the project. Conservation Measure Prairie Dog 7—If a dead or injured Utah prairie dog is located, initial notification must be made to the USFWS Division of Law Enforcement, Salt Lake City, Utah, at (801) 975-3330; to the Utah Division of Wildlife Resources at (435) 865-6100; and to the BLM Authorized Officer at (435) 865-3000. Instruction for proper handling and disposition of such specimens would be issued by the Division of Law Enforcement. Care must be taken in handling sick or injured animals to ensure effective treatment and care and in handling dead specimens to preserve biological material in the best possible state.	*(see above)*	*(see above)*

Treatment Method	Potential Direct and Indirect Effects to Utah Prairie Dog	Conservation Measures and Design Features for Avoiding or Reducing Adverse Effects	Effects Determination for Treatment Method	Rationale for the Effects Determination
Targeted Grazing	Injury from trampling.	Conservation Measure Prairie Dog 1—Proposed treatments in suitable Utah prairie dog habitat would be surveyed by certified individuals in accordance with USFWS protocols and in coordination with BLM and USFWS before implementation. Conservation Measure Prairie Dog 2—All staging areas for vehicles, trailers, and materials would be outside of a 350-foot disturbance buffer of Utah prairie dog habitat. Conservation Measure Prairie Dog 3—Project-related vehicles would not exceed 15 miles per hour in occupied Utah prairie dog habitat. Conservation Measure Prairie Dog 4—A qualified Utah prairie dog biologist, approved by the BLM and USFWS, would be required to be on-site during all work in occupied Utah prairie dog habitat. The biologist would document compliance with design features and any take that may occur and would have the authority to halt activities that may be in violation of these stipulations. Conservation Measure Prairie Dog 5—All vehicles would be maintained in maintenance facilities or, in the event of emergency, at least 350 feet from mapped Utah prairie dog habitat in previously disturbed areas. Precautions would be taken to ensure that contamination of maintenance sites by fuels, motor oils, and grease does not occur and that such materials are contained and properly disposed of off-site. Inadvertent spills of petroleum-based or other toxic materials would be cleaned up and removed immediately or on completion of the project. In coordination with USFWS and Utah Division of Wildlife Resources, habitat treatments in occupied Utah prairie dog habitat would occur during the extended active season (April 1 to September 30).	May affect but are not likely to adversely affect.	Would likely avoid livestock. Implementation of design features, SOPs, and avoidance measures.

Treatment Method	Potential Direct and Indirect Effects to Utah Prairie Dog	Conservation Measures and Design Features for Avoiding or Reducing Adverse Effects	Effects Determination for Treatment Method	Rationale for the Effects Determination
Targeted Grazing *(continued)*	*(see above)*	Conservation Measure Prairie Dog 6—All project employees would be informed of any Utah prairie dogs in the general area and the threatened status of the species. Employees would be advised of the definition of take and the potential penalties (up to $200,000 in fines and 1 year in prison) for taking a species listed under the ESA. Project personnel would not be permitted to have firearms or pets in their possession while on the project site. The rules on firearms and pets would be explained to all personnel involved with the project. Conservation Measure Prairie Dog 7—If a dead or injured Utah prairie dog is located, initial notification must be made to the USFWS Division of Law Enforcement, Salt Lake City, Utah, at (801) 975-3330; to the Utah Division of Wildlife Resources at (435) 865-6100; and to the BLM Authorized Officer at (435) 865-3000. Instruction for proper handling and disposition of such specimens would be issued by the Division of Law Enforcement. Care must be taken in handling sick or injured animals to ensure effective treatment and care and in handling dead specimens to preserve biological material in the best possible state.	*(see above)*	*(see above)*

C.8 YELLOW-BILLED CUCKOO

Treatment Method	Potential Direct and Indirect Effects to Yellow-Billed Cuckoo	Conservation Measures and Design Features for Avoiding or Reducing Adverse Effects	Effects Determination for Treatment Method	Rationale for the Effects Determination
Chemical Treatments	Disturbance from human presence and use of tools or equipment. Contact with sprayed foliage or consumption of contaminated prey.	Conservation Measure Cuckoo 1—No treatments would occur within 0.5 mile of proposed yellow-billed cuckoo critical habitat. Conservation Measure Cuckoo 2—Mechanical, chemical, or manual treatments would not occur during the yellow-billed cuckoo nesting season (June 1- August 31) within 0.5 mile of occupied suitable yellow-billed cuckoo habitat. Specific dates and buffer distances for the seasonal restrictions may be determined in coordination with the local USFWS Ecological Field Services Office, and should be based on species, variations in nesting chronology of particular species locally, topographic considerations, such as an intervening ridge between the treatment activities and a nest, or other factors that are biologically reasonable. Further, occupied suitable yellow-billed cuckoo habitat will be determined using the Utah Field Office August 2017 Guidelines for the identification and evaluation of suitable habitat for the western yellow-billed cuckoo. Conservation Measure Cuckoo 4— • Closely follow all application instructions and use restrictions on herbicide labels. • Do not use 2,4-D adjacent to yellow-billed cuckoo habitat; do not broadcast spray 2,4-D within ¼ mile of suitable yellow-billed cuckoo habitat. • Avoid use of the following herbicides adjacent to suitable yellow-billed cuckoo habitat: bromacil, clopyralid, diquat, diuron, glyphosate, hexazinone, imazapyr, metsulfuron methyl, picloram, tebuthiuron, and triclopyr. • Do not broadcast spray clopyralid, diquat, diuron, glyphosate, hexazinone, picloram, or triclopyr adjacent to suitable yellow-billed cuckoo habitat. • If broadcast spraying imazapyr or metsulfuron methyl adjacent to suitable yellow-billed cuckoo habitat, apply at the typical, rather than the maximum, application rate.	May affect but are not likely to adversely affect. No effect on proposed critical habitat (Riparian conservation areas are excluded.)	Aerial application of chemicals would not occur during the yellow-billed cuckoo nesting season (June 1 to August 31) within 0.5 miles of suitable or proposed critical yellow-billed cuckoo habitat (Design Feature 54). Also, ground-based broadcast application of herbicides would not occur during the yellow-billed cuckoo nesting season within 0.25 miles of suitable or proposed critical habitat (Design Feature 55). Riparian habitat is an exclusion area. Implementation of design features and SOPs.

Treatment Method	Potential Direct and Indirect Effects to Yellow-Billed Cuckoo	Conservation Measures and Design Features for Avoiding or Reducing Adverse Effects	Effects Determination for Treatment Method	Rationale for the Effects Determination
Chemical Treatments *(continued)*	*(see above)*	• If conducting manual spot applications of glyphosate, hexazinone, or triclopyr to vegetation adjacent to suitable yellow-billed cuckoo habitat, utilize the typical, rather than the maximum, application rate.	*(see above)*	*(see above)*
Manual Methods	Disturbance from human presence and use of tools or equipment.	Conservation Measure Cuckoo 1—No treatments would occur within 0.5 mile of proposed yellow-billed cuckoo critical habitat. Conservation Measure Cuckoo 2—Mechanical, chemical, or manual treatments would not occur during the yellow-billed cuckoo nesting season (June 1- August 31) within 0.5 mile of occupied suitable critical yellow-billed cuckoo habitat. Specific dates and buffer distances for the seasonal restrictions may be determined in coordination with the local USFWS Ecological Field Services Office, and should be based on species, variations in nesting chronology of particular species locally, topographic considerations, such as an intervening ridge between the treatment activities and a nest, or other factors that are biologically reasonable. Further, occupied suitable yellow-billed cuckoo habitat will be determined using the Utah Field Office August 2017 Guidelines for the identification and evaluation of suitable habitat for the western yellow-billed cuckoo.	May affect but are not likely to adversely affect. No effect on proposed critical habitat (Riparian conservation areas are excluded.)	Due to the small scale of manual treatments and the small area of habitat for cuckoo prey that would be treated (only upland foraging areas within the range of the yellow billed cuckoo on the action area), the change in prey availability and the level of disturbance would be insignificant.

Treatment Method	Potential Direct and Indirect Effects to Yellow-Billed Cuckoo	Conservation Measures and Design Features for Avoiding or Reducing Adverse Effects	Effects Determination for Treatment Method	Rationale for the Effects Determination
Mechanical Methods	Disturbance from human presence and use of tools or equipment.	Conservation Measure Cuckoo 1—No treatments would occur within 0.5 mile of proposed yellow-billed cuckoo critical habitat. Conservation Measure Cuckoo 2—Mechanical, chemical, or manual treatments would not occur during the yellow-billed cuckoo nesting season (June 1- August 31) within 0.5 mile of occupied suitable critical yellow-billed cuckoo habitat. Specific dates and buffer distances for the seasonal restrictions may be determined in coordination with the local USFWS Ecological Field Services Office, and should be based on species, variations in nesting chronology of particular species locally, topographic considerations, such as an intervening ridge between the treatment activities and a nest, or other factors that are biologically reasonable. Further, occupied suitable yellow-billed cuckoo habitat will be determined using the Utah Field Office August 2017 Guidelines for the identification and evaluation of suitable habitat for the western yellow-billed cuckoo.	May affect but are not likely to adversely affect. No effect on proposed critical habitat (Riparian conservation areas are excluded.)	Riparian habitat is an exclusion area. Implementation of design features and SOPs.
Prescribed Fire	Mortality or injury. Removal of vegetation for prey species.	Conservation Measure Cuckoo 1—No treatments would occur within 0.5 mile of proposed yellow-billed cuckoo critical habitat. Conservation Measure Cuckoo 3— Prescribed fire would not be used within 0.5 mile of suitable yellow-billed cuckoo habitat. Suitable yellow-billed cuckoo habitat will be determined using the Utah Field Office August 2017 Guidelines for the identification of suitable habitat for the western yellow-billed cuckoo.	May affect but are not likely to adversely affect. No effect on proposed critical habitat (Riparian conservation areas are excluded.)	Treatment method would not be used within 0.5 miles of suitable or proposed critical yellow-billed cuckoo habitat (Design Feature 56). Riparian habitat is an exclusion area. Implementation of design features and SOPs.

Treatment Method	Potential Direct and Indirect Effects to Yellow-Billed Cuckoo	Conservation Measures and Design Features for Avoiding or Reducing Adverse Effects	Effects Determination for Treatment Method	Rationale for the Effects Determination
Revegetation	Disturbance from human presence and use of tools or equipment. Trampling of prey. Improved habitat for upland prey species.	• Design Feature 54— No treatments would occur within 0.5 mile of proposed yellow-billed cuckoo critical habitat. • Design Feature 55—Mechanical, chemical, or manual treatments would not occur during the yellow-billed cuckoo nesting season (June 1- August 31) within 0.5 mile of occupied suitable critical yellow-billed cuckoo habitat. Specific dates and buffer distances for the seasonal restrictions may be determined in coordination with the local USFWS Ecological Field Services Office, and should be based on species, variations in nesting chronology of particular species locally, topographic considerations, such as an intervening ridge between the treatment activities and a nest, or other factors that are biologically reasonable. Further, occupied suitable yellow-billed cuckoo habitat will be determined using the Utah Field Office August 2017 Guidelines for the identification and evaluation of suitable habitat for the western yellow-billed cuckoo.	May affect but are not likely to adversely affect. No effect on proposed critical habitat (Riparian conservation areas are excluded.)	Riparian habitat is an exclusion area. Implementation of design features and SOPs.
Targeted Grazing	Disturbance from human and livestock presence. Trampling of prey.	Design Feature 23—Manage targeted grazing to conserve suitable habitat conditions for special status species, while implementing rangeland health standards and guidelines (BLM 2014). Conservation Measure Cuckoo 1—No treatments would occur within 0.5 mile of proposed yellow-billed cuckoo critical habitat.	May affect but are not likely to adversely affect. No effect on proposed critical habitat (Riparian conservation areas are excluded.)	Riparian habitat is an exclusion area. Implementation of design features and SOPs.

C.9 SOUTHWESTERN WILLOW FLYCATCHER

Treatment Method	Potential Direct and Indirect Effects to Southwestern Willow Flycatcher	Conservation Measures and Design Features for Avoiding or Reducing Adverse Effects	Effects Determination for Treatment Method	Rationale for the Effects Determination
Chemical Treatments	Disturbance from human presence and use of tools or equipment. Contact with sprayed foliage or consumption of contaminated prey.	Conservation Measure Flycatcher 1—Aerial application of chemicals would not occur during the southwestern willow flycatcher breeding season (April 15 to August 15) within 0.5 mile of suitable southwestern willow flycatcher habitat. Conservation Measure Flycatcher 2—Mechanical treatments, ground-based broadcast application of herbicides, or cutting of noxious or invasive woody species would not occur during the southwestern willow flycatcher breeding season within 0.5 mile of suitable habitat southwestern willow flycatcher habitat. Conservation Measure Flycatcher 5—Avoid treatments in more than 25 percent of a suitable habitat patches for southwestern willow-flycatchers in any given year. Conservation Measure Flycatcher 6— • Closely follow all application instructions and use restrictions on herbicide labels. • Do not use 2,4-D in least southwestern willow flycatcher habitat; do not broadcast spray 2,4-D within ¼ mile of southwestern willow flycatcher habitat. • Avoid use of the following herbicides in or adjacent to southwestern willow flycatcher habitat: bromacil, clopyralid, diquat, diuron, glyphosate, hexazinone, imazapyr, metsulfuron methyl, picloram, tebuthiuron, and triclopyr. • Do not broadcast spray clopyralid, diquat, diuron, glyphosate, hexazinone, picloram, or triclopyr in southwestern willow flycatcher habitat; do not broadcast spray these herbicides in areas adjacent to southwestern willow flycatcher habitat under conditions when spray drift onto the habitat is likely.	May affect but are not likely to adversely affect.	Riparian habitat is an exclusion area. Implementation of design features and SOPs.

Treatment Method	Potential Direct and Indirect Effects to Southwestern Willow Flycatcher	Conservation Measures and Design Features for Avoiding or Reducing Adverse Effects	Effects Determination for Treatment Method	Rationale for the Effects Determination
Chemical Treatments *(continued)*	*(see above)*	• If broadcast spraying imazapyr or metsulfuron methyl in or adjacent to southwestern willow flycatcher habitat, apply at the typical, rather than the maximum, application rate. • If conducting manual spot applications of glyphosate, hexazinone, or triclopyr to vegetation in or adjacent to southwestern willow flycatcher habitat, utilize the typical, rather than the maximum, application rate.	*(see above)*	*(see above)*
Manual Methods	Disturbance from human presence and use of tools or equipment.	Conservation Measure Flycatcher 2—Mechanical treatments, ground-based broadcast application of herbicides, or cutting of noxious or invasive woody species would not occur during the southwestern willow flycatcher breeding season within 0.5 mile of suitable habitat southwestern willow flycatcher habitat. Conservation Measure Flycatcher 5—Avoid treatments in more than 25 percent of a suitable habitat patches for southwestern willow-flycatchers in any given year.	May affect but are not likely to adversely affect.	Riparian habitat is an exclusion area. Implementation of design features and SOPs.
Mechanical Methods	Disturbance from human presence and use of tools or equipment.	Conservation Measure Flycatcher 2—Mechanical treatments, ground-based broadcast application of herbicides, or cutting of noxious or invasive woody species would not occur during the southwestern willow flycatcher breeding season within 0.5 mile of suitable habitat southwestern willow flycatcher habitat. Conservation Measure Flycatcher 5—Avoid treatments in more than 25 percent of a suitable habitat patches for southwestern willow-flycatchers in any given year.	May affect but are not likely to adversely affect.	Riparian habitat is an exclusion area. Implementation of design features and SOPs.
Prescribed Fire	Mortality or injury. Removal of vegetation for prey species.	Conservation Measure Flycatcher 3—Prescribed fire would not be used within 0.5 mile of suitable southwestern willow flycatcher habitat. Conservation Measure Flycatcher 5—Avoid treatments in more than 25 percent of a suitable habitat patches for southwestern willow-flycatchers in any given year.	May affect but are not likely to adversely affect.	Riparian habitat is an exclusion area. Implementation of design features and SOPs.

Treatment Method	Potential Direct and Indirect Effects to Southwestern Willow Flycatcher	Conservation Measures and Design Features for Avoiding or Reducing Adverse Effects	Effects Determination for Treatment Method	Rationale for the Effects Determination
Revegetation	Disturbance from human presence and use of tools or equipment. Trampling of prey. Improved habitat for upland prey species.	Conservation Measure Flycatcher 2—Mechanical treatments, ground-based broadcast application of herbicides, or cutting of noxious or invasive woody species would not occur during the southwestern willow flycatcher breeding season within 0.5 mile of suitable habitat southwestern willow flycatcher habitat. Conservation Measure Flycatcher 5—Avoid treatments in more than 25 percent of a suitable habitat patches for southwestern willow-flycatchers in any given year.	May affect but are not likely to adversely affect.	Riparian habitat is an exclusion area. Implementation of design features and SOPs.
Targeted Grazing	Disturbance from human and livestock presence. Trampling of prey. Facilitation of brood parasitism by brown-headed cowbirds	Conservation Measure Flycatcher 4—No targeted grazing will be implemented within 12 mi of suitable southwestern willow flycatcher habitat or final critical habitat during the southwestern willow flycatcher breeding season. Conservation Measure Flycatcher 5—Avoid treatments in more than 25 percent of a suitable habitat patches for southwestern willow-flycatchers in any given year.	May affect but are not likely to adversely affect.	Riparian habitat is an exclusion area. Implementation of design features and SOPs.

C.10 PLANTS: EFFECTS COMMON TO ALL

Treatment Method	Potential Direct and Indirect Effects	Conservation Measures and Design Features for Avoiding or Reducing Adverse Effects	Effects Determination for Treatment Method	Rationale for the Effects Determination
All Treatment Methods	See potential effects by individual treatment methods below.	• Design Feature 4: Apply restrictions and design features. Develop resource-specific buffer distances and apply seasonal restrictions. • Design Feature 7: Fuel breaks would be constructed where vegetation disturbance by wildland fire or surface-disturbing activities has already occurred. • Design Feature 9: All project personnel would be required to attend an environmental training prior to initiating project construction. The training would address environmental concerns and stipulations and requirements for compliance with the project. • Design Feature 11: During times of high fire danger, all equipment would be equipped with a functional spark arrestor. Operators would be required to have, at a minimum, a shovel and a working fire extinguisher on hand. • Design Feature 22: Provide adequate rest from livestock grazing. • Design Feature 25: Incorporate noxious and invasive weed management. • Design Feature 26: Thresholds and responses for noxious weeds and invasive plants will be included in fuel break implementation and monitoring plans. • Design Feature 28: Appropriate perennial forbs and grasses would be applied when appropriate to facilitate establishment of vegetation. • Design Feature 36: Minimize ground-disturbing treatments in areas with highly erosive soils. • Design Feature 37: Avoid or minimize ground-disturbing activities when soils are saturated. • Design Feature 38: Use best management practices and soil conservation practices to minimize sediment discharge into water resources.	See determinations for individual treatment methods below.	After implementation design features and conservation measures, the potential for adverse effects on most ESA-listed plant species is anticipated to be low enough to be discountable.

Treatment Method	Potential Direct and Indirect Effects	Conservation Measures and Design Features for Avoiding or Reducing Adverse Effects	Effects Determination for Treatment Method	Rationale for the Effects Determination
All Treatment Methods *(continued)*	*(see above)*	• Design Feature 39: Avoid excessive compaction, rutting, or damage to the soil surface layer. • Design Feature 40: Treatment methods involving equipment generally would not be applied on slopes exceeding 35 percent. • Design Feature 41: Bare soil portions of fuel breaks would not exceed 25 feet on either side of the roadway. • Design Feature 42: Conduct appropriately timed surveys within suitable or potential habitats for federally listed, proposed, and BLM special status species before treatment. For plant species, appropriate timing may vary by species but is directly related to phenological stages (for example flowering or fruiting stages) that provide confidence in identification. • Design Feature 43: Implement restrictions and conservation strategies for special status species, including federally listed, proposed, candidate, and BLM sensitive species	*(see above)*	*(see above)*
Chemical Treatments	Mortality or adverse health effects from unintended contact with chemicals Injury or mortality from trampling of undetected plants or seeds Adverse effects to pollinators Vegetation structure or composition alterations	• Design features for all treatment types listed above would apply. • Conservation Measure Listed Plants 1—The conservation measures contained in the biological assessments for Vegetation Treatments using Herbicides on Bureau of Land Management Lands in 17 Western States Programmatic Environmental Impact Statement (BLM 2007, pp. 4-129 to 4-130) and the 2016 Final PEIS for Vegetation Treatments Using Aminopyralid, Fluroxypyr, and Rimsulfuron on BLM Lands in 17 Western States (BLM 2015, Appendix B-2) would be implemented.	May affect but are not likely to adversely affect.	After implementation design features and conservation measures, the potential for adverse effects on most ESA-listed plant species is anticipated to be low enough to be discountable.

Treatment Method	Potential Direct and Indirect Effects	Conservation Measures and Design Features for Avoiding or Reducing Adverse Effects	Effects Determination for Treatment Method	Rationale for the Effects Determination
Manual Methods	Surface disturbance Injury or mortality of undetected plants or seeds Vegetation structure or composition alterations	• Design features for all treatment types listed above would apply.	May affect but are not likely to adversely affect	After implementation design features and conservation measures, the potential for adverse effects on most ESA-listed plant species is anticipated to be low enough to be discountable.
Mechanical Methods	Surface disturbance Injury or mortality of undetected plants or seeds Vegetation structure or composition alterations	• Design features for all treatment types listed above would apply.	May affect but are not likely to adversely affect	After implementation design features and conservation measures, the potential for adverse effects on most ESA-listed plant species is anticipated to be low enough to be discountable.
Prescribed Fire	Injury or mortality of undetected plants or seeds Alteration of soil properties and thus growth conditions Vegetation structure or composition alterations Improved seed bed conditions for revegetation	• Design features for all treatment types listed above would apply.	May affect but are not likely to adversely affect	After implementation design features and conservation measures, the potential for adverse effects on most ESA-listed plant species is anticipated to be low enough to be discountable.
Revegetation	Injury or mortality of undetected plants or seeds Increased competition for resources Increased habitat suitability for pollinators	• Design features for all treatment types listed above would apply.	May affect but are not likely to adversely affect	After implementation design features and conservation measures, the potential for adverse effects on most ESA-listed plant species is anticipated to be low enough to be discountable.

Treatment Method	Potential Direct and Indirect Effects	Conservation Measures and Design Features for Avoiding or Reducing Adverse Effects	Effects Determination for Treatment Method	Rationale for the Effects Determination
Targeted Grazing	Injury or mortality of undetected plants or seeds	• Design features for all treatment types listed above would apply. • Design Feature 21: Before targeted grazing begins, complete a targeted grazing plan that optimizes successful reduction or eradication of the target nonnative species, while avoiding damaging native desired plants. • Design Feature 23: Manage targeted grazing to conserve suitable habitat conditions for special status species, while implementing rangeland health standards and guidelines (BLM 2014). • Design Feature 24: Implement a Graduated Use Plan.	May affect but are not likely to adversely affect	After implementation design features and conservation measures, the potential for adverse effects on most ESA-listed plant species is anticipated to be low enough to be discountable.

C.11 Barneby Reed-mustard

Habitat for Barneby reed-mustard qualifies as an analysis exclusion area. The potential that the proposed action would have direct adverse effects on ESA-listed plant species that occur in Analysis Exclusion Areas would be low enough to be discountable.

Treatment Method	Potential Direct and Indirect Effects to Barneby Reed-mustard	Conservation Measures and Design Features for Avoiding or Reducing Adverse Effects	Effects Determination for Treatment Method	Rationale for the Effects Determination
Chemical Treatments	Effects common to all Habitat alterations for ground-dwelling pollinators	• Design features and conservation measures for ESA-listed plant species would apply • Conservation Measure Barneby Reed-Mustard 1—Establish a treatment avoidance buffer around individuals or populations to protect pollinator habitat. Individuals or populations would be avoided with a treatment buffer of 1,640 feet (Dawson 2012).	May affect but are not likely to adversely affect.	After implementation of design features, conservation measures, and avoidance measures, the potential for adverse effects would be low enough to be discountable.

Treatment Method	Potential Direct and Indirect Effects to Barneby Reed-mustard	Conservation Measures and Design Features for Avoiding or Reducing Adverse Effects	Effects Determination for Treatment Method	Rationale for the Effects Determination
Manual Methods	Effects common to all Habitat alterations for ground-dwelling pollinators	• Design features and conservation measures for ESA-listed plant species would apply • Conservation Measure Barneby Reed-Mustard 1—Establish a treatment avoidance buffer around individuals or populations to protect pollinator habitat. Individuals or populations would be avoided with a treatment buffer of 1,640 feet (Dawson 2012).	May affect but are not likely to adversely affect.	After implementation of design features, conservation measures, and avoidance measures, the potential for adverse effects would be low enough to be discountable.
Mechanical Methods	Effects common to all Habitat alterations for ground-dwelling pollinators	• Design features and conservation measures for ESA-listed plant species would apply • Conservation Measure Barneby Reed-Mustard 1—Establish a treatment avoidance buffer around individuals or populations to protect pollinator habitat. Individuals or populations would be avoided with a treatment buffer of 1,640 feet (Dawson 2012).	May affect but are not likely to adversely affect.	After implementation of design features, conservation measures, and avoidance measures, the potential for adverse effects would be low enough to be discountable.
Prescribed Fire	Effects common to all Habitat loss for ground-dwelling pollinators	• Design features and conservation measures for ESA-listed plant species would apply • Conservation Measure Barneby Reed-Mustard 1—Establish a treatment avoidance buffer around individuals or populations to protect pollinator habitat. Individuals or populations would be avoided with a treatment buffer of 1,640 feet (Dawson 2012).	May affect but are not likely to adversely affect.	After implementation of design features, conservation measures, and avoidance measures, the potential for adverse effects would be low enough to be discountable.
Revegetation	Effects common to all Habitat alterations for ground-dwelling pollinators	• Design features and conservation measures for ESA-listed plant species would apply • Conservation Measure Barneby Reed-Mustard 1—Establish a treatment avoidance buffer around individuals or populations to protect pollinator habitat. Individuals or populations would be avoided with a treatment buffer of 1,640 feet (Dawson 2012).	May affect but are not likely to adversely affect.	After implementation of design features, conservation measures, and avoidance measures, the potential for adverse effects would be low enough to be discountable.
Targeted Grazing	Effects common to all Habitat alterations for ground-dwelling pollinators	• Design features and conservation measures for ESA-listed plant species would apply • Conservation Measure Barneby Reed-Mustard 1—Establish a treatment avoidance buffer around individuals or populations to protect pollinator habitat. Individuals or populations would be avoided with a treatment buffer of 1,640 feet (Dawson 2012).	May affect but are not likely to adversely affect.	After implementation of design features, conservation measures, and avoidance measures, the potential for adverse effects would be low enough to be discountable.

C.12 CLAY/ATWOOD'S PHACELIA

Habitat for Clay/Atwoods's phacelia qualifies as an analysis exclusion area. The potential that the proposed action would have direct adverse effects on ESA-listed plant species that occur in Analysis Exclusion Areas would be low enough to be discountable.

Treatment Method	Potential Direct and Indirect Effects to Clay/Atwood's Phacelia	Conservation Measures and Design Features for Avoiding or Reducing Adverse Effects	Effects Determination for Treatment Method	Rationale for the Effects Determination
Chemical Treatments	Effects common to all Habitat alterations for ground-dwelling pollinators	• Design features and conservation measures for ESA-listed plant species would apply • Conservation Measure Clay Phacelia 1—Establish a treatment avoidance buffer around individuals or populations to protect pollinator habitat. Individuals or populations would be avoided with a treatment buffer of 1,640 feet (Dawson 2012).	May affect but are not likely to adversely affect.	After implementation of design features, conservation measures, and avoidance measures, the potential for adverse effects would be low enough to be discountable.
Manual Methods	Effects common to all Habitat alterations for ground-dwelling pollinators	• Design features and conservation measures for ESA-listed plant species would apply • Conservation Measure Clay Phacelia 1—Establish a treatment avoidance buffer around individuals or populations to protect pollinator habitat. Individuals or populations would be avoided with a treatment buffer of 1,640 feet (Dawson 2012).	May affect but are not likely to adversely affect.	After implementation of design features, conservation measures, and avoidance measures, the potential for adverse effects would be low enough to be discountable.
Mechanical Methods	Effects common to all Habitat alterations for ground-dwelling pollinators	• Design features and conservation measures for ESA-listed plant species would apply • Conservation Measure Clay Phacelia 1—Establish a treatment avoidance buffer around individuals or populations to protect pollinator habitat. Individuals or populations would be avoided with a treatment buffer of 1,640 feet (Dawson 2012).	May affect but are not likely to adversely affect.	After implementation of design features, conservation measures, and avoidance measures, the potential for adverse effects would be low enough to be discountable.
Prescribed Fire	Effects common to all Habitat alterations for ground-dwelling pollinators	• Design features and conservation measures for ESA-listed plant species would apply • Conservation Measure Clay Phacelia 1—Establish a treatment avoidance buffer around individuals or populations to protect pollinator habitat. Individuals or populations would be avoided with a treatment buffer of 1,640 feet (Dawson 2012).	May affect but are not likely to adversely affect.	After implementation of design features, conservation measures, and avoidance measures, the potential for adverse effects would be low enough to be discountable.

Treatment Method	Potential Direct and Indirect Effects to Clay/Atwood's Phacelia	Conservation Measures and Design Features for Avoiding or Reducing Adverse Effects	Effects Determination for Treatment Method	Rationale for the Effects Determination
Revegetation	Effects common to all Habitat alterations for ground-dwelling pollinators	• Design features and conservation measures for ESA-listed plant species would apply • Conservation Measure Clay Phacelia 1—Establish a treatment avoidance buffer around individuals or populations to protect pollinator habitat. Individuals or populations would be avoided with a treatment buffer of 1,640 feet (Dawson 2012).	May affect but are not likely to adversely affect.	After implementation of design features, conservation measures, and avoidance measures, the potential for adverse effects would be low enough to be discountable.
Targeted Grazing	Effects common to all Habitat alterations for ground-dwelling pollinators	• Design features and conservation measures for ESA-listed plant species would apply • Conservation Measure Clay Phacelia 1—Establish a treatment avoidance buffer around individuals or populations to protect pollinator habitat. Individuals or populations would be avoided with a treatment buffer of 1,640 feet (Dawson 2012). • Conservation Measure Clay Phacelia 2—To protect this species from adverse effects from livestock grazing, temporary fencing to prevent livestock entry would be placed ¼-mile from individuals or populations within the graduated use area for targeted grazing treatment areas.	May affect but are not likely to adversely affect.	After implementation of design features, conservation measures, and avoidance measures, the potential for adverse effects would be low enough to be discountable.

C.13 CLAY REED-MUSTARD

Habitat for Clay reed-mustard qualifies as an analysis exclusion area. The potential that the proposed action would have direct adverse effects on ESA-listed plant species that occur in Analysis Exclusion Areas would be low enough to be discountable.

Treatment Method	Potential Direct and Indirect Effects to Clay Reed-mustard	Conservation Measures and Design Features for Avoiding or Reducing Adverse Effects	Effects Determination for Treatment Method	Rationale for the Effects Determination
Chemical Treatments	Effects Common to All Habitat alterations for ground-dwelling pollinators	• Design features and conservation measures for ESA-listed plant species would apply • Conservation Measure Clay Reed-Mustard 1—Site inventories would be conducted within suitable habitat to determine occupancy. Where standard surveys are technically infeasible and otherwise hazardous due to topography, slope, etc., suitable habitat would be assessed and mapped for avoidance; in such cases, 300-foot avoidance buffers would be maintained between surface disturbance and avoidance areas. However, site specific distances would be approved by USFWS and BLM when disturbance would occur upslope of habitat. To avoid water flow and/or sedimentation into occupied habitat and avoidance areas, silt fences, hay bales, and similar structures or practices would be incorporated into the project design. • Conservation Measure Clay Reed-Mustard 2—Establish a treatment avoidance buffer around individuals or populations to protect pollinator habitat. Individuals or populations would be avoided with a treatment buffer of 1,640 feet (Dawson 2012).	May affect but are not likely to adversely affect.	-

Treatment Method	Potential Direct and Indirect Effects to Clay Reed-mustard	Conservation Measures and Design Features for Avoiding or Reducing Adverse Effects	Effects Determination for Treatment Method	Rationale for the Effects Determination
Manual Methods	Effects Common to All Habitat alterations for ground-dwelling pollinators	• Design features and conservation measures for ESA-listed plant species would apply • Conservation Measure Clay Reed-Mustard 1—Site inventories would be conducted within suitable habitat to determine occupancy. Where standard surveys are technically infeasible and otherwise hazardous due to topography, slope, etc., suitable habitat would be assessed and mapped for avoidance; in such cases, 300-foot avoidance buffers would be maintained between surface disturbance and avoidance areas. However, site specific distances would be approved by USFWS and BLM when disturbance would occur upslope of habitat. To avoid water flow and/or sedimentation into occupied habitat and avoidance areas, silt fences, hay bales, and similar structures or practices would be incorporated into the project design. • Conservation Measure Clay Reed-Mustard 2—Establish a treatment avoidance buffer around individuals or populations to protect pollinator habitat. Individuals or populations would be avoided with a treatment buffer of 1,640 feet (Dawson 2012).	May affect but are not likely to adversely affect.	After implementation of design features, conservation measures, and avoidance measures, the potential for adverse effects would be low enough to be discountable.

Treatment Method	Potential Direct and Indirect Effects to Clay Reed-mustard	Conservation Measures and Design Features for Avoiding or Reducing Adverse Effects	Effects Determination for Treatment Method	Rationale for the Effects Determination
Mechanical Methods	Effects Common to All Habitat alterations for ground-dwelling pollinators	• Design features and conservation measures for ESA-listed plant species would apply • Conservation Measure Clay Reed-Mustard 1—Site inventories would be conducted within suitable habitat to determine occupancy. Where standard surveys are technically infeasible and otherwise hazardous due to topography, slope, etc., suitable habitat would be assessed and mapped for avoidance; in such cases, 300-foot avoidance buffers would be maintained between surface disturbance and avoidance areas. However, site specific distances would be approved by USFWS and BLM when disturbance would occur upslope of habitat. To avoid water flow and/or sedimentation into occupied habitat and avoidance areas, silt fences, hay bales, and similar structures or practices would be incorporated into the project design. • Conservation Measure Clay Reed-Mustard 2—Establish a treatment avoidance buffer around individuals or populations to protect pollinator habitat. Individuals or populations would be avoided with a treatment buffer of 1,640 feet (Dawson 2012).	May affect but are not likely to adversely affect.	After implementation of design features, conservation measures, and avoidance measures, the potential for adverse effects would be low enough to be discountable.

Treatment Method	Potential Direct and Indirect Effects to Clay Reed-mustard	Conservation Measures and Design Features for Avoiding or Reducing Adverse Effects	Effects Determination for Treatment Method	Rationale for the Effects Determination
Prescribed Fire	Effects Common to All Habitat alterations for ground-dwelling pollinators	• Design features and conservation measures for ESA-listed plant species would apply • Conservation Measure Clay Reed-Mustard 1—Site inventories would be conducted within suitable habitat to determine occupancy. Where standard surveys are technically infeasible and otherwise hazardous due to topography, slope, etc., suitable habitat would be assessed and mapped for avoidance; in such cases, 300-foot avoidance buffers would be maintained between surface disturbance and avoidance areas. However, site specific distances would be approved by USFWS and BLM when disturbance would occur upslope of habitat. To avoid water flow and/or sedimentation into occupied habitat and avoidance areas, silt fences, hay bales, and similar structures or practices would be incorporated into the project design. • Conservation Measure Clay Reed-Mustard 2—Establish a treatment avoidance buffer around individuals or populations to protect pollinator habitat. Individuals or populations would be avoided with a treatment buffer of 1,640 feet (Dawson 2012).	May affect but are not likely to adversely affect.	After implementation of design features, conservation measures, and avoidance measures, the potential for adverse effects would be low enough to be discountable.

Treatment Method	Potential Direct and Indirect Effects to Clay Reed-mustard	Conservation Measures and Design Features for Avoiding or Reducing Adverse Effects	Effects Determination for Treatment Method	Rationale for the Effects Determination
Revegetation	Effects Common to All Habitat alterations for ground-dwelling pollinators	• Design features and conservation measures for ESA-listed plant species would apply • Conservation Measure Clay Reed-Mustard 1—Site inventories would be conducted within suitable habitat to determine occupancy. Where standard surveys are technically infeasible and otherwise hazardous due to topography, slope, etc., suitable habitat would be assessed and mapped for avoidance; in such cases, 300-foot avoidance buffers would be maintained between surface disturbance and avoidance areas. However, site specific distances would be approved by USFWS and BLM when disturbance would occur upslope of habitat. To avoid water flow and/or sedimentation into occupied habitat and avoidance areas, silt fences, hay bales, and similar structures or practices would be incorporated into the project design. • Conservation Measure Clay Reed-Mustard 2—Establish a treatment avoidance buffer around individuals or populations to protect pollinator habitat. Individuals or populations would be avoided with a treatment buffer of 1,640 feet (Dawson 2012).	May affect but are not likely to adversely affect.	After implementation of design features, conservation measures, and avoidance measures, the potential for adverse effects would be low enough to be discountable.

Treatment Method	Potential Direct and Indirect Effects to Clay Reed-mustard	Conservation Measures and Design Features for Avoiding or Reducing Adverse Effects	Effects Determination for Treatment Method	Rationale for the Effects Determination
Targeted Grazing	Effects Common to All Habitat alterations for ground-dwelling pollinators	• Design features and conservation measures for ESA-listed plant species would apply • Conservation Measure Clay Reed-Mustard 1—Site inventories would be conducted within suitable habitat to determine occupancy. Where standard surveys are technically infeasible and otherwise hazardous due to topography, slope, etc., suitable habitat would be assessed and mapped for avoidance; in such cases, 300-foot avoidance buffers would be maintained between surface disturbance and avoidance areas. However, site specific distances would be approved by USFWS and BLM when disturbance would occur upslope of habitat. To avoid water flow and/or sedimentation into occupied habitat and avoidance areas, silt fences, hay bales, and similar structures or practices would be incorporated into the project design. • Conservation Measure Clay Reed-Mustard 2—Establish a treatment avoidance buffer around individuals or populations to protect pollinator habitat. Individuals or populations would be avoided with a treatment buffer of 1,640 feet (Dawson 2012).	May affect but are not likely to adversely affect.	After implementation of design features, conservation measures, and avoidance measures, the potential for adverse effects would be low enough to be discountable.

C.14 Jones Cycladenia

Treatment Method	Potential Direct and Indirect Effects to Jones Cycladenia	Conservation Measures and Design Features for Avoiding or Reducing Adverse Effects	Effects Determination for Treatment Method	Rationale for the Effects Determination
Chemical Treatments	Effects common to all Habitat alterations for pollinators	• Design features and conservation measures for ESA-listed plant species would apply • Conservation Measure Jones Cycladenia 1—Establish a treatment avoidance buffer around individuals or populations to protect pollinator habitat. Individuals or populations would be avoided with a treatment buffer of 1,640 feet (Dawson 2012).	May affect but are not likely to adversely affect.	After implementation of design features, conservation measures, and avoidance measures, the potential for adverse effects would be low enough to be discountable.
Manual Methods	Effects common to all Habitat alterations for pollinators	• Design features and conservation measures for ESA-listed plant species would apply • Conservation Measure Jones Cycladenia 1—Establish a treatment avoidance buffer around individuals or populations to protect pollinator habitat. Individuals or populations would be avoided with a treatment buffer of 1,640 feet (Dawson 2012).	May affect but are not likely to adversely affect.	After implementation of design features, conservation measures, and avoidance measures, the potential for adverse effects would be low enough to be discountable.
Mechanical Methods	Effects common to all Habitat alterations for pollinators	• Design features and conservation measures for ESA-listed plant species would apply • Conservation Measure Jones Cycladenia 1—Establish a treatment avoidance buffer around individuals or populations to protect pollinator habitat. Individuals or populations would be avoided with a treatment buffer of 1,640 feet (Dawson 2012).	May affect but are not likely to adversely affect.	After implementation of design features, conservation measures, and avoidance measures, the potential for adverse effects would be low enough to be discountable.
Prescribed Fire	Effects common to all Habitat alterations for pollinators	• Design features and conservation measures for ESA-listed plant species would apply • Conservation Measure Jones Cycladenia 1—Establish a treatment avoidance buffer around individuals or populations to protect pollinator habitat. Individuals or populations would be avoided with a treatment buffer of 1,640 feet (Dawson 2012).	May affect but are not likely to adversely affect.	After implementation of design features, conservation measures, and avoidance measures, the potential for adverse effects would be low enough to be discountable.

Treatment Method	Potential Direct and Indirect Effects to Jones Cycladenia	Conservation Measures and Design Features for Avoiding or Reducing Adverse Effects	Effects Determination for Treatment Method	Rationale for the Effects Determination
Revegetation	Effects common to all Habitat alterations for pollinators	• Design features and conservation measures for ESA-listed plant species would apply • Conservation Measure Jones Cycladenia 1—Establish a treatment avoidance buffer around individuals or populations to protect pollinator habitat. Individuals or populations would be avoided with a treatment buffer of 1,640 feet (Dawson 2012).	May affect but are not likely to adversely affect.	After implementation of design features, conservation measures, and avoidance measures, the potential for adverse effects would be low enough to be discountable.
Targeted Grazing	Effects common to all Habitat alterations for pollinators	• Design features and conservation measures for ESA-listed plant species would apply • Conservation Measure Jones Cycladenia 1—Establish a treatment avoidance buffer around individuals or populations to protect pollinator habitat. Individuals or populations would be avoided with a treatment buffer of 1,640 feet (Dawson 2012).	May affect but are not likely to adversely affect.	After implementation of design features, conservation measures, and avoidance measures, the potential for adverse effects would be low enough to be discountable.

C.15 Kodachrome Bladderpod

Habitat for Kodachrome bladderpod qualifies as an analysis exclusion area. The potential that the proposed action would have direct adverse effects on ESA-listed plant species that occur in Analysis Exclusion Areas would be low enough to be discountable

Treatment Method	Potential Direct and Indirect Effects to Kodachrome Bladderpod	Conservation Measures and Design Features for Avoiding or Reducing Adverse Effects	Effects Determination for Treatment Method	Rationale for the Effects Determination
Chemical Treatments	Effects common to all Habitat alterations for pollinators	• Design features and conservation measures for ESA-listed plant species would apply • Conservation Measure Kodachrome Bladderpod 1—Establish a treatment avoidance buffer around individuals or populations to protect pollinator habitat. Individuals or populations would be avoided with a treatment buffer of 1,640 feet (Dawson 2012).	May affect but are not likely to adversely affect.	After implementation of design features and conservation measures, the potential for adverse effects would be low enough to be discountable.

Treatment Method	Potential Direct and Indirect Effects to Kodachrome Bladderpod	Conservation Measures and Design Features for Avoiding or Reducing Adverse Effects	Effects Determination for Treatment Method	Rationale for the Effects Determination
Manual Methods	Effects common to all Habitat alterations for pollinators	• Design features and conservation measures for ESA-listed plant species would apply • Conservation Measure Kodachrome Bladderpod 1—Establish a treatment avoidance buffer around individuals or populations to protect pollinator habitat. Individuals or populations would be avoided with a treatment buffer of 1,640 feet (Dawson 2012).	May affect but are not likely to adversely affect.	After implementation of design features and conservation measures, the potential for adverse effects would be low enough to be discountable.
Mechanical Methods	Effects common to all Habitat alterations for pollinators	• Design features and conservation measures for ESA-listed plant species would apply • Conservation Measure Kodachrome Bladderpod 1—Establish a treatment avoidance buffer around individuals or populations to protect pollinator habitat. Individuals or populations would be avoided with a treatment buffer of 1,640 feet (Dawson 2012).	May affect but are not likely to adversely affect.	After implementation of design features and conservation measures, the potential for adverse effects would be low enough to be discountable.
Prescribed Fire	Effects common to all Habitat alterations for pollinators	• Design features and conservation measures for ESA-listed plant species would apply • Conservation Measure Kodachrome Bladderpod 1—Establish a treatment avoidance buffer around individuals or populations to protect pollinator habitat. Individuals or populations would be avoided with a treatment buffer of 1,640 feet (Dawson 2012).	May affect but are not likely to adversely affect.	After implementation of design features and conservation measures, the potential for adverse effects would be low enough to be discountable.
Revegetation	Effects common to all Habitat alterations for pollinators	• Design features and conservation measures for ESA-listed plant species would apply • Conservation Measure Kodachrome Bladderpod 1—Establish a treatment avoidance buffer around individuals or populations to protect pollinator habitat. Individuals or populations would be avoided with a treatment buffer of 1,640 feet (Dawson 2012).	May affect but are not likely to adversely affect.	After implementation of design features and conservation measures, the potential for adverse effects would be low enough to be discountable.

Treatment Method	Potential Direct and Indirect Effects to Kodachrome Bladderpod	Conservation Measures and Design Features for Avoiding or Reducing Adverse Effects	Effects Determination for Treatment Method	Rationale for the Effects Determination
Targeted Grazing	Effects common to all Habitat alterations for pollinators	• Design features and conservation measures for ESA-listed plant species would apply • Conservation Measure Kodachrome Bladderpod 1—Establish a treatment avoidance buffer around individuals or populations to protect pollinator habitat. Individuals or populations would be avoided with a treatment buffer of 1,640 feet (Dawson 2012). • Conservation Measure Kodachrome Bladderpod 2—To protect this species from adverse effects from livestock grazing, temporary fencing to prevent livestock entry would be placed ¼-mile from individuals or populations within the graduated use area for targeted grazing treatment areas.	May affect but are not likely to adversely affect.	After implementation of design features and conservation measures, the potential for adverse effects would be low enough to be discountable.

C.16 Last Chance Townsendia

Treatment Method	Potential Direct and Indirect Effects to Last Chance Townsendia	Conservation Measures and Design Features for Avoiding or Reducing Adverse Effects	Effects Determination for Treatment Method	Rationale for the Effects Determination
Chemical Treatments	Effects common to all Habitat alterations for ground-dwelling pollinators	• Design features and conservation measures for ESA-listed plant species would apply • Conservation Measure Last Chance Townsendia 1—Establish a treatment avoidance buffer around individuals or populations to protect pollinator habitat. Individuals or populations would be avoided with a treatment buffer of 1,640 feet (Dawson 2012).	May affect but are not likely to adversely affect.	After implementation of design features and conservation measures, the potential for adverse effects would be low enough to be discountable.

Treatment Method	Potential Direct and Indirect Effects to Last Chance Townsendia	Conservation Measures and Design Features for Avoiding or Reducing Adverse Effects	Effects Determination for Treatment Method	Rationale for the Effects Determination
Manual Methods	Effects common to all Habitat alterations for ground-dwelling pollinators	• Design features and conservation measures for ESA-listed plant species would apply • Conservation Measure Last Chance Townsendia 1—Establish a treatment avoidance buffer around individuals or populations to protect pollinator habitat. Individuals or populations would be avoided with a treatment buffer of 1,640 feet (Dawson 2012).	May affect but are not likely to adversely affect.	After implementation of design features and conservation measures, the potential for adverse effects would be low enough to be discountable.
Mechanical Methods	Effects common to all Habitat alterations for ground-dwelling pollinators	• Design features and conservation measures for ESA-listed plant species would apply • Conservation Measure Last Chance Townsendia 1—Establish a treatment avoidance buffer around individuals or populations to protect pollinator habitat. Individuals or populations would be avoided with a treatment buffer of 1,640 feet (Dawson 2012).	May affect but are not likely to adversely affect.	After implementation of design features and conservation measures, the potential for adverse effects would be low enough to be discountable.
Prescribed Fire	Effects common to all Habitat alterations for ground-dwelling pollinators	• Design features and conservation measures for ESA-listed plant species would apply • Conservation Measure Last Chance Townsendia 1—Establish a treatment avoidance buffer around individuals or populations to protect pollinator habitat. Individuals or populations would be avoided with a treatment buffer of 1,640 feet (Dawson 2012).	May affect but are not likely to adversely affect.	After implementation of design features and conservation measures, the potential for adverse effects would be low enough to be discountable.
Revegetation	Effects common to all Habitat alterations for ground-dwelling pollinators	• Design features and conservation measures for ESA-listed plant species would apply • Conservation Measure Last Chance Townsendia 1—Establish a treatment avoidance buffer around individuals or populations to protect pollinator habitat. Individuals or populations would be avoided with a treatment buffer of 1,640 feet (Dawson 2012).	May affect but are not likely to adversely affect.	After implementation of design features and conservation measures, the potential for adverse effects would be low enough to be discountable.

Treatment Method	Potential Direct and Indirect Effects to Last Chance Townsendia	Conservation Measures and Design Features for Avoiding or Reducing Adverse Effects	Effects Determination for Treatment Method	Rationale for the Effects Determination
Targeted Grazing	Effects common to all Habitat alterations for ground-dwelling pollinators	• Design features and conservation measures for ESA-listed plant species would apply • Conservation Measure Last Chance Townsendia 1—Establish a treatment avoidance buffer around individuals or populations to protect pollinator habitat. Individuals or populations would be avoided with a treatment buffer of 1,640 feet (Dawson 2012). • Conservation Measure Last Chance Townsendia 2—To protect this species from adverse effects from livestock grazing, temporary fencing to prevent livestock entry would be placed ¼-mile from individuals or populations within the graduated use area for targeted grazing treatment areas.	May affect but are not likely to adversely affect.	After implementation of design features and conservation measures, the potential for adverse effects would be low enough to be discountable.

C.17 Pariette Cactus

Habitat for Pariette cactus qualifies as an analysis exclusion area. The potential that the proposed action would have direct adverse effects on ESA-listed plant species that occur in Analysis Exclusion Areas would be low enough to be discountable.

Treatment Method	Potential Direct and Indirect Effects to Pariette Cactus	Conservation Measures and Design Features for Avoiding or Reducing Adverse Effects	Effects Determination for Treatment Method	Rationale for the Effects Determination
Chemical Treatments	Effects common to all Habitat alterations for ground-dwelling pollinators	• Design features and conservation measures for ESA-listed plant species would apply • Conservation Measure Pariette Cactus 1—Establish a treatment avoidance buffer around individuals or populations to protect pollinator habitat. Individuals or populations would be avoided with a treatment buffer of 1,640 feet (Dawson 2012).	May affect but are not likely to adversely affect.	After implementation of design features, avoidance measures, and conservation measures, the potential for adverse effects would be low enough to be discountable

Treatment Method	Potential Direct and Indirect Effects to Pariette Cactus	Conservation Measures and Design Features for Avoiding or Reducing Adverse Effects	Effects Determination for Treatment Method	Rationale for the Effects Determination
Manual Methods	Effects common to all Habitat alterations for ground-dwelling pollinators	• Design features and conservation measures for ESA-listed plant species would apply • Conservation Measure Pariette Cactus 1—Establish a treatment avoidance buffer around individuals or populations to protect pollinator habitat. Individuals or populations would be avoided with a treatment buffer of 1,640 feet (Dawson 2012).	May affect but are not likely to adversely affect.	After implementation of design features, avoidance measures, and conservation measures, the potential for adverse effects would be low enough to be discountable
Mechanical Methods	Effects common to all Habitat alterations for ground-dwelling pollinators	• Design features and conservation measures for ESA-listed plant species would apply • Conservation Measure Pariette Cactus 1—Establish a treatment avoidance buffer around individuals or populations to protect pollinator habitat. Individuals or populations would be avoided with a treatment buffer of 1,640 feet (Dawson 2012).	May affect but are not likely to adversely affect.	After implementation of design features, avoidance measures, and conservation measures, the potential for adverse effects would be low enough to be discountable
Prescribed Fire	Effects common to all Habitat alterations for ground-dwelling pollinators	• Design features and conservation measures for ESA-listed plant species would apply • Conservation Measure Pariette Cactus 1—Establish a treatment avoidance buffer around individuals or populations to protect pollinator habitat. Individuals or populations would be avoided with a treatment buffer of 1,640 feet (Dawson 2012).	May affect but are not likely to adversely affect.	After implementation of design features, avoidance measures, and conservation measures, the potential for adverse effects would be low enough to be discountable
Revegetation	Effects common to all Habitat alterations for ground-dwelling pollinators	• Design features and conservation measures for ESA-listed plant species would apply • Conservation Measure Pariette Cactus 1—Establish a treatment avoidance buffer around individuals or populations to protect pollinator habitat. Individuals or populations would be avoided with a treatment buffer of 1,640 feet (Dawson 2012).	May affect but are not likely to adversely affect.	After implementation of design features, avoidance measures, and conservation measures, the potential for adverse effects would be low enough to be discountable

Treatment Method	Potential Direct and Indirect Effects to Pariette Cactus	Conservation Measures and Design Features for Avoiding or Reducing Adverse Effects	Effects Determination for Treatment Method	Rationale for the Effects Determination
Targeted Grazing	Effects common to all Habitat alterations for ground-dwelling pollinators	• Design features and conservation measures for ESA-listed plant species would apply • Conservation Measure Pariette Cactus 1—Establish a treatment avoidance buffer around individuals or populations to protect pollinator habitat. Individuals or populations would be avoided with a treatment buffer of 1,640 feet (Dawson 2012). • Conservation Measure Pariette Cactus 2—To protect this species from adverse effects from livestock grazing, temporary fencing to prevent livestock entry would be placed ¼-mile from individuals or populations within the graduated use area for targeted grazing treatment areas.	May affect but are not likely to adversely affect.	After implementation of design features, avoidance measures, and conservation measures, the potential for adverse effects would be low enough to be discountable

C.18 San Rafael Cactus

Treatment Method	Potential Direct and Indirect Effects to San Rafael Cactus	Conservation Measures and Design Features for Avoiding or Reducing Adverse Effects	Effects Determination for Treatment Method	Rationale for the Effects Determination
Chemical Treatments	Effects common to all Habitat alterations for pollinators	• Design features and conservation measures for ESA-listed plant species would apply • Conservation Measure San Rafael Cactus 1—Establish a treatment avoidance buffer around individuals or populations to protect pollinator habitat. Individuals or populations would be avoided with a treatment buffer of 1,640 feet (Dawson 2012).	May affect but are not likely to adversely affect.	After implementation of design features and conservation measures, the potential for adverse effects would be low enough to be discountable.
Manual Methods	Effects common to all Habitat alterations for pollinators	• Design features and conservation measures for ESA-listed plant species would apply • Conservation Measure San Rafael Cactus 1—Establish a treatment avoidance buffer around individuals or populations to protect pollinator habitat. Individuals or populations would be avoided with a treatment buffer of 1,640 feet (Dawson 2012).	May affect but are not likely to adversely affect.	After implementation of design features and conservation measures, the potential for adverse effects would be low enough to be discountable.

Treatment Method	Potential Direct and Indirect Effects to San Rafael Cactus	Conservation Measures and Design Features for Avoiding or Reducing Adverse Effects	Effects Determination for Treatment Method	Rationale for the Effects Determination
Mechanical Methods	Effects common to all Habitat alterations for pollinators	• Design features and conservation measures for ESA-listed plant species would apply • Conservation Measure San Rafael Cactus 1—Establish a treatment avoidance buffer around individuals or populations to protect pollinator habitat. Individuals or populations would be avoided with a treatment buffer of 1,640 feet (Dawson 2012).	May affect but are not likely to adversely affect.	After implementation of design features and conservation measures, the potential for adverse effects would be low enough to be discountable.
Prescribed Fire	Effects common to all Habitat alterations for pollinators	• Design features and conservation measures for ESA-listed plant species would apply • Conservation Measure San Rafael Cactus 1—Establish a treatment avoidance buffer around individuals or populations to protect pollinator habitat. Individuals or populations would be avoided with a treatment buffer of 1,640 feet (Dawson 2012).	May affect but are not likely to adversely affect.	After implementation of design features and conservation measures, the potential for adverse effects would be low enough to be discountable.
Revegetation	Effects common to all Habitat alterations for pollinators	• Design features and conservation measures for ESA-listed plant species would apply • Conservation Measure San Rafael Cactus 1—Establish a treatment avoidance buffer around individuals or populations to protect pollinator habitat. Individuals or populations would be avoided with a treatment buffer of 1,640 feet (Dawson 2012).	May affect but are not likely to adversely affect.	After implementation of design features and conservation measures, the potential for adverse effects would be low enough to be discountable.
Targeted Grazing	Effects common to all Habitat alterations for pollinators	• Design features and conservation measures for ESA-listed plant species would apply • Conservation Measure San Rafael Cactus 1—Establish a treatment avoidance buffer around individuals or populations to protect pollinator habitat. Individuals or populations would be avoided with a treatment buffer of 1,640 feet (Dawson 2012). • Conservation Measure San Rafael Cactus 2—To protect this species from adverse effects from livestock grazing, temporary fencing to prevent livestock entry would be placed ¼-mile from individuals or populations within the graduated use area for targeted grazing treatment areas.	May affect but are not likely to adversely affect.	After implementation of design features and conservation measures, the potential for adverse effects would be low enough to be discountable.

C.19 Shrubby Reed-mustard

Habitat for Shrubby reed-mustard qualifies as an analysis exclusion area. The potential that the proposed action would have direct adverse effects on ESA-listed plant species that occur in Analysis Exclusion Areas would be low enough to be discountable.

Treatment Method	Potential Direct and Indirect Effects to Shrubby Reed-mustard	Conservation Measures and Design Features for Avoiding or Reducing Adverse Effects	Effects Determination for Treatment Method	Rationale for the Effects Determination
Chemical Treatments	Effects common to all Habitat alterations for ground-dwelling pollinators	• Design features and conservation measures for ESA-listed plant species would apply • Conservation Measure Shrubby Reed-Mustard 1—Establish a treatment avoidance buffer around individuals or populations to protect pollinator habitat. Individuals or populations would be avoided with a treatment buffer of 1,640 feet (Dawson 2012).	May affect but are not likely to adversely affect.	After implementation of design features, avoidance measures, and conservation measures, the potential for adverse effects would be low enough to be discountable
Manual Methods	Effects common to all Habitat alterations for ground-dwelling pollinators	• Design features and conservation measures for ESA-listed plant species would apply • Conservation Measure Shrubby Reed-Mustard 1—Establish a treatment avoidance buffer around individuals or populations to protect pollinator habitat. Individuals or populations would be avoided with a treatment buffer of 1,640 feet (Dawson 2012).	May affect but are not likely to adversely affect.	After implementation of design features, avoidance measures, and conservation measures, the potential for adverse effects would be low enough to be discountable
Mechanical Methods	Effects common to all Habitat alterations for ground-dwelling pollinators	• Design features and conservation measures for ESA-listed plant species would apply • Conservation Measure Shrubby Reed-Mustard 1—Establish a treatment avoidance buffer around individuals or populations to protect pollinator habitat. Individuals or populations would be avoided with a treatment buffer of 1,640 feet (Dawson 2012).	May affect but are not likely to adversely affect.	After implementation of design features, avoidance measures, and conservation measures, the potential for adverse effects would be low enough to be discountable

Treatment Method	Potential Direct and Indirect Effects to Shrubby Reed-mustard	Conservation Measures and Design Features for Avoiding or Reducing Adverse Effects	Effects Determination for Treatment Method	Rationale for the Effects Determination
Prescribed Fire	Effects common to all Habitat alterations for ground-dwelling pollinators	• Design features and conservation measures for ESA-listed plant species would apply • Conservation Measure Shrubby Reed-Mustard 1—Establish a treatment avoidance buffer around individuals or populations to protect pollinator habitat. Individuals or populations would be avoided with a treatment buffer of 1,640 feet (Dawson 2012).	May affect but are not likely to adversely affect.	After implementation of design features, avoidance measures, and conservation measures, the potential for adverse effects would be low enough to be discountable
Revegetation	Effects common to all Habitat alterations for ground-dwelling pollinators	• Design features and conservation measures for ESA-listed plant species would apply • Conservation Measure Shrubby Reed-Mustard 1—Establish a treatment avoidance buffer around individuals or populations to protect pollinator habitat. Individuals or populations would be avoided with a treatment buffer of 1,640 feet (Dawson 2012).	May affect but are not likely to adversely affect.	After implementation of design features, avoidance measures, and conservation measures, the potential for adverse effects would be low enough to be discountable
Targeted Grazing	Effects common to all Habitat alterations for ground-dwelling pollinators	• Design features and conservation measures for ESA-listed plant species would apply • Conservation Measure Shrubby Reed-Mustard 1—Establish a treatment avoidance buffer around individuals or populations to protect pollinator habitat. Individuals or populations would be avoided with a treatment buffer of 1,640 feet (Dawson 2012). • Conservation Measure Shrubby Reed-Mustard 2—To protect this species from adverse effects from livestock grazing, temporary fencing to prevent livestock entry would be placed ¼-mile from individuals or populations within the graduated use area for targeted grazing treatment areas.	May affect but are not likely to adversely affect.	After implementation of design features, avoidance measures, and conservation measures, the potential for adverse effects would be low enough to be discountable

C.20 Slickspot Peppergrass

Treatment Method	Potential Direct and Indirect Effects to Slickspot Peppergrass	Conservation Measures and Design Features for Avoiding or Reducing Adverse Effects	Effects Determination for Treatment Method	Rationale for the Effects Determination
Chemical Treatments	Effects common to all Habitat alterations for slickspot and ground-dwelling pollinators	• Design features and conservation measures for ESA-listed plant species would apply • Conservation Measure Slickspot Peppergrass 1—A qualified biologist would conduct pretreatment slickspot habitat surveys in accordance with slickspot peppergrass inventory guidelines (BLM 2010). If suitable or occupied slickspot habitat is identified, a treatment avoidance buffer of 1,640 feet, would be established to protect the microhabitat and potential seed bank. Fencing, flagging, signs or other methods to denote or exclude the avoidance buffer would be implemented. No treatments or actions would occur within the avoidance buffer. • Conservation Measure Slickspot Peppergrass 4—All slickspot peppergrass proposed critical habitat will be avoided and buffered as per Conservation Measure Slickspot Peppergrass 1. • Conservation Measure Slickspot Peppergrass 5—Establish a treatment avoidance buffer around individuals or populations to protect pollinator habitat. Individuals or populations would be avoided with a treatment buffer of 1,640 feet (Dawson 2012).	May affect but are not likely to adversely affect.	After implementation of design features and conservation measures, the potential for adverse effects would be low enough to be discountable.

Treatment Method	Potential Direct and Indirect Effects to Slickspot Peppergrass	Conservation Measures and Design Features for Avoiding or Reducing Adverse Effects	Effects Determination for Treatment Method	Rationale for the Effects Determination
Manual Methods	Effects common to all Habitat alterations for slickspot and pollinators	• Design features and conservation measures for ESA-listed plant species would apply • Conservation Measure Slickspot Peppergrass 1—A qualified biologist would conduct pretreatment slickspot habitat surveys in accordance with slickspot peppergrass inventory guidelines (BLM 2010). If suitable or occupied slickspot habitat is identified, a treatment avoidance buffer of 1,640 feet, would be established to protect the microhabitat and potential seed bank. Fencing, flagging, signs or other methods to denote or exclude the avoidance buffer would be implemented. No treatments or actions would occur within the avoidance buffer. • Conservation Measure Slickspot Peppergrass 4—All slickspot peppergrass proposed critical habitat will be avoided and buffered as per Conservation Measure Slickspot Peppergrass 1. • Conservation Measure Slickspot Peppergrass 5—Establish a treatment avoidance buffer around individuals or populations to protect pollinator habitat. Individuals or populations would be avoided with a treatment buffer of 1,640 feet (Dawson 2012).	May affect but are not likely to adversely affect.	After implementation of design features and conservation measures, the potential for adverse effects would be low enough to be discountable.

Treatment Method	Potential Direct and Indirect Effects to Slickspot Peppergrass	Conservation Measures and Design Features for Avoiding or Reducing Adverse Effects	Effects Determination for Treatment Method	Rationale for the Effects Determination
Mechanical Methods	Effects common to all Damage or mortality of plants or seedbanks Habitat alterations for slickspot and its pollinators	• Design features and conservation measures for ESA-listed plant species would apply • Conservation Measure Slickspot Peppergrass 1—A qualified biologist would conduct pretreatment slickspot habitat surveys in accordance with slickspot peppergrass inventory guidelines (BLM 2010). If suitable or occupied slickspot habitat is identified, a treatment avoidance buffer of 1,640 feet, would be established to protect the microhabitat and potential seed bank. Fencing, flagging, signs or other methods to denote or exclude the avoidance buffer would be implemented. No treatments or actions would occur within the avoidance buffer. • Conservation Measure Slickspot Peppergrass 4—All slickspot peppergrass proposed critical habitat will be avoided and buffered as per Conservation Measure Slickspot Peppergrass 1. • Conservation Measure Slickspot Peppergrass 5—Establish a treatment avoidance buffer around individuals or populations to protect pollinator habitat. Individuals or populations would be avoided with a treatment buffer of 1,640 feet (Dawson 2012).	May affect but are not likely to adversely affect.	Pretreatment slickspot habitat surveys and implementation of avoidance buffers around slickspot habitat in accordance with design features and conservation measures would exclude mechanical treatments from occupied and suitable habitat, and avoid or minimize potential adverse effects from mechanical treatments in the vicinity. If mechanical treatments would be required within identified slickspot habitat to create effective fuel breaks, then additional consultation would occur.

Treatment Method	Potential Direct and Indirect Effects to Slickspot Peppergrass	Conservation Measures and Design Features for Avoiding or Reducing Adverse Effects	Effects Determination for Treatment Method	Rationale for the Effects Determination
Prescribed Fire	Effects common to all Damage or mortality of plants or seedbanks Habitat alterations for slickspot and pollinators	• Design features and conservation measures for ESA-listed plant species would apply • Conservation Measure Slickspot Peppergrass 1—A qualified biologist would conduct pretreatment slickspot habitat surveys in accordance with slickspot peppergrass inventory guidelines (BLM 2010). If suitable or occupied slickspot habitat is identified, a treatment avoidance buffer of 1,640 feet, would be established to protect the microhabitat and potential seed bank. Fencing, flagging, signs or other methods to denote or exclude the avoidance buffer would be implemented. No treatments or actions would occur within the avoidance buffer. • Conservation Measure Slickspot Peppergrass 3—If prescribed fire treatments occur within the potential range of slickspot peppergrass, follow-up native seeding or revegetation would be implemented to suppress nonnative, invasive species occupancy. • Conservation Measure Slickspot Peppergrass 4—All slickspot peppergrass proposed critical habitat will be avoided and buffered as per Conservation Measure Slickspot Peppergrass 1. • Conservation Measure Slickspot Peppergrass 5—Establish a treatment avoidance buffer around individuals or populations to protect pollinator habitat. Individuals or populations would be avoided with a treatment buffer of 1,640 feet (Dawson 2012).	May affect but are not likely to adversely affect.	Pretreatment surveys and avoidance buffers of slickspot habitat would avoid disturbance to occupied and potential microsite habitat. . Site-specific burn plans, detailing prescribed fire parameters, would ensure proper management of prescribed fire and avoid adverse effects to slickspot peppergrass. Since slickspot microsite habitat makes up only a fraction of the total potential habitat and only 436,060 acres (19 percent) of the total current range are located in the action area it is not anticipated prescribed burning would jeopardize a given population survivorship. Implementation of design features, and slickspot peppergrass specific conservation measures would render adverse effects discountable, or minimize them to insignificant levels.

Treatment Method	Potential Direct and Indirect Effects to Slickspot Peppergrass	Conservation Measures and Design Features for Avoiding or Reducing Adverse Effects	Effects Determination for Treatment Method	Rationale for the Effects Determination
Revegetation	Effects common to all Habitat alterations for slickspot and pollinators	• Design features and conservation measures for ESA-listed plant species would apply • Conservation Measure Slickspot Peppergrass 1—A qualified biologist would conduct pretreatment slickspot habitat surveys in accordance with slickspot peppergrass inventory guidelines (BLM 2010). If suitable or occupied slickspot habitat is identified, a treatment avoidance buffer of 1,640 feet, would be established to protect the microhabitat and potential seed bank. Fencing, flagging, signs or other methods to denote or exclude the avoidance buffer would be implemented. No treatments or actions would occur within the avoidance buffer. • Conservation Measure Slickspot Peppergrass 2—Within the potential range of slickspot peppergrass only native plant material would be used for revegetation. • Conservation Measure Slickspot Peppergrass 4—All slickspot peppergrass proposed critical habitat will be avoided and buffered as per Conservation Measure Slickspot Peppergrass 1. • Conservation Measure Slickspot Peppergrass 5—Establish a treatment avoidance buffer around individuals or populations to protect pollinator habitat. Individuals or populations would be avoided with a treatment buffer of 1,640 feet (Dawson 2012).	May affect but are not likely to adversely affect.	After implementation of design features and conservation measures, the potential for adverse effects would be low enough to be discountable.

Treatment Method	Potential Direct and Indirect Effects to Slickspot Peppergrass	Conservation Measures and Design Features for Avoiding or Reducing Adverse Effects	Effects Determination for Treatment Method	Rationale for the Effects Determination
Targeted Grazing	Effects common to all Habitat alterations for slickspot and pollinators	• Design features and conservation measures for ESA-listed plant species would apply • Conservation Measure Slickspot Peppergrass 1—A qualified biologist would conduct pretreatment slickspot habitat surveys in accordance with slickspot peppergrass inventory guidelines (BLM 2010). If suitable or occupied slickspot habitat is identified, a treatment avoidance buffer of 1,640 feet, would be established to protect the microhabitat and potential seed bank. Fencing, flagging, signs or other methods to denote or exclude the avoidance buffer would be implemented. No treatments or actions would occur within the avoidance buffer. • Conservation Measure Slickspot Peppergrass 4—All slickspot peppergrass proposed critical habitat will be avoided and buffered as per Conservation Measure Slickspot Peppergrass 1. • Conservation Measure Slickspot Peppergrass 5—Establish a treatment avoidance buffer around individuals or populations to protect pollinator habitat. Individuals or populations would be avoided with a treatment buffer of 1,640 feet (Dawson 2012). • Conservation Measure Slickspot Peppergrass 6—To protect this species from adverse effects from livestock grazing, temporary fencing to prevent livestock entry would be placed ¼-mile from suitable and occupied habitat within the graduated use area for targeted grazing treatment areas.	May affect but are not likely to adversely affect.	After implementation of design features and conservation measures, the potential for adverse effects would be low enough to be discountable.

C.21 Spalding's Catchfly

Treatment Method	Potential Direct and Indirect Effects to Spalding's Catchfly	Conservation Measures and Design Features for Avoiding or Reducing Adverse Effects	Effects Determination for Treatment Method	Rationale for the Effects Determination
Chemical Treatments	Effects common to all Habitat alterations for pollinators	• Design features and conservation measures for ESA-listed plant species would apply • Conservation Measure Spalding's Catchfly 1—Establish a treatment avoidance buffer around individuals or populations to protect pollinator habitat. Individuals or populations would be avoided with a treatment buffer of 1,640 feet (Dawson 2012).	May affect but are not likely to adversely affect.	After implementation of design features and conservation measures, the potential for adverse effects would be low enough to be discountable
Manual Methods	Effects common to all Habitat alterations for pollinators	• Design features and conservation measures for ESA-listed plant species would apply • Conservation Measure Spalding's Catchfly 1—Establish a treatment avoidance buffer around individuals or populations to protect pollinator habitat. Individuals or populations would be avoided with a treatment buffer of 1,640 feet (Dawson 2012).	May affect but are not likely to adversely affect.	After implementation of design features and conservation measures, the potential for adverse effects would be low enough to be discountable
Mechanical Methods	Effects common to all Habitat alterations for pollinators	• Design features and conservation measures for ESA-listed plant species would apply • Conservation Measure Spalding's Catchfly 1—Establish a treatment avoidance buffer around individuals or populations to protect pollinator habitat. Individuals or populations would be avoided with a treatment buffer of 1,640 feet (Dawson 2012).	May affect but are not likely to adversely affect.	After implementation of design features and conservation measures, the potential for adverse effects would be low enough to be discountable

Treatment Method	Potential Direct and Indirect Effects to Spalding's Catchfly	Conservation Measures and Design Features for Avoiding or Reducing Adverse Effects	Effects Determination for Treatment Method	Rationale for the Effects Determination
Prescribed Fire	Effects common to all Habitat alterations for pollinators Broken dormancy, increased stem and flower production, and increased seedling recruitment, to the extent that prescribed fire mimics historical fire regimes,	• Design features and conservation measures for ESA-listed plant species would apply • Conservation Measure Spalding's Catchfly 1—Establish a treatment avoidance buffer around individuals or populations to protect pollinator habitat. Individuals or populations would be avoided with a treatment buffer of 1,640 feet (Dawson 2012). • Conservation Measure Spalding's Catchfly 3—Where prescribed fire treatments are proposed in suitable habitat in the species range, treatments should mimic historical fire behavior to the extent that this is known. Prescribed burning should occur during times when Spalding's catchfly is typically dormant to prevent adverse effects on reproduction. Where invasive annual grasses are present in a prescribed fire treatment area in the species range, revegetation, weed control, and monitoring should be conducted to prevent invasive annual grass germination to the extent possible.	May affect but are not likely to adversely affect.	After implementation of design features and conservation measures, the potential for adverse effects would be low enough to be discountable
Revegetation	Effects common to all Habitat alterations for pollinators	• Design features and conservation measures for ESA-listed plant species would apply • Conservation Measure Spalding's Catchfly 1—Establish a treatment avoidance buffer around individuals or populations to protect pollinator habitat. Individuals or populations would be avoided with a treatment buffer of 1,640 feet (Dawson 2012).	May affect but are not likely to adversely affect.	After implementation of design features and conservation measures, the potential for adverse effects would be low enough to be discountable

Treatment Method	Potential Direct and Indirect Effects to Spalding's Catchfly	Conservation Measures and Design Features for Avoiding or Reducing Adverse Effects	Effects Determination for Treatment Method	Rationale for the Effects Determination
Targeted Grazing	Effects common to all Habitat alterations for pollinators	• Design features and conservation measures for ESA-listed plant species would apply • Conservation Measure Spalding's Catchfly 1—Establish a treatment avoidance buffer around individuals or populations to protect pollinator habitat. Individuals or populations would be avoided with a treatment buffer of 1,640 feet (Dawson 2012). • Conservation Measure Spalding's Catchfly 2—To protect this species from adverse effects from livestock grazing, temporary fencing to prevent livestock entry would be placed ¼-mile from individuals or populations within the graduated use area for targeted grazing treatment areas.	May affect but are not likely to adversely affect.	After implementation of design features and conservation measures, the potential for adverse effects would be low enough to be discountable

C.22 Uinta Basin Hookless Cactus

Habitat for Uinta Basin hookless cactus qualifies as an analysis exclusion area. The potential that the proposed action would have direct adverse effects on ESA-listed plant species that occur in Analysis Exclusion Areas would be low enough to be discountable

Treatment Method	Potential Direct and Indirect Effects to Uinta Basin Hookless Cactus	Conservation Measures and Design Features for Avoiding or Reducing Adverse Effects	Effects Determination for Treatment Method	Rationale for the Effects Determination
Chemical Treatments	Effects common to all Habitat alterations for pollinators	• Design features and conservation measures for ESA-listed plant species would apply • Conservation Measure Uinta Basin Hookless Cactus 1—Establish a treatment avoidance buffer around individuals or populations to protect pollinator habitat. Individuals or populations would be avoided with a treatment buffer of 1,640 feet (Dawson 2012).	May affect but are not likely to adversely affect.	After implementation of design features, avoidance measures, and conservation measures, the potential for adverse effects would be low enough to be discountable

Treatment Method	Potential Direct and Indirect Effects to Uinta Basin Hookless Cactus	Conservation Measures and Design Features for Avoiding or Reducing Adverse Effects	Effects Determination for Treatment Method	Rationale for the Effects Determination
Manual Methods	Effects common to all Habitat alterations for pollinators	• Design features and conservation measures for ESA-listed plant species would apply • Conservation Measure Uinta Basin Hookless Cactus 1—Establish a treatment avoidance buffer around individuals or populations to protect pollinator habitat. Individuals or populations would be avoided with a treatment buffer of 1,640 feet (Dawson 2012).	May affect but are not likely to adversely affect.	After implementation of design features, avoidance measures, and conservation measures, the potential for adverse effects would be low enough to be discountable
Mechanical Methods	Effects common to all Habitat alterations for pollinators	• Design features and conservation measures for ESA-listed plant species would apply • Conservation Measure Uinta Basin Hookless Cactus 1—Establish a treatment avoidance buffer around individuals or populations to protect pollinator habitat. Individuals or populations would be avoided with a treatment buffer of 1,640 feet (Dawson 2012).	May affect but are not likely to adversely affect.	After implementation of design features, avoidance measures, and conservation measures, the potential for adverse effects would be low enough to be discountable
Prescribed Fire	Effects common to all Habitat alterations for pollinators	• Design features and conservation measures for ESA-listed plant species would apply • Conservation Measure Uinta Basin Hookless Cactus 1—Establish a treatment avoidance buffer around individuals or populations to protect pollinator habitat. Individuals or populations would be avoided with a treatment buffer of 1,640 feet (Dawson 2012).	May affect but are not likely to adversely affect.	After implementation of design features, avoidance measures, and conservation measures, the potential for adverse effects would be low enough to be discountable
Revegetation	Effects common to all Habitat alterations for pollinators	• Design features and conservation measures for ESA-listed plant species would apply • Conservation Measure Uinta Basin Hookless Cactus 1—Establish a treatment avoidance buffer around individuals or populations to protect pollinator habitat. Individuals or populations would be avoided with a treatment buffer of 1,640 feet (Dawson 2012).	May affect but are not likely to adversely affect.	After implementation of design features, avoidance measures, and conservation measures, the potential for adverse effects would be low enough to be discountable

Treatment Method	Potential Direct and Indirect Effects to Uinta Basin Hookless Cactus	Conservation Measures and Design Features for Avoiding or Reducing Adverse Effects	Effects Determination for Treatment Method	Rationale for the Effects Determination
Targeted Grazing	Effects common to all Habitat alterations for pollinators	• Design features and conservation measures for ESA-listed plant species would apply • Conservation Measure Uinta Basin Hookless Cactus 1—Establish a treatment avoidance buffer around individuals or populations to protect pollinator habitat. Individuals or populations would be avoided with a treatment buffer of 1,640 feet (Dawson 2012). • Conservation Measure Uinta Basin Hookless Cactus 2—To protect this species from adverse effects from livestock grazing, temporary fencing to prevent livestock entry would be placed ¼-mile from individuals or populations within the graduated use area for targeted grazing treatment areas.	May affect but are not likely to adversely affect.	After implementation of design features, avoidance measures, and conservation measures, the potential for adverse effects would be low enough to be discountable

C.23 Webber's Ivesia

Treatment Method	Potential Direct and Indirect Effects to Webber's Ivesia	Conservation Measures and Design Features for Avoiding or Reducing Adverse Effects	Effects Determination for Treatment Method	Rationale for the Effects Determination
Chemical Treatments	Effects common to all Habitat alterations for pollinators	• Design features and conservation measures for ESA-listed plant species would apply • Conservation Measure Webber's Ivesia 1—Establish a treatment avoidance buffer around individuals or populations to protect pollinator habitat. Individuals or populations would be avoided with a treatment buffer of 1,640 feet (Dawson 2012). • Conservation Measure Webber's Ivesia 3—All Webber's ivesia designated critical habitat will be avoided and buffered with an avoidance buffer of 1,640 feet, to protect the PCEs. Fencing, flagging, signs or other methods to denote or exclude the avoidance buffer would be implemented. No treatments or actions would occur within the avoidance buffer.	May affect but are not likely to adversely affect.	After implementation of design features, avoidance measures, and conservation measures, the potential for adverse effects would be low enough to be discountable

Treatment Method	Potential Direct and Indirect Effects to Webber's Ivesia	Conservation Measures and Design Features for Avoiding or Reducing Adverse Effects	Effects Determination for Treatment Method	Rationale for the Effects Determination
Manual Methods	Effects common to all Habitat alterations for pollinators	• Design features and conservation measures for ESA-listed plant species would apply • Conservation Measure Webber's Ivesia 1—Establish a treatment avoidance buffer around individuals or populations to protect pollinator habitat. Individuals or populations would be avoided with a treatment buffer of 1,640 feet (Dawson 2012). • Conservation Measure Webber's Ivesia 3— All Webber's ivesia designated critical habitat will be avoided and buffered with an avoidance buffer of 1,640 feet, to protect the PCEs. Fencing, flagging, signs or other methods to denote or exclude the avoidance buffer would be implemented. No treatments or actions would occur within the avoidance buffer.	May affect but are not likely to adversely affect.	After implementation of design features, avoidance measures, and conservation measures, the potential for adverse effects would be low enough to be discountable
Mechanical Methods	Effects common to all Habitat alterations for pollinators	• Design features and conservation measures for ESA-listed plant species would apply • Conservation Measure Webber's Ivesia 1—Establish a treatment avoidance buffer around individuals or populations to protect pollinator habitat. Individuals or populations would be avoided with a treatment buffer of 1,640 feet (Dawson 2012). • Conservation Measure Webber's Ivesia 3— All Webber's ivesia designated critical habitat will be avoided and buffered with an avoidance buffer of 1,640 feet, to protect the PCEs. Fencing, flagging, signs or other methods to denote or exclude the avoidance buffer would be implemented. No treatments or actions would occur within the avoidance buffer.	May affect but are not likely to adversely affect.	After implementation of design features, avoidance measures, and conservation measures, the potential for adverse effects would be low enough to be discountable

Treatment Method	Potential Direct and Indirect Effects to Webber's Ivesia	Conservation Measures and Design Features for Avoiding or Reducing Adverse Effects	Effects Determination for Treatment Method	Rationale for the Effects Determination
Prescribed Fire	Effects common to all Habitat alterations for pollinators	• Design features and conservation measures for ESA-listed plant species would apply • Conservation Measure Webber's Ivesia 1—Establish a treatment avoidance buffer around individuals or populations to protect pollinator habitat. Individuals or populations would be avoided with a treatment buffer of 1,640 feet (Dawson 2012). • Conservation Measure Webber's Ivesia 3— All Webber's ivesia designated critical habitat will be avoided and buffered with an avoidance buffer of 1,640 feet, to protect the PCEs. Fencing, flagging, signs or other methods to denote or exclude the avoidance buffer would be implemented. No treatments or actions would occur within the avoidance buffer.	May affect but are not likely to adversely affect.	After implementation of design features, avoidance measures, and conservation measures, the potential for adverse effects would be low enough to be discountable
Revegetation	Effects common to all Habitat alterations for pollinators	• Design features and conservation measures for ESA-listed plant species would apply • Conservation Measure Webber's Ivesia 1—Establish a treatment avoidance buffer around individuals or populations to protect pollinator habitat. Individuals or populations would be avoided with a treatment buffer of 1,640 feet (Dawson 2012). • Conservation Measure Webber's Ivesia 3— All Webber's ivesia designated critical habitat will be avoided and buffered with an avoidance buffer of 1,640 feet, to protect the PCEs. Fencing, flagging, signs or other methods to denote or exclude the avoidance buffer would be implemented. No treatments or actions would occur within the avoidance buffer.	May affect but are not likely to adversely affect.	After implementation of design features, avoidance measures, and conservation measures, the potential for adverse effects would be low enough to be discountable

Treatment Method	Potential Direct and Indirect Effects to Webber's Ivesia	Conservation Measures and Design Features for Avoiding or Reducing Adverse Effects	Effects Determination for Treatment Method	Rationale for the Effects Determination
Targeted Grazing	Effects common to all Habitat alterations for pollinators	• Design features and conservation measures for ESA-listed plant species would apply • Conservation Measure Webber's Ivesia 1—Establish a treatment avoidance buffer around individuals or populations to protect pollinator habitat. Individuals or populations would be avoided with a treatment buffer of 1,640 feet (Dawson 2012). • Conservation Measure Webber's Ivesia 2—To protect this species from adverse effects from livestock grazing, temporary fencing to prevent livestock entry would be placed 1640 ft from individuals or populations within the graduated use area for targeted grazing treatment areas. • Conservation Measure Webber's Ivesia 3— All Webber's ivesia designated critical habitat will be avoided and buffered with an avoidance buffer of 1,640 feet, to protect the PCEs. Fencing, flagging, signs or other methods to denote or exclude the avoidance buffer would be implemented. No treatments or actions would occur within the avoidance buffer.	May affect but are not likely to adversely affect.	After implementation of design features, avoidance measures, and conservation measures, the potential for adverse effects would be low enough to be discountable

C.24 Wright Fishhook Cactus

Treatment Method	Potential Direct and Indirect Effects to Wright Fishhook Cactus	Conservation Measures and Design Features for Avoiding or Reducing Adverse Effects	Effects Determination for Treatment Method	Rationale for the Effects Determination
Chemical Treatments	Effects common to all Habitat alterations for ground-dwelling pollinators	• Design features and conservation measures for ESA-listed plant species would apply • Conservation Measure Wright Fishhook Cactus 1—Establish a treatment avoidance buffer around individuals or populations to protect pollinator habitat. Individuals or populations would be avoided with a treatment buffer of 1,640 feet (Dawson 2012).	May affect but are not likely to adversely affect.	After implementation of design features, avoidance measures, and conservation measures, the potential for adverse effects would be low enough to be discountable

Treatment Method	Potential Direct and Indirect Effects to Wright Fishhook Cactus	Conservation Measures and Design Features for Avoiding or Reducing Adverse Effects	Effects Determination for Treatment Method	Rationale for the Effects Determination
Manual Methods	Effects common to all Habitat alterations for ground-dwelling pollinators	• Design features and conservation measures for ESA-listed plant species would apply • Conservation Measure Wright Fishhook Cactus 1—Establish a treatment avoidance buffer around individuals or populations to protect pollinator habitat. Individuals or populations would be avoided with a treatment buffer of 1,640 feet (Dawson 2012).	May affect but are not likely to adversely affect.	After implementation of design features, avoidance measures, and conservation measures, the potential for adverse effects would be low enough to be discountable
Mechanical Methods	Effects common to all Habitat alterations for ground-dwelling pollinators	• Design features and conservation measures for ESA-listed plant species would apply • Conservation Measure Wright Fishhook Cactus 1—Establish a treatment avoidance buffer around individuals or populations to protect pollinator habitat. Individuals or populations would be avoided with a treatment buffer of 1,640 feet (Dawson 2012).	May affect but are not likely to adversely affect.	After implementation of design features, avoidance measures, and conservation measures, the potential for adverse effects would be low enough to be discountable
Prescribed Fire	Effects common to all Habitat alterations for ground-dwelling pollinators	• Design features and conservation measures for ESA-listed plant species would apply • Conservation Measure Wright Fishhook Cactus 1—Establish a treatment avoidance buffer around individuals or populations to protect pollinator habitat. Individuals or populations would be avoided with a treatment buffer of 1,640 feet (Dawson 2012).	May affect but are not likely to adversely affect.	After implementation of design features, avoidance measures, and conservation measures, the potential for adverse effects would be low enough to be discountable
Revegetation	Effects common to all Habitat alterations for ground-dwelling pollinators	• Design features and conservation measures for ESA-listed plant species would apply • Conservation Measure Wright Fishhook Cactus 1—Establish a treatment avoidance buffer around individuals or populations to protect pollinator habitat. Individuals or populations would be avoided with a treatment buffer of 1,640 feet (Dawson 2012).	May affect but are not likely to adversely affect.	After implementation of design features, avoidance measures, and conservation measures, the potential for adverse effects would be low enough to be discountable

Treatment Method	Potential Direct and Indirect Effects to Wright Fishhook Cactus	Conservation Measures and Design Features for Avoiding or Reducing Adverse Effects	Effects Determination for Treatment Method	Rationale for the Effects Determination
Targeted Grazing	Effects common to all Habitat alterations for ground-dwelling pollinators	• Design features and conservation measures for ESA-listed plant species would apply • Conservation Measure Wright Fishhook Cactus 1—Establish a treatment avoidance buffer around individuals or populations to protect pollinator habitat. Individuals or populations would be avoided with a treatment buffer of 1,640 feet (Dawson 2012). • Conservation Measure Wright Fishhook Cactus 2—To protect this species from adverse effects from livestock grazing, temporary fencing to prevent livestock entry would be placed ¼-mile from individuals or populations within the graduated use area for targeted grazing treatment areas.	May affect but are not likely to adversely affect.	After implementation of design features, avoidance measures, and conservation measures, the potential for adverse effects would be low enough to be discountable