BLM

U.S. Department of the Interior
Bureau of Land Management

Spruce Mountain Restoration

PREPARING OFFICE

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Spruce Mountain Restoration
:
Environmental Assessment:

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Table of Contents

1. Introduction 1

1.1. Identifying Information: 1
1.1.1. Location of Proposed Action: 1
1.1.2. Name and Location of Preparing Office: 1
1.2. Purpose and Need for Action: 1
1.3. Scoping, Public Involvement and Issues: 2

2. Proposed Action and Alternatives 3

2.1. Alternative A — Proposed Action 5
2.1.1. Proposed Project Procedures 14
2.2. Alternative B 20
2.3. Alternative C 20
2.4. Alternative D 20
2.5. No Action Alternative 21
2.6. Alternatives Considered but not Analyzed in Detail 21
2.6.1. Hand Thinning on Treatments 21
2.6.2. Sagebrush Mowing and Dixie Harrow 21
2.7. Conformance 22

3. Affected Environment: 23

3.1. Air Quality and Climate 25
3.2. Cultural Resources 26
3.3. Fire Management 26
3.4. Forestry and Forest Products 30
3.5. Hydrology and Riparian/Wetland 31
3.6. Invasive, Non-Native Species 33
3.7. Migratory Birds 33
3.8. Native American Religious Concerns 45
3.9. Public Health and Safety 45
3.10. Lands with Wilderness Characteristics 46
3.11. Livestock Grazing 46
3.12. Recreation 47
3.13. Soils 48
3.14. Special Status Species 49
3.15. Vegetation 57
3.16. Visual Resource Management 58
3.17. Wilderness Study Areas 59
3.18. Wild Horses 60
3.19. Wildlife 60

4. Environmental Effects: 67

4.1. Air Quality 70

4.2. Cultural Resources 71
4.3. Fire Management 75
4.4. Forestry and Forest Products 80
4.5. Hydrology and Riparian/Wetland 85
4.6. Invasive, Non-Native Species 86
4.7. Migratory Birds 89
4.8. Native American Religious Concerns 93
4.9. Public Health and Safety 95
4.10. Livestock Grazing 96
4.11. Recreation 101
4.12. Soils 102
4.13. Special Status Species 105
4.14. Vegetation 114
4.15. Visual Resource Management 122
4.16. Wilderness Study Areas 122
4.17. Wild Horses 123
4.18. Wildlife 127

5. Tribes, Individuals, Organizations, or Agencies Consulted: 139

6. List of Preparers 143

Appendix A. Spruce Mountain Restoration Treatments 147

Appendix B. Cumulative Effects Study Areas (CESA's) 163

Glossary of Terms 177

Bibliography 179

List of Figures

Figure A.1. Spruce Mountain Restoration Proposed Treatments 147
Figure A.2. Spruce Mountain Restoration Treatment Types 148
Figure A.3. Basco Chaining Maintenance/Expansion 149
Figure A.4. Brush Creek 150
Figure A.5. Coyote Basin Bottom 151
Figure A.6. Coyote East 152
Figure A.7. Coyote North Bowl 153
Figure A.8. Demonstration 154
Figure A.9. East Spruce Ridge 155
Figure A.10. Honeymoon Chaining Maintenance/Expansion 156
Figure A.11. Indian Creek 157
Figure A.12. Lower Spruce Spring 158
Figure A.13. Upper Spruce Spring 159
Figure A.14. Westside Lower 160
Figure A.15. Westside Upper 161
Figure B.1. Air Resources CESA 163
Figure B.2. Cultural Resources CESA 164
Figure B.3. Fire Management CESA 165
Figure B.4. Forestry CESA 166
Figure B.5. Hydrology, Riparian and Soils CESA 167
Figure B.6. Vegetation, and Non-Native, Invasive Species CESA 168
Figure B.7. Livestock Grazing Allotment 169
Figure B.8. Wilderness, Recreation and Visual Resource Management CESA 170
Figure B.9. Sage Grouse CESA 171
Figure B.10. Wild Horse CESA 172
Figure B.11. Wildlife: Small Mammals CESA 173
Figure B.12. Antelope CESA 174
Figure B.13. Elk CESA 175
Figure B.14. Mule Deer CESA 176

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List of Tables

Table 2.1. Spruce Mountain Restoration 8
Table 2.2. Raptor Nest Buffers 16
Table 3.1. Affected Environments 25
Table 3.2. Springs on Public Land 32
Table 3.3. Migratory Bird Species Considered Located In or Near the Project Area 34
Table 3.4. Migratory Birds In or Near Study Area and Their Habitat Associations 35
Table 3.5. Big Game Habitat Types and Acres Impacted by Proposed Treatments 63
Table 4.1. Cumulative Effects Study Areas 69
Table 4.2. Summary of fire effects on vegetation of the Intermountain Region 115
Table 4.3. Wildland Fire Disturbance of Habitat Acres in the CESA's 133
Table 4.4. Past and Present Active and Closed Minerals Disturbance and Right of Ways Acreages in CESA's 135
Table 5.1. List of Persons, Agencies and Organizations Consulted 141
Table 6.1. List of Prepares 145

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Chapter 1. Introduction

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1.1. Identifying Information:

1.1.1. Location of Proposed Action:

The Spruce Mountain Restoration project is located in southeastern Elko County. This project would occur in the Spruce grazing allotment. These allotments are located approximately 30 miles south of Wells, Nevada spanning from Ruby Valley on the west side to the crest of the Goshute Mountains on the east side and encompassing an area of approximately 552,000 acres.

1.1.2. Name and Location of Preparing Office:

Wells Field Office, Elko District, Nevada.

1.2. Purpose and Need for Action:

Studies show that the expansion of pinyon-juniper has more than tripled in the areas dominated by pinyon-juniper woodlands within at least 150 years. Although pinyon and juniper woodlands have increased dramatically in the last 130 years , they currently occupy far less than they are capable of under current climatic conditions (Miller & Tausch, 2001). These changes have generally coincided with the introduction of heavy livestock grazing, tree utilization by the mining industry, and fire suppression that followed settlement of the region. An increase in tree dominance results in a loss of understory. A loss of understory further reduces the fuel and further the fire frequency. Altered disturbance regimes and climate change have resulted in major changes in plant community compositions. Since the 1860's, many bunchgrass and sagebrush-bunchgrass communities, which dominated the Intermountain West, have shifted to pinyon and juniper woodland or introduced annual-dominated communities (West 1984, Miller et al. 1994). Studies conclude that barring some major environmental change or management action, continued forage reduction and decreased fire frequency will continue until trees dominate most of the sites favorable to their survival. This continued tree dominance then jeopardizes the historic woodland sites because under the right conditions, a crown fire could result in a stand replacement wildfire with catastrophic consequences because of continuous tree canopy. Studies further show that in pinyon-juniper communities that are overstocked, the ability of the understory to respond after a fire is dramatically reduced and potentially opens the site to the invasion by exotics. Any treatments or rehabilitation of these areas could be very costly.

The purpose of the proposed project within the Spruce Allotment is to:

- Reduce the expansion of pinyon-juniper woodlands and promote healthy forests by removing stressed and diseased trees.
- Reduce hazardous fuels to reduce the threat of a large-scale wildland fire.
- Restore and maintain healthy rangelands and wildlife habitat.
- Protect historic pinyon-juniper woodlands.
- Reduce that amount of invasive weeds throughout the project area.
- Restore previous wildfire damaged areas with desired vegetation.

- Protect treatment areas from livestock grazing to allow for establishment and for treatment success on case by case basis.
- Protect cultural resources within the project area.

The Spruce Allotment has experienced few disturbances in the last several decades. Of these disturbances wild fires have burned small portions of the allotment. As a result of very little disturbance throughout the rest of the allotment, much of these areas have experienced significant pinyon-juniper woodlands expansion and large amounts of disease and pest outbreaks in the pinyon-juniper and mixed conifer communities. Large portions of the Spruce Allotment are considered to be Crucial Mule Deer Winter Range. The quality of habitat within these areas has decreased as a result of several factors. The need for action is to:

- Reverse expansion of pinyon-juniper woodlands because of the negative effects on wildlife habitat quality.
- Prevent large-scale wildland fire resulting from the buildup of fuels and the conversion of fuel type based on prediction from historic assessments.
- Improve species composition and diversity.
- Reverse the decreasing quality of wildlife habitat and forage due to damage from wildfires.
- Prevent the establishment and expansion of invasive non-native species.

1.3. Scoping, Public Involvement and Issues:

[Describe the scoping, public involvement, and identified issues here.]

Chapter 2. Proposed Action and Alternatives

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2.1. Alternative A — Proposed Action

The proposed action was developed in cooperation with the Bureau of Land Management and Nevada Department of Wildlife (NDOW) and consists of treating up to 10,000 acres of pinyon-juniper and cheatgrass impacted areas primarily within crucial mule deer winter range on the Spruce Allotment with the use of either prescribed fire, and/or mechanical devices, and/or herbicide applications. It is anticipated that the project would be completed over a 5 to 10 year period; however, the time to complete the project would ultimately depend on annual funding and environmental conditions. The number of acres completed annually would be based on funding. All treatments would be completed on public lands.

Figure A.1, "Spruce Mountain Restoration Proposed Treatments" (p. 147) shows the proposed treatment polygons. These polygons were delineated through coordination by BLM resource specialists and NDOW wildlife biologists. The combination of these polygons exceeds the size of the proposed action target acres, but no more than 10,000 acres would be treated within the project area. The following is a summarization of how each polygon was delineated:

1. *Basco Chaining Maintenance*: This treatment area was chained in the 1960's or 1970's and is approximately 1,240 acres in size. Since this chaining has occurred, pinyon and juniper have reestablished within the treatment area. Desired understory vegetation does occur on this site; however, increased establishment of pinyon and juniper threatens to out-compete the desired understory vegetation. The threat for large-scale wildland fire has increased with the increased fuel loading occurring on this site. This polygon is described as "crucial winter" habitat for mule deer. See Figure A.3, "Basco Chaining Maintenance/Expansion" (p. 149).

2. *Brush Creek*: This treatment area is approximately 1,500 acres in size and was delineated upon the lack of desired understory and the very high fuel loading of pinyon and juniper on the site. This treatment area contains very little to no desired understory vegetation. Pinyon and juniper have out-competed and removed virtually all other vegetation within the area. The Brush Creek polygon is at high risk of a large-scale, stand replacing wildfire that would negatively impact the entire watershed. This polygon has been described as "year round" habitat for mule deer. See Figure A.4, "Brush Creek" (p. 150).

3. *Coyote Basin Bottom*: This treatment area is approximately 350 acres in size. This treatment area contains very little to no desired understory vegetation. Pinyon and juniper have out-competed and removed virtually all other vegetation within the area. The Coyote Basin polygon is at high risk of a large-scale, stand replacing wildfire that would negatively impact entire watershed. This polygon is described as "year round" habitat for mule deer. See Figure A.5, "Coyote Basin Bottom" (p. 151).

4. *Coyote East*: This treatment area contains several smaller polygons cumulatively adding up to approximately 1,200 acres in size. This polygon was delineated upon the lack of desired understory vegetation and the increased threat of large-scale wildland fire. This treatment area contains little to moderate amount of desired understory vegetation. Pinyon and juniper have out-competed and removed virtually all other vegetation within the areas. The Coyote East polygon is at high risk of a large-scale, stand replacing wildfire that would negatively impact entire watershed. This polygon is described as "crucial winter" habitat for mule deer. See Figure A.6, "Coyote East" (p. 152).

5. *Coyote North Bowl*: This treatment area is approximately 1,370 acres in size and was delineated upon the lack of desired understory and the very high fuel loading of pinyon and juniper occurring in the site. This treatment area contains very little to no desired understory. Pinyon and juniper have out-competed and removed virtually all other vegetation within the area. The Coyote North Bowl polygon is at high risk of a large-scale, stand replacing wildfire that would negatively impact the entire watershed. This polygon is described as "year round" habitat for mule deer. See Figure A.7, "Coyote North Bowl" (p. 153).

6. *Demonstration*: This polygon is approximately 31 acres in size. This area was hand thinned in the 1980's and the biomass was removed from the site. The BLM is not proposing any pinyon and juniper manipulations at this time within the demonstration unit. Cheatgrass is present within the Demonstration in small portions. The BLM is proposing the use of herbicide within the Demonstration unit to reduce the amount of cheatgrass present in the unit. The purpose of the demonstration site is to use it as a tool to explain the potential for diversity when treating overstocked pinyon and juniper sites. See Figure A.8, "Demonstration" (p. 154).

7. *East Spruce Ridge*: This treatment area is approximately 2,700 acres in size. This area has been impacted by the 2006 Nine Mile Fire and a previous unrecorded fire. The impacts by these previous fires has left this area with very little ground cover. Lower elevations of these fires have responded with crested wheatgrass (*Agropyron cristatum*) that was seeded years prior to fires occurring; however, much of the upper elevations are negatively impacted by cheatgrass. This polygon is described as "year round" habitat for mule deer. See Figure A.9, "East Spruce Ridge " (p. 155).

8. *Honeymoon Chaining Maintenance/Expansion*: This treatment area is approximately 2,800 acres in size. This treatment was chained with an Ely Chain in 1970. Since this chaining has occurred pinyon and juniper have reestablished within the treatment. Desired shrub and understory vegetation does occur on this site; however, increased reforestation of pinyon and juniper threatens to out compete desired understory vegetation. Due to the success of the previous treatments the BLM is proposing to maintain the original treatment area as well as expand outside of original treatment boundaries into adjacent forested stands. The adjacent stands lack desired understory vegetation and contains very high fuel loading. The expansion areas are at high risk of a large-scale, stand replacing wildfire that would negatively impact the entire watershed. This polygon is described as "year round" habitat for mule deer. See Figure A.10, "Honeymoon Chaining Maintenance/Expansion" (p. 156).

9. *Indian Creek*: This treatment area is approximately 1,200 acres in size. This polygon was delineated upon the lack of desired understory vegetation and the increased threat of large-scale wildland fire. This treatment area contains little to moderate desired understory vegetation. Pinyon and Juniper have out competed and removed virtually all other vegetation within the area. The Indian Creek polygon is at high risk of a large-scale, stand replacing wildfire that would negatively impact the entire watershed. This polygon is described as "crucial winter" habitat for mule deer. See Figure A.11, "Indian Creek" (p. 157).

10. *Lower Spruce Spring*: This treatment area is approximately 220 acres in size. This polygon was delineated upon the lack of desired understory vegetation and the increased threat of large-scale wildland fire. This treatment area contains little to moderate desired understory vegetation. Pinyon and Juniper have out-competed and removed virtually all other vegetation within the area. The Lower Spruce Spring polygon is at high risk of a

large-scale, stand replacing wildfire that would negatively impact the entire watershed. This polygon is described as "crucial winter" habitat for mule deer. See Figure A.12, "Lower Spruce Spring" (p. 158).

11. *Upper Spruce Spring*: This treatment area is approximately 600 acre in size. This polygon was delineated upon the lack of desired understory vegetation and the increased threat of large-scale wildland fire. This treatment area contains little to moderate desired understory vegetation. Pinyon and Juniper have out-competed and removed virtually all other vegetation within the area. The Upper Spruce Spring polygon is at high risk of a large-scale, stand replacing wildfire that would negatively impact the entire watershed. This polygon is described as "crucial winter" habitat for mule deer. See Figure A.13, "Upper Spruce Spring " (p. 159).

12. *Westside Lower*: This treatment area is approximately 4,250 acres in size and is comprised of polygons both north and south of the main Spruce Mountain road. Portions of this polygon lack desired understory vegetation and has been determined to be at high risk of large-scale wildland fire. Other portions of this polygon contain marginal to moderate desired understory vegetation. In these cases pinyon and juniper are increasing on the sites and are out-competing understory vegetation. Increased fuel loading on these sites poses an increased threat of large-scale wildland fires within the treatment polygon. A portion of this polygon is described as "crucial winter" habitat for mule deer, while the rest of the polygons are described as "winter range" habitat for mule deer. See Figure A.14, "Westside Lower" (p. 160).

13. *Westside Upper*: This treatment area is approximately 750 acres in size and was delineated upon the lack of desired understory and the very high fuel loading of pinyon and juniper on the site. This treatment area contains very little to no desired understory. Pinyon and juniper have out competed and removed virtually all other vegetation within the area. The Brush Creek polygon is at high risk of a large-scale, stand replacing wildfire that would negatively impact the entire watershed. A portion of this polygon is described as "winter range" habitat for mule deer while the rest of the polygon is described as "year round" habitat for mule deer. See Figure A.15, "Westside Upper" (p. 161).

Table 2.1. Spruce Mountain Restoration

Treatment Areas	Proposed Treatments									
	Prescribed Fire	Management of Wildland Fire	Chaining	Mastication	Hand Thinning	Herbicide	Seeding	Vegetation Treatment Protection	Firewood Cutting	Maintenance
Basco Chaining Maintenance	X		X	X	X	X	X	X	X	X
Brush Creek	X				X	X	X	X	X	X
Coyote Basin Bottom	X		X	X	X	X	X	X	X	X
Coyote East	X		X	X	X	X	X	X	X	X
Coyote North Bowl	X				X	X	X	X	X	X
Demonstration										
East Spruce Ridge	X					X	X	X		X
Honeymoon Chaining Maintenance and Expansion	X		X	X	X	X	X	X	X	X
Indian Creek	X		X	X	X	X	X	X	X	X
Lower Spruce Spring	X		X	X	X	X	X	X	X	X
Upper Spruce Spring	X				X	X	X	X	X	X
Westside Lower	X		X	X	X	X	X	X	X	X
Westside Upper	X		X	X	X	X	X	X	X	X

Figure A.2, "Spruce Mountain Restoration Treatment Types " (p. 148) shows all of the polygons proposed in this project and the possible treatment options within each polygon. These polygons and treatment methods were developed in coordination with BLM resource specialists and NDOW wildlife biologists. A more thorough description of what each treatment entails can be found later in this section. The following is a summary of possible treatments that could occur within each polygon:

1. *Herbicide Application*: All treatment polygons would be analyzed for herbicide application. Herbicide application may occur on each polygon for the removal of non-native or invasive vegetative species. Herbicide application may be included in the maintenance of the projects in the event of non-native, invasive species moving into the treatment areas.

2. *Broadcast Burning*: Areas that were delineated for broadcast burning are areas with environmental conditions that do not favor a more selective method of treatment such as mechanical treatment. These areas have been observed as overstocked with Pinyon and Juniper with little desired understory vegetation. Seeding would occur post completion of the burn to allow for soil stabilization and prevent the infestation of non-native invasive species.

3. *Hand Thinning*: All treatment polygons would be analyzed for hand thinning treatments for this project. Hand thinning would occur on sites where treatments would need to be highly selective. Also treatments that have been determined to receive little to no ground disturbance. These areas range from overstocked Pinyon and Juniper woodlands with little desired understory vegetation to woodlands with adequate desired understory vegetation that is at risk of being out competed from the site.

4. *Pile Burning*: Areas that have been delineated for pile burning would be in coordination with hand thinning. However, not all hand thinning treatments would be piled and burned. Some hand thinning treatments result in lopping and scattering of the debris throughout the site.

5. *Chaining/Mastication*: Areas that were delineated for Chaining treatments contain little desired understory vegetation. These areas are also 30 percent slope (17°) or less. Thirty percent or less slope is ideal for mechanical treatment methods including chaining and mastication treatments. Seeding would be accompanied with these treatments. Mastication treatments would be preferred over chaining treatments when it has been determined that the site has adequate desired understory vegetation and seeding may not be essential to obtain objectives.

6. *Seeding/Seed Bed Preparation/Herbicide*: The polygon described for seeding and seed bed preparation has experience multiple fires and has been converted to annual grasslands. The BLM is proposing to treat this polygon with herbicide or other seed bed preparation methods to eliminate the annual grasses and allow for seed to come in contact with the soil. Mechanical seed bed preparation methods may include dragging a chain across the ground, or disking.

The purpose of the treatments in these areas are to improve vegetation diversity, improve wildlife habitat, and decrease hazardous fuels loading. Each treatment area would be evaluated to determine the most appropriate treatment type and resource protection measures based on slope, aspect, terrain, soil, vegetation composition, vegetation condition, amount of fuel/biomass needed to be removed, overall access on site, visual disturbance, and proximity to major roads. The

treatment types and locations would be designed by NDOW wildlife biologists in conjunction with BLM resource specialists.

The treated areas would be completed in mosaic designs with irregular edges. Trees to be removed would include pinyon pine (*Pinus monophylla*), and Utah juniper (*Juniperus osteosperma*). Trees infested with forest insects and disease within the treatment areas will be a priority for removal. Diseased trees removed will not be for commercial timber use.

Treatment areas would be focused in areas where residual herbaceous vegetation is adequate to promote native release. However, areas in which do not have adequate understory may be treated as well do to the importance of the site. Seeding of primarily native species would be completed in areas where existing herbaceous understory has been compromised and is not sufficient for native release. The treatment types would be considered, either individually or in combination, to achieve the desired results. The treatments to be considered for each site include:

- **Prescribed Fire**: Prescribed fire treatments include broadcast burning and/or the burning of hand stacked piles following hand thinning treatments. Broadcast burning treatments are located in areas where slope is the limiting factor for mechanical treatments and creating openings in the vast overstocked pinyon-juniper woodlands has been identified as a priority. Prescribed fire would reduce hazardous fuels loading on project site as well as asssist in preparation of the site for seeding.

  Prescribed burning would be completed during the spring months (February through June) or fall (September through December). For spring burns, start date would be as early as possible after snow melt to allow for trees to burn with minimal impacts to soil and understory herbaceous vegetation. Fall burns would begin based on prescriptions outlined in the burn plans for each specific treatment area. Prescribed burning would be targeted in blocks of 5—50 acres. However, if the prescribed fire threatens to exceed the targeted size, the prescribed fire Burn Boss and on-site resource specialist would have the flexibility to determine whether or not to initiate suppression actions based on fire behavior, topography, fuel continuity, and firefighter safety. Therefore, any variation in size would depend on resource specialist input. In treatment areas that are within vicinity of Wilderness Study Area's (WSA's), prescribed fires would be fully suppressed when threatening WSA's.

  When in combination with the mechanical treatments described below, pile burning may be desired as appropriate action to remove fuels from the site. Piles would be constructed using the debris and dead material on site after the implementation of a mechanical treatment. Piles would be burned based on environmental conditions and in coordination with developed burn plan.

- **Management of Wildland Fire**: Natural ignitions within the project areas could be managed to achieve desired resource objectives if the environmental conditions allow for attainment of those objectives. For this option to be considered, an approved Wildfire Implementation Plan (WFIP) must have been completed for the specific area prior to allowing the natural ignition to continue to burn. If such a burn plan does not exist, then appropriate suppression efforts would be initiated on all natural ignitions occurring in the proposed areas.

- **Mechanical Treatments**: Mechanical treatments may include:

  - **Chaining**: Areas will be recommended for chaining when the site has been identified to have a inadequate desired understory vegetation and competition is high among

overstocked woodlands. Site evaluations will decide if local seed source is present or if seeding would be completed in coordinaton with this treatment. Chaining treatments would be limited by slope; rule of thumb for chaining operations has been identified as slopes of 30% or less.

A Ely chain, of approximately 200 feet in length, would be pulled behind two bulldozers. All treated areas would be double chained and would generally be completed in the fall/winter months. The concept of double chaining is to pull the chain one direction to the end of the project and then pull the chain back 180 degrees from the original direction. When bringing the chain back through an area it will up-root the knocked over trees which will increase mortality of trees to be treated. Seeding would occur before the chain is brought back through on second pass.

- **Mastication**: Similar to chaining described above, mastication also has slope limitations of 30% (17°)or less. Mastication sites would be determined based on site evaluations. Sites with sufficient desired understory vegetation and little to no seeding are recommended for mastication.

  Mastication may include such equipment as Bull Hog, Hydro Axe, or any machine designed for the shredding and/or mulching of tree species, which would be mounted onto a tracked or wheeled vehicle. A general overview of masticating equipment can be found in the Understory Biomass Reduction Methods and Equipment Catalog (USDA Forest Service, 2000). Mastication equipment mounted onto tracked or wheeled vehicles would be more selective in tree removal than the chaining option described above. Mastication includes the mulching and/or shredding of trees on site. Wood chips and branch/leaf mulch would be dispersed on site, not to exceed 3 inches deep. This mastication effort may be in coordination with seeding operations allowing for mulch and chips to cover seed. This management method would have less ground disturbance than chaining but would have more ground disturbance than selective hand thinning methods.

- **Selective Cutting**: This treatment would include hand thinning methods using chainsaws. Selective cutting may occur in specific areas and may include a single tree to several acres of trees. Selective cutting may include dead, diseased, or healthy trees depending on site evaluation and treatment objectives. It may be necessary to cut healthy trees where there are no dead or diseased trees to meet resource objectives. Cut trees may be removed, chipped, lopped and scattered, or piled and burned, based on site evaluation and objectives.

- **Herbicide Treatment**:Chemicals, either alone or in combination with the other, would be incorporated into a tank mix of water, surfactants, crop oils or other adjuvants and applied at a rate in accordance with their labels, State law, and BLM's Programmatic Environmental Impacts Statement (PEIS) for Vegetation Treatments with Herbicides (USDI 2007a). A combination of Imazapic, Glyphosate, 2–4–D, and Dicamba herbicide treatments would be used to suppress non-native species such as cheatgrass (*Bromus tectorum*) and halogeton (*Halogeton glomeratus*) in order to successfully introduce shrubs, forbs and grasses into the treatment areas. Herbicide applications techniques would include:

  - Hand Spraying.
  - Ground Application (including All Terrain Vehicles, Vehicles, and Tractor Mounted Units).
  - Aerial Application (including Fix-winged Aircrafts and Helicopters).

Herbicides proposed by the BLM for application throughout the life of this project would be:

- **Imazapic, Glyphosate, or Imazapic + Glyphosate:** Imazapic (trade names include but are not limited to: Panoramic 2SL, Plateau, and Imazapic E 2 SL), Glyphosate (trade names include but are not limited to: Roundup or Rodeo) and Imazapic + Glyphosate (trade names include Journey) are proposed for the treatment of cheatgrass (*Bromus tectorum*).

  The Imazapic will be used as pre and/or post- emergent. When Imazapic is applied as a pre-emergent for cheatgrass, applications would be applied to the project area(s) in late fall through early spring. When Imazapic is applied as a post-emergent for halogeton (*Halogeton glomeratus*), applications would be applied to project locations in the late spring through late summer.

  Glyphosate, when combined with a pre-emergent such as Imazapic can be an effective tool against plants such as cheatgrass that may have multiple growth cycles within a single season.

- **2–4–D, or Dicamba, or 2–4–D + Dicamba:** Formulations to be used include 2–4–D (trade names include but are not limited to: weedar 64, Platoon, or Weedone LV4), Dicamba (trade names include but are not limited to: Clarity or Banvel) or a tank mix of 2,4–D plus dicamba (trade names include but are not limited to: Weedmaster). Both 2,4–D and Dicamba are selective broadleaf herbicides that will not kill grasses. These chemicals will be utilized to control halogeton. All applications of these chemicals will occur with ground based equipment.

- **Seeding**: All treatments described throughout the proposed action could have seeding applied. Seeding would occur on disturbed sites when it has been determined that native perennial vegetation response and on-site seed source would be inadequate. Additionally, where portions of the Spruce Mountain Allotment have experienced past wildland fires and vegetation has not responded as desired vegetation, seeding may also be needed. Seed mixes would primarily be of native species; however, in some cases non-native species may be applied to meet site objectives. Species selection would be based on site potential and objectives.

  A variety of seeding methods may be used for the proposed projects. Depending on the terrain, soil type, soil moisture, and seed species one or more of the following seeding methods may be used:

  - **Broadcast and Drag**: broadcast application of seed (aerially or by truck or all-terrain vehicle (ATV) mounted applicators) followed by dragging a heavy chain across the seeded area to enhance ground-to-seed contact. Ground-to-seed contact can be a critical factor in successful seeding.

  - **Drill**: application of seed by rangeland or Truax seed drills pulled behind a tractor, truck, or similarly capable vehicle. Seed drills operate on the principle of inserting (or drilling) the seed into the soil thereby ensuring proper seeding depth and ground to seed contact.

  - **Aerial Broadcast**: application of seed by distributing the seed through the air and the seed falling at random within the application area. Methods include the use of helicopter or fixed wing aircraft.

- **Harrow**: application of seed by broadcast method followed by enhancement of ground-to-seed contact by pulling a series of spikes (usually attached in rows to a metal frame) along the ground to cover the seed and smooth the soil.
- **Disking**: preparation of the seed bed by plowing using large metal disks that slice through and turn over an approximate four to six-inch surface layer of turf and/or hardened soil.
- **Hand**: application by scattering seed by hand using either no tools or hand-held broadcast spreaders.
- **Hand Planting of Seedlings**: Some smaller parcels within the proposed treatment areas may be selected for sagebrush (*Artemisia tridentata ssp.*), cliffrose (*Purshia stansburiana*) and in the higher elevations bitterbrush (*Purshia tridentata*) seedling plantings. The seedlings would be planted by hand in the early spring while soil moisture is adequate to allow for seedling establishment.

- **Vegetation Treatment Protection:** The BLM is also proposing to construct livestock and wild horse protection fences around treatment boundaries. These protective fences would be on an as needed basis to allow for vegetation to successfully establish. The Spruce Allotment is a very large area that contains few pasture fences. The construction of these vegetation treatment protection fences would allow livestock and wild horses to graze the untreated portions of the allotment, while still the treatment areas rather than removing livestock from the entire Spruce Allotment. Fencing would be constructed according to BLM guidelines for wildlife concerns (e.g. smooth wire on bottom, proper wire spacing, etc.). These protective fences are proposed to be temporary; however, these fences may be deemed necessary to remain permanent to protect the integrity of the treatment.

  Treatment areas may be closed to livestock and wild horse grazing in order to allow the vegetation to successfully establish. The closure would occur through a minimum of two growing seasons or until establishment objectives are met. Separate decisions would be issued in order to close the treatment areas to livestock grazing. Associated Animal Unit Month's (AUM's) within the treatments would be temporarily suspended. The treated area would be reopened to grazing once the establishment objectives in the Closure Decision(s) have been met and the associated temporarily suspended AUM's would be reinstated on the grazing permit.

  Additionally, the BLM is proposing to protect Lower Boone Spring which falls within the Indian Creek treatment area. This spring and associated riparian area would be at risk of increased livestock and or wild horse use following vegetation treatment in the Indian Creek area. The spring is currently developed and most water is diverted away from the small riparian area at the spring source. The diversion pipe originally emptied into a trough; however the existing trough is no longer functional and the pipe empties onto the ground. The BLM is proposing to install a protective fence around this spring and reroute the existing diversion into a trough with a float valve. The BLM would not redevelop the spring by digging into the spring source, but would utilize the existing diversion. The proposed system would provide water for livestock, wild horses and wildlife and return unused water to the riparian area at the spring source. The BLM would ensure that surface disturbance would be kept to a minimum and that the rate of diversion of water would not increase.

  Firewood Cutting: Proposed treatment areas would be opened to green and dead fire woodcutting for commercial and non-commercial uses prior to treatments. Firewood cutting

is currently allowed within the proposed treatment area; however, the cutting of green trees and the traveling off of a designated road is not currently authorized. The authorization of green and dead firewood cutting within the proposed treatment areas would allow the public to utilize the pinyon and juniper that are to be removed during later treatments. Travel restrictions for the Spruce Mountain area would be lifted in designated areas in which the green and dead firewood cutting would be allowed. Designated areas would be signed and project boundaries would be appropriately flagged to avoid unauthorized off-road travel outside of cutting units. Islands of trees that are to be left intact within project areas would also be appropriately flagged to prohibit firewood cutting of these leave trees.

- **Maintenance**: The BLM is proposing to maintain the above treatments so that original objectives may be met or continue to be met. Objectives for above treatments would be based on agency specific objectives and resource benefits. Maintenance of the above treatments (outlined in the Decision Record for this document) may include any of the described proposed actions in single or in any combination.

2.1.1. Proposed Project Procedures

Project procedures would be implemented to ensure potential negative impacts resulting from treatments are minimized. These are specific protective measures that would be identified for each treatment during the final design process. The following is a list of design features to be incorporated into proposed projects outlined in Alternatives A, B, C, and D:

Cultural Resources

1. All disturbance activities will comply with Section 106 of the National Historic Preservation Act (NHPA). Compliance will be achieved in accordance with the measures outlined in the Protocol Agreement between the Nevada BLM and the Nevada State Historic Preservation Office.

2. Wherever possible the project will be designed to avoid potential adverse affects to historic properties (i.e. archeological sites eligible for inclusion on the National Register of Historic Places). Where it is not possible to avoid potential adverse affects a mitigation plan will be crafted in accordance with NHPA as guided by the 36 CFR 800 regulations.

3. Each treatment would be monitored to ensure that avoidance measures have been effective and to ensure that project activities have not impacted cultural resources in an unforeseen manner. All persons participating in the construction, operation, or maintenance of a project will not disturb, alter, injure or destroy any scientifically important paleontological remains, or any eligible archeological site, structure, building, object or artifact on lands associated with the project. Individuals involved in illegal activities will be subject to penalties under the Archaeological Resource Protection Act (16 U.S.C 470ii), the Federal Land Management Policy Act (43 U.S.C 1701), the Native American Graves and Repatriation Act (16 U.S.C 1170) and other applicable statues.

4. If human remains/burials or other previously unidentified cultural resources or vertebrate paleontological resources are discovered during project operations all activities within 300 feet of the discovery will immediately cease and the BLM archeologist will be notified by telephone, followed by written conformation. Work will not resume and the discovery will be protected until the BLM Authorized Officer issues a Notice to Proceed. All discoveries of

human remains (regardless of location in association with the project area) will be reported to the BLM Elko District Office.

Special Status Species, Wildlife and Migratory Birds

1. Each proposed project will be evaluated with regard to potential for impacts to a current list of special status species, and consistency with current Bureau policy for special status species. Baseline surveys will be conducted for special status species (plant and animal) prior to project implementation. Projects will be designed to avoid special status species and monitoring will be conducted to determine if indirect activities associated with projects are causing impacts.

2. Habitats of less mobile species tied to specific geographic areas (a particular spring, a burrow complex, a unique and locally rare patch of habitat) will be avoided. Examples include burrow complexes used by burrowing owls or pygmy rabbits, etc.

3. A raptor and migratory bird nesting survey (using current approved US Fish and Wildlife Service protocol) will be required for projects that are proposed to be constructed between March-July. Should nests be found, disturbance activities will be postponed until completion of nesting and until after a second survey is completed to ensure no later nesting attempts have been initiated and/or are ongoing.

   Depending on the time of year, these selected treatments could have the potential for destruction of active nests or disturbance of breeding behavior of migratory bird species. The BLM will conduct nest surveys prior to any surface disturbing activities that would occur during the avian breeding season (March 15 through July 31). If nests are located, or if other evidence of nesting (i.e., mated pairs, territorial defense, carrying nest material, transporting food) is observed, a protective buffer (the size depending on the habitat requirements of the species) would be delineated and the buffer area would be avoided to prevent destruction or disturbance to nests and birds until they are no longer active or the area would be removed from project consideration. Direct impacts to breeding birds could include the possible direct loss of nests or indirect abandonment from increased human activity within close proximity of an active nest site. Loss of an active nest site, incubating adults, eggs or young would be in violation of the Migratory Bird Treaty Act (MBTA).

4. The Study Area may contain plants, or animals designated or proposed as threatened or endangered species. In addition, the Study Area may contain habitat designated or proposed as critical for a listed species. To ensure that the action does not jeopardize the continued existence of a proposed or listed threatened or endangered species or result in the destruction or adverse modification of a designated or proposed critical habitat, BLM may require special design features, relocation, or modification of an approved activity. BLM will not approve any ground-disturbing activity that may affect any proposed or listed threatened or endangered species or critical habitat.

   This stipulation applies to implementation and major maintenance.

5. This project may contain lands with raptor nesting sites. These lands are subject to seasonal and spatial protection from disturbance to avoid displacement and mortality of raptor young. BLM will require migratory bird nesting surveys to be conducted by a BLM-approved wildlife biologist using current U.S. Fish and Wildlife Service protocols. Such surveys shall be conducted no more than 14 days prior to commencement of surface-disturbing

activities in an area. If disturbance does not occur within 14 days of the survey, the site shall be resurveyed. If during any surveys, nests or nesting behavior are documented, the area must be avoided until the young have fledged from the nest or the nest fails. Nest results will be determined by the above-mentioned wildlife biologist. For example, if a Cooper's hawk nest is found to exist within 0.25 mile of a project area, no activity would be authorized within a 0.25 mile buffer of the nest from 15 March through 31 August, or from 15 March through the date that young have fledged and are no longer dependent upon the nest, as determined by a BLM-approved biologist. Compliance with this stipulation does not constitute full compliance with, or exemption from, the Migratory Bird Treaty Act as amended (16 U.S.C. §§ 703-712) or any other legislation.

Table 2.2. Raptor Nest Buffers

Species	Seasonal Buffer[a]	Spatial Buffer[b]
Turkey Vulture	2/1[c] – 8/15	0.5 mile[a]
Northern Harrier	4/1 – 8/15	0.25 mile
Cooper's Hawk	3/15 – 8/31	0.25 mile
Sharp-shinned Hawk	3/15 – 8/31	0.25 mile
Northern Goshawk	3/1 – 8/15	0.5 mile
Red-tailed Hawk	3/15 – 8/15	0.33 mile
Swainson's Hawk	3/1 – 8/31	0.25 mile
Ferruginous Hawk	3/1 – 8/1	1.0 mile
Golden Eagle	1/1 – 8/31	0.5 mile
Bald Eagle	1/1 – 8/31	1.0 mile
American Kestrel	4/1 – 8/15	0.125 mile
Prairie Falcon	3/1[c] – 8/31	0.5 mile
Peregrine Falcon	2/1 – 8/31	1.0 mile
Barn Owl	2/1 – 9/15	0.125 mile
Long-eared Owl	2/1 – 8/15	0.125 mile
Short-eared Owl	3/1 – 8/1	0.25 mile
Flammulated Owl	4/1 – 9/30	0.25 mile
Western Screech-owl	3/1 – 8/15	0.125 mile
Great Horned Owl	12/1 – 9/30	0.125 mile
Northern Pygmy Owl	4/1 – 8/1	0.25 mile
Burrowing Owl	3/1 – 8/31	0.25 mile
Northern Saw-whet Owl	3/1 – 8/31	0.125 mile

[a]From Utah Field Office Guidelines for Raptor Protection from Human and Land Use Disturbances (USFWS).
[b]From Guidelines for Raptor Conservation in the Western United States, except where noted (USFWS).
[c]From Nevada Raptors: Their Biology and Management (NDOW).

This stipulation applies to implementation and major maintenance.

6. This project may contain lands which have been identified as mule deer crucial winter range. These lands are subject to seasonal protection from disturbance during the period of 15 November through 16 March to avoid displacement and mortality to animals during the winter. The most current seasonal range maps provided by the Nevada Department of Wildlife will be used to delineate crucial winter range at the time of implementation or major maintenance.

   This stipulation applies to implementation and major maintenance.

7. This project may contain lands which have been identified as pronghorn antelope crucial winter range. These lands are subject to seasonal protection from disturbance during the period of 15 November through 16 March to avoid displacement and mortality to

animals during the winter. The most current seasonal range maps provided by the Nevada Department of Wildlife will be used to delineate crucial winter range at the time of implementation or major maintenance.

This stipulation applies to implementation and major maintenance.

8. This project may contain lands which have been identified as pronghorn antelope kidding areas. These lands are subject to seasonal protection from disturbance during the period of 1 May through 30 June to avoid displacement and mortality to animals during kidding season. The most current seasonal range maps provided by the Nevada Department of Wildlife will be used to delineate crucial summer range at the time of implementation or major maintenance.

   This stipulation applies to implementation and major maintenance.

9. This project may contain lands which have been identified as greater sage-grouse strutting grounds (leks) that are subject to seasonal protection from disturbance during the period of 1 March through 15 May between 7:00 PM and 10:00 AM Pacific time. Seasonal restrictions from disturbance apply within view of 3 miles from greater sage-grouse leks. The most current lek data provided by the Nevada Department of Wildlife will be used to delineate active leks at the time of implementation or major maintenance.

   This stipulation applies to implementation and major maintenance.

10. This project may contain lands which have been identified as greater sage-grouse brood rearing areas that are subject to seasonal protection from disturbance during the period of 15 May through 15 August. The most current seasonal range maps provided by the Nevada Department of Wildlife will be used to delineate brood rearing habitat at the time of implementation or major maintenance.

    This stipulation applies to implementation and major maintenance

11. This project may contain lands which have been identified as greater sage-grouse crucial winter habitat that are subject to seasonal protection from disturbance during the period of 1 November through 15 March. The most current seasonal range maps provided by the Nevada Department of Wildlife will be used to delineate crucial winter habitat at the time of implementation or major maintenance.

    This stipulation applies to implementation and major maintenance.

Invasive Species

1. To eliminate the transport of vehicle-borne weed seeds, roots or rhizomes, all vehicles and heavy equipment used for the completion, maintenance, inspection or monitoring of ground disturbing activities; or for authorized off-road driving will be free of soil and debris capable of transporting weed propagules. All such vehicles and equipment will be cleaned prior to entering or leaving the work site or project area. Cleaning efforts will concentrate on tracks, feet and tires, and on the undercarriage. Special emphasis will be applied to axles, frames, cross members, motor mounts, on and underneath steps, running boards, and front bumper/brush guard assemblies. Vehicle cabs will be swept out and refuse will be disposed of in waste receptacles. Equipment will arrive at the project/unit area already cleaned of

all dirt and debris. Any subsequent cleanings (i.e before moving between units) will be recorded using global positioning systems or other mutually acceptable equipment and provided to the District Office Weed Coordinator or designated person.

2. Equipment will be washed prior to being moved from project unit to project unit.

3. All proposed treatments with associated soil disturbances will be monitored for the establishment of noxious weeds. Invasive and noxious weeds will be treated in a manner that is most appropriate to the weed species and degree of infestation.

4. All herbicide treatments will be applied as per the chemical label, State law, all BLM policies, manuals, guidelines, and Programmatic Environmental Impact Statement (PEIS) for Vegetation Treatments with Herbicides (USDI BLM 2007a), 1999 Programmatic Environmental Assessment of Integrated Weed Management on Bureau of Land Management Lands (BLM 1999; BLM/EK/PL-98/008), associated 2011 Noxious Weed Treatment Determination of NEPA Adequacy (DNA), and BLM Manual 900–01.

5. The Study Area will be surveyed for noxious weeds prior to project implementation. Any weeds discovered within the Study Area will be flagged and avoided with a 75 yard buffer.

6. All herbicide applications will made by state licensed personnel and will be overseen by BLM certified personnel.

Seeding

1. BLM policy will be followed throughout the entire seed procurement process including the sampling and testing of all seed lots for invasive and noxious weeds to ensure that noxious weed seed are not present.

2. Drill seeding operations will be completed following the contour of the land as much as possible to reduce potential water erosion. Intact stands of sagebrush and native perennial vegetation will not be disturbed.

Protective fences

1. Fences will be built in accordance with manual H-1741-1. Modifications may be incorporated into the design based on consultation with Nevada Department of Wildlife (NDOW) and subsequent recommendations to minimize adverse impacts to wildlife. Let down fences could be constructed in big game crucial ranges and migration corridors where feasible and necessary.

2. The top fence wire will be secured above horizontal braces to minimize perching by predatory birds.

3. If steel pipe corners are used, domed pipe caps will be secured to the top of steel pipes to prevent wildlife entry and to minimize predatory bird perching.

4. Visibility of fences constructed within 1 km (5/8 mile) of seasonal sage grouse ranges will be increased by utilizing appropriate measures such as installing wide stays, deflectors and/or white-topped posts. Type or brand of reflectors used will be selected from those that have been previously tested and determined to be effective.

Livestock

1. Notify permittees of proposed treatments and identify any needed livestock grazing, feeding, or slaughter restrictions for areas within herbicide applications.
2. Design treatments to take advantage of normal livestock grazing rest periods, when possible, to minimize impacts to livestock grazing permits.
3. Use herbicides of low toxicity to livestock, where feasible.
4. As directed by the herbicide label, remove livestock from treatment sites prior to herbicide application, where applicable.
5. Whenever possible and whenever needed, schedule herbicide treatments when livestock are not present in the treatment area.
6. Take into account the different types of application equipment and methods, where possible, to reduce the probability of contamination of non-target food and water sources.
7. Notify permittee of the project to improve coordination and avoid potential conflicts and safety concerns during implementation of the treatment.

Off-road Travel

Vehicles are restricted to existing roads and two-tracks on public lands in the Spruce Mountain Area (defined as Nevada Department Wildlife Hunt Unit 105). Exceptions from this restriction will apply for BLM authorized permittees related to their ranching operations as described within the terms and conditions of their existing permits, official Nevada State and Elko County business and BLM law enforcement. The authorized officer may make other exemptions to the restrictions on a case-by-case basis.

1. During the implementation of treatments, vehicles and equipment would be authorized to drive off of existing roads. After treatment completion or upon meeting polygon objectives, any new vehicle routes that are created will be removed and/or rehabilitated and closed. For those areas where green and dead woodcutting would be permitted to the public, cross country vehicle use will be authorized. Areas will be marked and signed to avoid unauthorized off-road travel outside of cutting areas. Upon meeting objectives for treatment areas, any new vehicle routes that are created will be removed and/or rehabilitated and closed. [Note that the Wells Field Office is in a planning process for an amendment to the 1985 Wells RMP for recreation at Spruce Mountain. Once a decision has been made and the Wells RMP amended, Off-road vehicle use shall comply with that decision document if different from this Project Procedure.]

Other Environmental Design and Resource Protection Procedures

1. Treatments will be designed to minimize impacts to visual resources by avoiding straight or block shapes.
2. Materials cut using hand thinning methods will be bucked into pieces no longer than 3 feet in length to speed up the drying process. Debris 12 inches in diameter or larger would be cut into lengths of 18 to 24 inches to increase the speed of the drying process on site.

3. To maximize interspersion of cover types, the distance from any chained location to the edge of an untreated stand (leave area) should be no more than 1/8 mile. Consequently, chaining widths will be no greater than 1/4 mile (Fairchild, 1999).

4. The oldest stands will be incorporated into leave areas (Fairchild, 1999). Stands at the age of 400 years or older will not be treated and would be designed into leave areas (Miller, Tausch, and Waichler, 1999). All age classes of trees will be designed into leave areas to create uneven aged stands.

5. Project maintenance, including retreatment, will be completed as needed.

6. Equipment use: Work will not be done in saturated soils where soil compression could result in the creation of deep ruts either on or off roads.

7. In treatment areas that are within the vicinity of Wilderness Study Areas (WSA), prescribed fires will be fully suppressed when threatening a WSA.

8. Treatments within pinyon and juniper woodlands will be no more than 50 acres consecutively at any one time.

2.2. Alternative B

Under this alternative the BLM proposes to complete the treatments above except for prescribed fire and management of wildland fire. All other treatment methods described above in Section 1.1 Alternative A would be carried forward for analysis. All associated procedures with treatments proposed under this alternative are outlined above in Section 1.1.1 Proposed Project Procedures. These procedures would also be carried forward for analysis for this alternative.

2.3. Alternative C

Under this alternative the BLM proposes to complete all of the treatments outlined in Section 1.1 Alternative A except for the use of chaining. All other mechanical treatment methods as well as the use of seeding, prescribed fire, management of wild fire, and herbicide application would be carried forward for analysis. All associated procedures with treatments proposed under this alternative are outlined above in Section 1.1.1 Proposed Project Procedures. These procedures would also be carried forward for analysis for this alternative.

2.4. Alternative D

Under this alternative the BLM proposes to complete all of the treatments outlined above in Section 1.1 Alternative A, except for the application of herbicides to control and or reduce cheatgrass and halogeton throughout project sites. All other treatments outlined above in Section 1.1 Alternative A would be carried forward for analysis under this alternative. All associated procedures with treatments proposed under this alternative are outlined above in Section 1.1.1 Proposed Project Procedures. These procedures would also be carried forward for analysis for this alternative.

2.5. No Action Alternative

The No action Alternative would mean that the restoration project would not be completed and there would be no man-caused direct changes to current conditions. Hazardous fuels would not be reduced. Forest pest infestations would continue to spread throughout the area. The threat of a large scale wildland fire event that may cause a stand replacing fire would still exist. Crucial mule deer winter range would continue to degrade as a result of pinyon-juniper expansion and the loss of important herbaceous understory. Areas previously impacted by wild fires would continue to be infested with cheatgrass, as well as continued cheatgrass invasion throughout the Spruce Mountain Area.

2.6. Alternatives Considered but not Analyzed in Detail

2.6.1. Hand Thinning on Treatments

One alternative brought forth through public scoping was to only use hand thinning treatments in the proposed project polygons. All though this treatment method is described in Alternatives A, B, C, and D, the BLM does not believe that this method solely would meet the purpose and need for this restoration project. Some of the polygons outlined in the above alternatives are lacking desired understory vegetation and the BLM believes that seeding, following the thinning of overstocked pinyon and juniper from the site, would be necessary for establishment of desired understory vegetation. Other methods such as prescribed fire, chaining, or other mechanical treatments may be needed for seed bed preparation prior to seeding. To ensure successful establishment the BLM believes that the use of hand thinning only would not allow for desired understory vegetation to respond well in cases when present desired understory vegetation has been suppressed and/or removed. Additionally, the BLM believes that hand thinning without the coordination with prescribed fire would again not meet the purpose and need for this restoration project. The BLM believes that to maintain and improve forest health, thinning would need to be completed in coordination with prescribed fire to reduce the amounts of hazardous fuels within the treatment areas; this decreasing the risk of large-scale wildland fires.

2.6.2. Sagebrush Mowing and Dixie Harrow

Originally the BLM was proposing the use of mowing and dixie harrowing to manipulate sagebrush communities within the Spruce Allotment. Through interdisciplinary (ID) team meetings and public scoping, the BLM decided to not manipulate sagebrush communities within the Spruce Allotment. Treating sagebrush communities via mowing or dixie harrowing would not reflect the purpose and need for this restoration project. Altering sagebrush communities in crucial mule deer winter range does not meet the purpose and need for this project and was opposed by ID team members. Comments opposed to sagebrush manipulation were also received through the public scoping. Other issues identified through public scoping and from ID team members expressed concer regarding the potential negative impacts to pygmy rabbit (BLM sensitive species) habitat with such treatment proposals.

2.7. Conformance

The EA is in conformance with the Elko and Wells Resource Management Plan Fire Management Amendment.

Date Approved: September 2004

Decision: Section 1.1 Major Decisions

- Fire Prevention: Use of prescribed burning, mechanical, chemical and biological (including grazing) treatments to reduce wildfire fuel hazards.
- Fire Rehabilitation: Conduct fire rehabilitation activities to emulate historic or pre-fire ecosystem structure, functioning, diversity and to restore a healthy stable ecosystem.

This EA is in conformance with the 1991 Record of Decision Vegetation Treatment on BLM Lands in Thirteen Western States, and the Final Environmental Impact Statement Vegetation Treatment on BLM Lands in Thirteen Western States.

- *Priority 1*: Lands where tree canopy has excluded understory vegetation resulting in reduced biological diversity, increased erosion, loss of big game habitat, or the desired plant community is no longer present.
- *Priority 2*: Lands where undesirable trees have encroached onto traditional shrub grass vegetation community and the desired plant community is no longer present. This priority shall also include previously treated areas on which re-invasion is occurring.
- *Priority 3*: Lands where encroachment of undesirable trees is occurring which will eventually result in loss of the desired plant community.

This EA is also in conformance with the 2007 Record of Decision Vegetation Treatments Using Herbicides on Bureau of Land Management Lands in 17 Western States, and the Final Programmatic Environmental Impact Statement for Vegetaion Treatments Using Herbicides on Bureau of Land Management Lands in 17 Western States.

This EA is also in conformance with the Wells Resource Management Plan signed July 16th, 1985.

Chapter 3. Affected Environment:

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Table 3.1. Affected Environments

Resource	Section
Air Quality	Section 3.1, “Air Quality and Climate” (p. 25)
Cultural Resources	Section 3.2, “Cultural Resources” (p. 26)
Fire Management	Section 3.3, “Fire Management” (p. 26)
Forestry and Forest Products	Section 3.4, “Forestry and Forest Products” (p. 30)
Hydrology and Riparian/ Wetlands	Section 3.5, “Hydrology and Riparian/Wetland” (p. 31)
Invasive, Non-Native Species	Section 3.6, “Invasive, Non-Native Species” (p. 33)
Migratory Birds	Section 3.7, “Migratory Birds” (p. 33)
Native American Religious Concerns	Section 3.8, “Native American Religious Concerns” (p. 45)
Public Health & Safety	Section 3.9, “Public Health and Safety” (p. 45)
Lands Containing Wilderness Characteristics	Section 3.10, “Lands with Wilderness Characteristics” (p. 46)
Livestock Grazing	Section 3.11, “Livestock Grazing” (p. 46)
Recreation	Section 3.12, “Recreation” (p. 47)
Soils	Section 3.13, “Soils” (p. 48)
Special Status Species	???
Vegetation	Section 3.15, “Vegetation” (p. 57)
Visual Resource Management	Section 3.16, “Visual Resource Management” (p. 58)
Wilderness, Including Wilderness Study Area’s (WSA’s)	Section 3.17, “Wilderness Study Areas” (p. 59)
Wild Horses	Section 3.18, “Wild Horses” (p. 60)
Wildlife	Section 3.19, “Wildlife” (p. 60)

3.1. Air Quality and Climate

The project is located within the Independence Valley, Clover Valley, Butte Valley, and Goshute Valley airsheds. These cover the same area as the watersheds with the same names. These airsheds are designated by the Environmental Protection Agency (EPA as “unclassified” per National Ambient Air Quality Standards as set forth in 40 CFR 81.329). An unclassified area is one for which no ambient air quality data are available and the ambient concentrations could be above or below the ambient air quality standards; however, unclassified areas are managed as in attainment. Generally, the ambient air quality over much of the valley is good due to the limited population and absence of major industrial activity. The project is classified as a Class II area, pursuant to the Prevention of Significant Deterioration regulations promulgated under the Clean Air Act (CAA) Standards. New sources within this basin must evaluate their impacts to air quality with respect to the ambient standards. The major source of fugitive dust in the vicinity includes vehicular traffic on unpaved roads.

The climate of the Spruce Mountain area is characterized by warm, dry summers and cold, wet winters. The nearest meteorological data was recorded from 1961 through 1991 at the Currie Highway Station located 20 miles south of the project The mean annual precipitation was 7.2 inches and the mean annual snowfall was 25.6 inches. Average high temperatures in July were 89 degrees F. and average lows in January were 8 degrees F. Climate within and near proposed treatment areas is likely cooler and wetter because these areas are at higher elevation than the Currie Highway Station.

Recent changes in global climate and atmospheric conditions have been well documented by the Intergovernmental Panel on Climate Change (IPCC) and BLM has acknowledged the need to incorporate the appropriate level of climate change analysis in NEPA documents (BLM IM

2008–171). The IPCC concluded that "warming of the climate system is unequivocal" and "most of the observed increase in globally average temperatures since the mid-20th century is very likely due to the observed increase in anthropogenic greenhouse gas concentrations." Several activities contribute to the phenomena of climate change, including emissions of GHGs (especially carbon dioxide and methane) from fossil fuel development, large wildfires and activities using combustion engines; changes to the natural carbon cycle; and changes to radiative forces and reflectivity (IPPC, 2007).

3.2. Cultural Resources

The proposed Study Area is situated in and around an area of exceptionally high archaeological site density. There are two main archaeological areas of concern for the project area: the Spruce Mining District (SMD) and the Spruce Mountain Complex of prehistoric period pronghorn hunting sites. Both the Spruce Mining District and the Spruce Mountain Complex are comprised primarily of archaeological sites which are eligible for inclusion on the National Register of Historic Places.

The SMD is comprised of approximately 9,179 acres, 812 of which are within the proposed Area of Potential Effect (APE). Known and potential cultural resources within the SMD include (but are not limited to) residential and/or commercial structures, middens, dumps, shafts, adits, and mineral processing areas and/or facilities. A total of 171 acres within the SMD have been inventoried for cultural resources (about 2% of the entire SMD), resulting in the documentation of 17 archaeological sites, or about one site per acre.

The Spruce Mountain Complex (SMC) is comprised of approximately 107,171 acres, of which 2,212 are within the proposed APE. Known and potential cultural resources within the SMC include (but are not limited to) sites relating to prehistoric antelope drives and/or mass kills (e.g. camp sites, corrals and drive lines constructed from juniper wood, staging areas, etc.). A total of 18,771 acres within the SMC have been inventoried for cultural resources (about 18% of the entire SMC), resulting in the documentation of 283 archaeological sites, or about 1 site per 66 acres.

3.3. Fire Management

Fire history and fire effects in the Great Basin are a vital component of resource health. Historically, the Spruce Mountain area was fire adapted. Fire played a regular disturbance role in the ecosystem. Fire exclusion has occurred throughout the west since Europeans arrived, which is thought to have affected the natural role of fire. Vegetation volume has increased, and vegetative composition has changed as a result of this natural disturbance alteration resulting in mature sagebrush with increasing dead to live woody material and decreasing understory grasses and forbs. Fires prior to European settlement once carried through fine fuels and created structural and age class diversity in sagebrush sites. According to Miller and Tausch (2001), infrequent fires in the past 130 years have allowed pinyon and juniper to establish on sagebrush sites. This fuel type presents a unique fire hazard as the potential for crown fire is higher.

The Fire Prevention Component of the 2004 Fire Management Amendment (FMA) is described as: Vegetation manipulation, fuels reduction, greenstrips, fuel breaks and thinning should be maximized through the use of prescribed burning, mechanical, chemical and biological (including grazing) treatments to reduce wildfire fuel hazards.

The FMA acknowledges the benefits of vegetative manipulation and fuels reduction. Single focus policies based solely on full fire suppression have had an impact on the landscape causing fuel loads and suppression costs to increase with no notable improvement in the attainment of resource objectives. In areas where fires have not occurred for many years, fuel loading can increase the intensity of fire causing atypical burn results. Timing, intensity, and frequency can critically influence vegetation recovery, leading to potentially long-term changes in vegetation and flammability.

- Fuel Load Reduction Treatments: Reduction of fuel load can be achieved through prescribed fire, mechanical (chaining, masticating, mowing, disking) methods, chemical treatments (herbicides such as tebuthyron, glyphosate, imazapic, etc.) and biological treatments (including grazing). These options should give consideratoin to fire management objectives and also the resource goals of the area.

  Prescribed burning is one of the primary methods of reducing fuel loads. Prescribed burns, are the planned and controlled burning of an area and could include managing some naturally occuring wildland fires to achieve resource management objectives.

- Fuelbreaks and Greenstrips: Fuels breaks and greenstrips are strategically located blocks or strips of land on which a cover of dense, heavy, or flammable vegetation has been permanently changed to one of lower fuel volume or reduced flammability as an aid to fire control.

The Fire Management Categories of the 2004 Fire Management Amendment are subdivided into 21 polygon types throughout the Elko District. Of these 21 polygon categories, 7 exist within the proposed project area. The 7 polygon categories are as follows:

- A-2 Cultural Sites, Historic and Protohistoric:
  - Current Condition: These areas are of high cultural concern due to their susceptibility to damage from wildfire or to damage from fire suppression activities. A wider variety of cultural resources are represented. Some of the polygons represent historic towns, mining districts, cabins, wickiups, game drives or other sites with organic or heat sensitive artifacts and features that can be damaged or destroyed by fire. Other areas have high site densities or rare site types and while these are not highly sensitive to fire, they can be severely impacted by fire suppression activities, especially construction of fire line with mechanized equipment. They occur within vegetation types ranging from low sagebrush to pinyon-juniper woodlands.
  - Future Desired Condition: Maintain integrity of these cultural resources.
- B-1 District-wide Areas of Exotic Vegetation Invasion.
  - Current Condition: Cheatgrass and other annual invasive species dominate these polygons. Isolated areas of sagebrush in early to mid seral condition and native perennial grasses are also present.
  - Future Desired Condition: Resource management objectives for these areas are to restrict the expansion of cheatgrass and other invasive vegetation into surrounding native plant communities and to increase the amount of perennial native vegetation available for livestock grazing, wildlife habitat and improvement.
- B-4 Areas Primarily Private Land and Urban Interface.

- Current Condition: The vegetation type of these polygons is primarily sagebrush and perennial grasses. Large acreages have been converted to crested wheatgrass seedings. The native vegetation response ranges from low to high. Due to low to moderate precipitation and current range conditions, previous wildfires have resulted in the invasion of annual vegetation. This demonstrates the potential for significant annual and non-native species invasion within portions of this polygon. The management objectives within these areas are to maintain and improve native vegetation conditions, maintain some crucial big game habitat, provide forage for livestock and protect private property.

- Future Desired Condition: Maintenance.

- B-8 Early Seral Sagebrush/Grasslands.

  - Current Condition: The primary vegetation type in this area is sagebrush and perennial grasses in lower elevations and Utah juniper and Pinyon pine at the higher elevations. However because of the frequent fire history and other vegetative disturbances in these areas, intrusions of annual invasive species and noxious weeds exist but do not dominate the area. Because of the current early seral conditions and low response potential within these areas, future fire occurences could potentially increase the amount of undesirable and invasive species in these areas to the extent that they could dominate the site. The management objectives for this area are to maintain and improve native vegetation conditions, limit the spread of annual invasive species and noxious weeds, protect critical watersheds, provide wildlife and livestock forage and provide woodland products from higher elevations.

  - Future Desired Condition: Maintain and/or improve sagebrush/perennial grass diversity. Prevent further encroachment of annual and non-native vegetation in the area.

- B-9 Crucial Mule Deer Winter Range.

  - Current Condition: The vegetation types in these crucial deer winter range areas vary from sagebrush and perennial grasses at lower elevations in western portions of the district office to Single-leaf pinyon pine (*Pinus monophylla*), Utah juniper (*Juniperus osteosperma*), Antelope bitterbrush (*Pershia tridentata*), and Curl-leaf mohagony (*Cercocarpus ledifolius*) with associated perennial grasses and sagebrush in eastern regions. Vegetation types and current conditions vary depending upon elevation and fire history. Many of the mule deer winter ranges in Elko County have been impacted by wildfire in the past several years. Rehabilitation efforts have been implemented in many areas. However, due to varying degrees of aspect and elevation, range site potentials, and pre-fire ecological conditions, the shrub component on these western ranges is limited in many areas. Because of the past several years, protection and seeded areas and the remaining intact portions of these crucial winter ranges from further fire impacts is critical. Because of current early seral conditions in some of these areas, future fire occurrences could potentially increase the amounts of undesirable and invasive species. The management objectives for these areas are to maintain and improve vegetative conditions, protect critical watersheds, provide wildlife and livestock forage and provide woodland products in pinyon-juniper areas.

  - Future Desired Condition: Maintain big game habitat and woodland integrity at higher elevations. Maintain sagebrush/perennial grass diversity at lower elevations. Prevent annual non-native plant encroachment.

- D-3 Mixed Confers.
  - Current Condition: These are high elevation areas with predominant vegetation type being White fir (*Abies concolor*), Limber Pine (*Pinus flexilis*), Bristlecone pine (*Pinus longaeva*), and Spruce (*Picea ssp.*). These stands isolated on the tops of the higher elevation mountain ranges in the eastern part of Elko District. Because of the lack of disturbance most of these stands are becoming even aged stands dominated by dead standing and down trees. There is a heavy fuel load associated with these areas, making them more susceptible to a large stand replacing fire. Desired management for these areas are to restore the health of the forest community.
  - Future Desired Condition: Healthy mosaic of uneven aged conifer stands with reduced fuel loadings.
- D-4 South Pequop Wilderness Study Area (WSA).
  - Current Condition: The vegetation types vary from sagebrush and perennial grasses to pinyon-juniper woodlands to mixed conifer woodlands. Primary management objectives for these areas are to maintain their natural characteristics and to comply with the Interim Management Policy for the Land under Wilderness Review.
  - Future Desired Condition: Maintain the natural ecology of the areas including pre-settlement fire activity. Prevent the encroachment of annual and non-native vegetation into the areas.

The above categories are separated by different management actions preferred for each category. Each category was evaluated by three components; Fire Prevention Activities, Fire Response, and Fire Rehabilitation. For the purpose of the proposed treatments, this document will only outline the management action of the fire prevention component:

- A-2 Cultural Sites, Historic and Protohistoric: No fire prevention actions proposed at this time.
- B-1 District-wide Areas of Exotic Vegetation Invasion: Prescribed fire is to be used in a selective manner in these areas, usually in conjunction with mechanical or chemical treatments designed to convert these areas to perennial vegetation. Planned ignitions can be used in a limited way to accomplish specific management objectives within areas of native vegetation. Chainings and seedings within this polygon would be maintained through the use of planned ignitions.
- B-4 Areas of Primarily Private Land and Urban Interface: Prescribed fire should be used to reduce fuel loadings in the urban interface and, to a limited extent, to improve native vegetation. Actively work with Nevada Division of Forestry (NDF) to accomplish fuels reduction through prescribed fire and mechanical means to lessen wildfire threat to developed areas. Work with private landowners and NDF to do collaborative prescribed fires where public lands abut private lands and opportunities exist to cross-jurisdictional boundaries to improve vegetative conditions.
- B-8 Early Seral Sagebrush/Grasslands: Prescribed fire should be limited in this area to achieving site-specific management objectives. An evaluation of historical unplanned ignitions and their impacts will be considered when developing prescribed fire goals for this polygon.

- B-9 Crucial Mule Deer Winter Range: Prescribed fire in the eastern regions of Elko County can be used to meet resource objectives while maintaining big game habitat and woodland integrity.
- D-3 Mixed Conifer: Prescribed fire should play a large part in this process. Because of the fuels build-up in these areas, a series of low-intensity prescribed fires should be done to reduce fuel loadings, open up mineral soil for seedling germination, and increase nutrient recycling and create a mosaic of uneven aged pockets within the stand while avoiding total destruction of the stand as a whole. Prescribed fire can be used in conjunction with thinning projects to reduce the number of stems per acre. Planned ignitions would be used in these areas to meet the management objective of maintaining a healthy stand. Planned ignitions would be low-intensity surface fires with allowable torching of pockets of heavy fuels and will be planned in cycles (five years prior to reentry) to gradually reduce fuel loadings and create mosaic of different aged stands.
- D-4 South Pequop WSA: Develop and apply fire prescription guidelines to allow for management of unplanned ignitions through monitoring and/or minimal suppression efforts if prescriptions guidelines are met.

3.4. Forestry and Forest Products

The proposed treatment area is in pinyon-juniper woodlands vegetative community. The site is dominated by Utah juniper (*Juniperus osteosperma*) intermixed with Single-leaf pinyon pine (*Pinus monophylla*). At the present time, an ocular estimation of site tree species compositions is 80% Utah juniper and 20% Single-leaf pinyon pine. The majority of trees in the proposed treatment area are mature to over-mature with all age classes being represented. The canopy closure of the stand ranges from approximately 30–60% throughout the proposed treatment areas. The lower tree densities can be found in the lower elevations transition zones with higher tree densities located in the upper elevations and drainages. Stand competition, combined with drought, has stressed the stand, leaving the stand more susceptible to insects and disease. One of the primary factors leading to poor tree health is too many trees spaced too closely (Skelly and Christopherson, undated). Within the last few years insect outbreaks have noticeably increased throughout the project area.

Present forest pest populations appear to be within expected tolerances under the current climatic cycles and can be found scattered through out the project area. Forest pests include but are not limited to Pinyon Engraver Beetle (*Ips Confusus*), Pinyon needleminer (*Coleotechnites sp.*), Pinyon sawfly (*Neodiprion edulicolus*), Pinyon needle scale (*Matsucoccus acalyptus*) (USDA Forest Service, 2003). It is reasonable to expect that without treatment and under continued drought conditions, the forest pest populations will increase.

Forestry products that may be found within the proposed treatment locations are; Pinyon nuts, Juniper posts, Wildings, Pinyon/Juniper/Mahogany firewood, and Christmas trees. A portion of the project location has been identified as a commercial Christmas tree cutting harvest area. Allowable harvest of Christmas trees for this unit has averaged 500 trees. Also, the proposed treatment lies completely within the Spruce Mountain commercial Pinyon Nuts ("pine nuts") harvest unit. Additionally, Spruce Mountain has been a home for cutting of domestic firewood , Juniper posts, as well as wildings of several species, including, Cliffrose (*Purshia stansburiana*), Antelope bitterbrush (*Purshia tridentata*), Curleaf mahogany (*Cercocarpus ledifolius*), Single — leaf pinyon pine and Utah juniper.

The tree species that occur within the proposed project location are; Utah juniper , Single-leaf pinyon pine, White Fir, Curl leaf mahogany (*Cercocarpus ledifolius*), Limber Pine (*Pinus flexilis*), and Great Basin bristlecone pine (*Pinus longaeva*). Of these species the pinyon and juniper are the trees to be focused on for treatment. In some cases White fir will be treated when disease is prevalent through the stand.

3.5. Hydrology and Riparian/Wetland

Hydrology

Water resources in the Spruce Mountain area include springs/seeps (springs), ephemeral/intermittent streams, and water wells. Spruce Mountain is located within the terminal basins of Independence Valley, Clover Valley, Butte Valley, and Goshute Valley. Water resource inventory data collected from 1979 to 2010 along with Proper Functioning Condition Assessments provide much of the information regarding flow, condition and other characteristics of these water resources and associated riparian values. Detailed information is only available for sources on public lands.

There are 15 springs in the Spruce Mountain area near the areas proposed for treatment (see map). Of these, 9 are located on public land and 6 are located on private land. Discharge from the springs on public land ranges from very little overland flow to around 4 gallons per minute. Spring flow varies by season and year reflecting climatic variability. These discharge measurements are not a quantification of total water produced by the spring since a portion or all water coming from a spring is evaporated, utilized by nearby vegetation, or seeps into groundwater near the spring source. A summary of flow rates for public land springs is presented in Table 3.2, " Springs on Public Land" (p. 32). Springs with no discharge rate shown are sources that express indications of a spring source as evidenced by riparian vegetation and/or surface ponding, but do not have any measurable overland flow. There are two sources near the Study Area that consist of a pond dug into a spring source. These sources do not express overland flow but usually contain water.

Most springs are developed to make surface water available for wild horses, livestock, and/or wildlife. Spring development was usually accomplished by piping a portion of spring water a short distance from the source into troughs or by constructing an earthen diversion for water collection.

Quantity of available water in the Spruce Mountain area is limited, and heavy use by wild horses and livestock typically results in less available water for other beneficial uses such as riparian vegetation and wildlife. Most springs within the complex have low flow and some available flow is consumed directly by wild horses, livestock or wildlife. There are several operating water wells near Spruce Mountain that provide water to wild horses, livestock and/or wildlife. These wells are operated at the discretion and expense of the livestock grazing permittee.

There are no known water contaminations within Spruce Mountain area that have resulted in an inability to use water resources for their known beneficial uses. Some water quality data has been collected, but these data are insufficient to determine trends at local springs and do not include any nutrient or bacteria data. For purposes of evaluation, riparian condition assessments can be used to determine whether and to what extent water quality is under anthropogenic influence. In general, a spring is more likely to have water quality issues if its riparian area has been rated as non-functional, than if it is rated at proper functioning condition.

Riparian/Wetland

The Spruce Mountain Area has scattered riparian areas which are associated with springs/seeps (springs). These small springs provide water, forage and habitat diversity for native wildlife, livestock, and/or wild horses. These systems occupy less than 0.1% of the landscape but are disproportionally important for biodiversity and users of the landscape including humans.

Riparian condition assessments were conducted between 2006 and 2010 to evaluate the condition of selected riparian areas. Riparian condition assessments are qualitative assessment of riparian areas based on quantitative science. The methodology evaluates the functionality of riparian areas based on hydrological, vegetation, and soils/erosional factors, within the context of the geologic setting and the potential of the area. Prichard et al. (1999) suggests the following definitions for spring and lentic areas: "Lentic riparian-wetland areas are functioning properly when adequate vegetation, landform, or debris is present to:

1. dissipate energies associated with wind action, wave action, and overland flow from adjacent sites, thereby reducing erosion and improving water quality;
2. filter sediment and aid floodplain development;
3. improve flood-water retention and ground-water recharge;
4. develop root masses that stabilize islands and shoreline features against cutting action;
5. restrict water percolation;
6. develop diverse ponding characteristics to provide the habitat and water depth, duration, and temperature necessary for fish production, water bird breeding, and other uses;
7. and support greater biodiversity."

Riparian condition assessments conducted at six riparian areas throughout the Spruce Mountain area indicated that lentic riparian areas are generally in poor condition. It was determined that there was one spring functioning at risk with no apparent trend, 3 springs functioning at risk with downward trend, and 2 springs with non-functional riparian areas.

Table 3.2. Springs on Public Land

Legal Description	Source Name	Source Type	Flow Rate (gal/min)	Type of negative impacts				PFC Rating*
				Grazing/ Hoof action	Wild Horses	Cattle	Diversion	
N30 E63 02AD	Basco Spring	spring	3.2				x	NF[b]
N31 E63 12BBC	West Latham Spring	spring	2.5	x	x	x		FARD[c]
N31 E63 12BBD	Latham Spring	spring	3.6					FARN[d]
N31 E63 36AC	unnamed spring	spring	4	x				FARD[c]
N31 E64 06BD	South Latham Spring	spring	0.02				x	NF[b]
N31 E64 18BC	Side Hill Spring	spring	1.82					
N31 E65 20CA	Lower Boone Spring	spring	0.58				x	NF[b]
N33 E64 32ADB	Dugout Spring	spring/pond	0.00					
N33 E64 29D	North Spring	spring/pond	0.00					

*PFC Rating

[b]NF = Non Functional
[c]FARD = Functional At Risk Downward Trend
[d]FARN = Functional At Risk No Apperent Trend

Data recorded at spring sites indicated that poor riparian condition is caused by impacts related to wild horse use, grazing in general, and water diversion. Water diversion was determined to be a causal factor where riparian areas were small or lacking key components yet water was available or abundant in the diversion.

3.6. Invasive, Non-Native Species

The BLM defines an invasive weed as, "a non-native plant that disrupts or has the potential to disrupt or alter the natural ecosystem function, composition and diversity of the site it occupies. Its presence deteriorates the health of the site, it makes efficient use of natural resources difficult and it may interfere with management objectives for that site. It is an invasive species that requires a concerted effort (manpower and resources) to remove from its current location, if it can be removed at all" (BLM National List of Invasive Weed Species of Concern).

Invasive and non-native plant species may spread from infested areas by people, equipment, livestock, wildlife, and winds. They often exhibit aggressive growth and have the potential to seriously degrade the economic and ecological values of natural resources. Under Executive Order 13112, it is the policy of the land management agencies to prevent introduction of noxious weeds, invasive and non-native species and to control their impact (NISC, 2010). Nevada Revised Statute 555.005 defines noxious weeds as plants which are likely to be "detrimental or destructive and difficult to control or eradicate."

The BLM's GIS database was evaluated to find what weeds are known to exist within or adjacent to the Study Area and these include: Scotch thistle (*Onopordum acanthium*), Russian knapweed (*Acroptilon repens*), and whitetop (*Cardaria draba*). Weeds suspected (although not confirmed) to exist within the project boundary include bull thistle (*Cirsium arvense*) and Canada thistle (*Cirsium vulgare*). Cheatgrass (*Bromus tectorum*) and halogeton (*Halogeton glomeratus*) are both invasive, annual species which also occur within the project area. Although weeds do occur within the Study Area they are generally found in low densities widely scattered across the landscape.

3.7. Migratory Birds

"Migratory bird" means any bird listed in 50 CFR 10.13. All native birds found commonly in the United States, with the exception of native resident game birds, are protected under the Migratory Bird Treaty Act (MBTA). The MBTA prohibits taking of migratory birds, their parts, nests, eggs, and nestlings. Executive Order 13186, signed January 10, 2001, directs federal agencies to protect migratory birds by integrating bird conservation principles, measures, and practices. Additional direction comes from the Memorandum of Understanding (MOU) between the BLM and the United States Fish and Wildlife Service (USFWS), signed January 17, 2001. The purpose of this MOU is to strengthen migratory bird conservation through enhanced collaboration between the BLM and USFWS, in coordination with state, tribal, and local governments. The MOU identifies management practices that impact populations of high priority migratory bird species, including nesting, migration, or over-wintering habitats, on public lands, and develops management objectives or recommendations that avoid or minimize these impacts. A wide variety of migratory birds are found within the project area. These species are associated with a variety of habitat types, and many occur within the project vicinity year round. Table 3.3,

"Migratory Bird Species Considered Located In or Near the Project Area" (p. 34) provides a compilation of the migratory bird species considered present within the Study Area based on habitat requirement present for certain species.

Table 3.3. Migratory Bird Species Considered Located In or Near the Project Area

	Sagebrush	Mountain Shrub	Cliffs/Talus	Mountain Riparian	Lowland Riparian	Pinyon/ Juniper	Salt Desert Scrub
American Kestrel	X	X				X	
American Robin	X	X		X	X		
American Goldfinch							X
Ash-throated Flycatcher					X		
Bank Swallow					X		
Black Rosy Finch	X	X	X *				
Black-throated Gray Warbler		X				X	
Black-throated Sparrow	X						
Blue Grosbeak		X			X		
Blue Grouse				X	X		
Blue-gray gnatcatcher		X				X	
Brewer's Sparrow	X						
Brewer's Blackbird	X						
Broad-tailed Hummingbird				X			
Burrowing Owl	X	X					X
Bushtit		X		X		X	
Canyon Wren			X				
Calliope Hummingbird	X	X		X			
Chipping sparrow		X					
Clark's nutcracker						X	
Cliff Swallow			X				
Common nighthawk		X				X	X
Common Raven			X				
Common 'poorwill		X				X	X
Cooper's Hawk	X	X		X			
Dark-eyed junco		X				X	
Ferruginous Hawk	X		X			X	
Fox Sparrow	X			X			
Gray Flycatcher	X					X	
Gray Vireo		X				X	
Green-tailed Towhee	X						
Golden Eagle			X				
Horned Lark	X						
Juniper Titmouse						X	
Lark Sparrow	X						
Lewis' Woodpecker	X			X			X
Loggerhead Shrike	X	X					X
MacGillivray's Warbler		X		X*			
Mountain Bluebird		X					
Mountain Chickadee		X					
Northern Flicker	X						

	Sagebrush	Mountain Shrub	Cliffs/Talus	Mountain Riparian	Lowland Riparian	Pinyon/ Juniper	Salt Desert Scrub
Northern Goshawk	X		X	X			
Orange-Crowned Warbler	X	X		X			
Pinyon Jay						X	
Plain Titmouse		X					
Prairie Falcon	X		X*				
Red-naped Sapsucker	X			X			
Red-shafted Flicker	X						
Rock Wren			X				
Sage Grouse	X*						
Sage Sparrow	X						
Sage Thrasher	X						
Say's Phoebe			X				
Scrub Jay		X					
Scott's Oriole						X	
Short-eared Owl		X					
Southwest Willow Flycatcher					X		
Swainson's Hawk	X	X					
Turkey Vulture	X		X			X	X
Vesper Sparrow	X	X					
Violet-green Swallow			X				
Virginia's Warbler				X	X	X	
Warbling Vireo				X			
Western Bluebird		X				X	X
White-breasted Nuthatch		X					
White-throated Swift			X				
Willow Flycatcher				X			
Western Meadowlark	X	X					
Wilson's Warbler				X*			
Yellow-breasted Chat				X	X		

*"Obligates" are species that are found only in the habitat type described in the section. [Habitat needed during life cycle even though a significant portion of their life cycle is supported by other habitat types]

Table 3.4. Migratory Birds In or Near Study Area and Their Habitat Associations

Common Name	Scientific Name	PIF[a] *"Long term Planning and Responsibility Species"*	NVPIF[b] "Priority Species"	Habitat Associations*
American kestrel	*Falco sparverius*	No[a*]	No	Found in various open and semi-open habitats. Nest in natural holes in trees and abandoned bird nests.
American Robin	*Turdus migratorius*	No	No	Found in mixed, coniferous, and hardwood forests, grasslands, shrublands, and orchards.
American Goldfinch	*Spinus tristis*	No	No	Found in open areas and semi-open habitats.

Common Name	Scientific Name	PIF[a] *"Long term Planning and Responsibility Species"*	NVPIF[b] "Priority Species"	Habitat Associations*
Ash-throated Flycatcher	Myiarchus cinerascens	No	Yes	Found in arid and semi-arid scrub, open woodland, and riparian woodlands
Bank Swallow	Riparia riparia	No	Yes	Found at open water riparian habitats
Black Rosy Finch	Leucosticte atrata	Yes	Yes	Breeds in alpine areas, usually near rock piles, and cliffs. Winters in open country, including mountain meadows, high deserts, valleys, and plains.
Black-throated gray warbler	Dendroica nigrescens	Yes	Yes	Found mostly in piñon-juniper woodlands, and less frequently in mountain mahogany and montane riparian woodlands.
Black-throated sparrow	Amphispiza bilineata	No	No	Found in desert and shrubland/chaparral. Nests are well-concealed at the base of a bush or cactus, on or near the ground.
Blue Grosbeak	Passerina caerulea	No	Yes	This species is found in partly open habitat with scattered trees, riparian woodland, scrub, thickets, cultivated lands, woodland edges, overgrown fields, or hedgerows. It nests in a low tree or bush or a tangle of vegetation, usually about 1–3 m above ground, often at the edge of an open area.
Blue Grouse	Dendragapus obscurus	Yes	No	The blue grouse can be found in bush areas in coastal rain forests, burned areas, mountain forests and subalpine forest clearings.
Blue-gray gnatcatcher	Polioptila caerulea	No	No	Found in deciduous forest, open woodland, second growth, scrub, brushy areas, chaparral, and in open piñon-juniper woodland. Nests where tracts of brush, scrub, or chaparral are intermixed with taller vegetation

Common Name	Scientific Name	PIF[a] *"Long term Planning and Responsibility Species"*	NVPIF[b] "Priority Species"	Habitat Associations*
Brewer's Sparrow	Spizella breweri	Yes	No	Found closely associated with sagebrush, preferring dense stands broken up with grassy areas. Adults return persistently to the same breeding sites each year. In the northern part of their range, they can be found in habitats such as sub-alpine fir or dwarf birch, or montane pinon-juniper woodlands.
Brewer's blackbird	Euphagus cyanocephalus	No	No	Found in agricultural fields that have brushy edges, open areas including parks, campgrounds, parking lots, wetlands, and suburban and urban settings.
Broad-tailed Hummingbird	Selasphorus platycercus	No	No	Found in open woodland, especially pinyon-juniper and pine-oak association, brush hillsides, montane scrub and thickets, in migration and winter also open situations in lowlands where flowering shrubs are present.
Burrowing owl	Athene cunicularia	No	Yes	Found in valley bottoms. Nest primarily in abandoned burrows of ground squirrels, badgers, and coyotes.
Bushtit	Psaltriparus minimus	No	No	Found in woodlands and scrub habitat with scattered trees and shrubs, in brushy streamsides, piñon-juniper, chaparral and pine-oak associations.
Canyon Wren	Catherpes mexicanus	No	No	Found in cliffs, canyons, rocky outcrops, and boulder piles.

Common Name	Scientific Name	PIF[a] *"Long term Planning and Responsibility Species"*	NVPIF[b] "Priority Species"	Habitat Associations*
Calliope Hummingbird	Stellula calliope	Yes	Yes	The Calliope prefers high mountains, and has been seen as high as 11,000 feet. It builds its nests over creeks or over roads next to streams or lakes, usually repairing the previous year's nest or constructing a new one atop the old. This bird usually forages within five feet of the ground.
Chipping sparrow	Spizella passerina	No	No	Found in woodlands edges, dry open woodlands, in pine-oak forests, along river and lakes shores, on lawns, grassy fields, orchards and parks.
Clark's nutcracker	Nucifraga columbiana	Yes	No	Found in piñon-juniper woodlands, and in higher elevation coniferous forests including ponderosa/Jeffrey pine forest, red fir forest, and spruce-fir forests.
Cliff swallow	Petrochelidon pyrrhonota	No	No	Found in open canyons and river valleys with rocky cliffs for nesting, under bridges and freeways, farmland, wetlands, prairies, residential areas, road cuts and over open water. Require a source of mud for their nests.
Common nighthawk	Chordeiles minor	No	No	Found in open habitats, from shrub-steppe, grassland, and agricultural fields to cities, clear-cuts, and burns, as long as there are abundant flying insects and open gravel surfaces for nesting.
Common raven	Corvus corax	No	No	Found in dense forests, open sagebrush country, and alpine parklands.
Common poorwill	Phalaenoptilus nuttallii	No	No	Found in valleys and foothills, mixed chaparral-grassland, and piñon-juniper habitat. Nests in open areas on a bare site.

Common Name	Scientific Name	PIF[a] *"Long term Planning and Responsibility Species"*	NVPIF[b] "Priority Species"	Habitat Associations*
Cooper's hawk	Accipiter cooperii	No	Yes	Nests in old, tall deciduous tree groves, such as cottonwood stands.
Dark-eyed junco	Junco hyemalis	No	No	Habitats include various sorts of coniferous, mixed, and deciduous forest, forest edge; forest clearings, open woodland. Nests are in scrapes on the ground and usually are concealed by logs, rocks, tree roots, leaves, or ground vegetation.
Ferruginous Hawk	Buteo regalis	Yes	Yes	Found in arid and semi-arid grassland regions of North America. The countryside is open, level, or rolling prairies; foothills or middle elevation plateaus largely devoid of trees; and cultivated shelterbelts or riparian corridors. Rock outcrops, shallow canyons, and gullies may characterize some habitats. These hawks avoid high elevations, forest interiors, narrow canyons, and cliff areas.
Fox Sparrow	Passerella iliaca	No	No	Breeding Fox Sparrows can be found at high elevations, especially in wet meadows or in scattered conifers. Wintering Fox Sparrows inhabit recent clearcuts and tangled brush, especially blackberry thickets.
Gray flycatcher	Empidonax wrightii	Yes	Yes	Found in tall sagebrush and bitterbrush stands and the sagebrush shrubland/piñon juniper transitional zone. Nest in tall sagebrush or conifers.
Gray vireo	Vireo vicinior	Yes	Yes	Found in open piñon-juniper woodlands. Nest in west or north facing trees in forked, lateral branches.

Common Name	Scientific Name	PIF[a] *"Long term Planning and Responsibility Species"*	NVPIF[b] "Priority Species"	Habitat Associations*
Green-tailed towhee	Pipilo chlorurus	Yes	No	Found in mixed-species shrublands of intermediate and higher elevations, including piñon-juniper woodlands, montane sage steppe, and aspen. Nest on or near the ground under dense shrub cover.
Golden eagle	Aquila chrysaetos	Yes	Yes	Found in generally open country, in prairies, tundra, open coniferous forest and barren areas, especially in hilly or mountainous regions, nesting on cliff ledges and in trees.
Horned lark	Eremophila alpestris	No	No	Found in open, barren country. Prefers bare ground to short grasses.
Juniper titmouse	Baeolophus ridgwayi	No	Yes	Found in piñon-juniper woodlands. Nest constructed in natural tree cavity, in old woodpecker hole
Lark sparrow	Chondestes grammacus	No	No	Found in shortgrass, mixed-grass, and tallgrass prairie; parkland; sandhills; barrens; old fields; cultivated fields; shrub thickets; woodland edges; shelterbelts; parks; riparian areas; brushy pastures; and overgrazed pastures. Nest on ground near plant or bush or in low tree or bush. May use old nest of mockingbird or thrasher.
Lewis' woodpecker	Melanerpes lewis	Yes	Yes	Found in open pine woodlands, and other areas with scattered trees.
Loggerhead shrike	Lanius ludovicianus	No	Yes	Found in open shrublands, including Mojave scrub, Joshua tree, salt desert scrub, sagebrush, lowland riparian, and montane riparian.
MacGillivary's warbler	Oporornis tolmei	No	Yes	Nests in dense riparian willow and alder at the edges of meadows, coniferous or mixed woods.

Common Name	Scientific Name	PIF[a] *"Long term Planning and Responsibility Species"*	NVPIF[b] "Priority Species"	Habitat Associations*
Mountain bluebird	Sialia currucoides	Yes	No	Found in coniferous forest edges, open woodlands, and in the transitional area between piñon-juniper woodlands and sagebrush.
Mountain chickadee	Poecile gambeli	No	No	Found in dry coniferous forests, especially ponderosa and lodgepole pines. During the summer they can also be found in high-elevation aspen forests. In winter, they sometimes inhabit juniper stands and river bottoms.
Northern flicker	Colaptes auratus	No	No	Found in open forest, both deciduous and coniferous, open woodland, open situations with scattered trees and snags, riparian woodland, pine-oak association, parks. Nests in dead tree trunk, or stump, or dead top of live tree; sometimes nests in wooden pole, building or earth bank.
Northern goshawk	Accipiter gentilis	Yes	Yes	Found in various forest types, especially mature forest
Orange-crowned warbler	Vermivora celata	No	Yes	Breeds in streamside thickets and woodland groves with moderately dense foliage, and in understory of forests and chaparral. Winters in thickets and shrubs along streams, forests, weedy fields, and dense tangles of shrubs and vines.
Piñon jay	Gymnorhinus cyanocephalus	No (Management)	Yes	Found almost exclusively in piñon-juniper and occasionally wander into sagebrush and Joshua tree.
Plain titmouse	Baeolophus inornatus	Yes	Yes	Found in warm, dry woodlands at low to mid-elevations.
Prairie falcon	Falco mexicanus	No	Yes	Forages in sagebrush, salt desert, wet meadows, and some agricultural areas; nest in cliff ledges with overhead cover.

Common Name	Scientific Name	PIF[a] *"Long term Planning and Responsibility Species"*	NVPIF[b] "Priority Species"	Habitat Associations*
Red-naped sapsucker	Sphyrapicus nuchalis	No	Yes	Breeds in deciduous and mixed montane forests, often associated with willows and aspens. Winters in diverse habitats, including orchards and pine-oak woodlands.
Red-shafted flicker	• Colaptes auratus	No	No	Found in open habitats near trees, including woodlands, edges, yards, and parks. In the West you can find them in mountain forests all the way up to treeline.
Rock wren	Salpinctes obsoletus	No	No	Found in bare rock, talus, scree, on cliffs, and in the desert and shrubland/chaparral. Nest in gopher burrows, rock crevices, cavities under rocks, adobe buildings, etc.
Sage grouse	Centrocercus urophasianus	Yes	Yes	Found in foothills, plains, and mountain slopes where sagebrush is present.
Sage sparrow	Amphispiza belli	Yes	Yes	Found in big sagebrush and associated shrub species. Nest close to and on the ground under shrubs or in grass tufts.
Sage thrasher	Oreoscoptes montanus	Yes	Yes	Found in big sagebrush stands, in greasewood flats, and montane sagebrush steppe. Nest on the ground or in the shrub canopy, depending on greatest overhead cover.
Say's Pheobe	Sayornis saya	No	No	Found in open country, sagebrush, badlands, dry barren foothills, canyons, borders of deserts, and ranches. Often around buildings. Avoids watercourses and heavy forest.
Scott's oriole	Icterus parisorum	No	Yes	Desert-facing slopes of mountains and foothills, where yuccas are common.

Common Name	Scientific Name	PIF[a] *"Long term Planning and Responsibility Species"*	NVPIF[b] "Priority Species"	Habitat Associations*
Short-eared Owl	Asio flammeus	Yes	Yes	Inhabits wide open spaces such as grasslands, prairie, agricultural fields, salt marshes, estuaries, mountain meadows, and alpine and Arctic tundra. Breeding habitat must have sufficient ground cover to conceal nests and nearby sources of small mammals for food.
Southwest Willow Flycatcher	Empidonax traillii extimus	Yes	Yes	Breeds in moist, shrubby areas, often with standing or running water. Winters in shrubby clearings and early successional growth.
Swainson's Hawk	Buteo swainsoni	Yes	Yes	Found in open country such as grassland, shrubland, and agricultural areas.
Turkey vulture	Cathartes aura	No	No	Found in forested and open situations, from lowlands to mountains.
Vesper sparrow	Pooecetes gramineus	No	Yes	Found in sagebrush steppe and dry-grassland associated species during breeding. Nest on the ground under vegetative cover.
Violet-green swallow	Tachycineta thalassina	No	No	Breeds in open woodlands, especially at middle elevations
Virginia's warbler	Oreothlypis virginiae)	Yes	Yes	Found in steep-sloped, xeric, piñon-juniper and oak woodland–dominated habitat,
Warbling vireo	Vireo gilvus	No	No	Found in habitat that is open deciduous or shrubby mixed woodlands, especially where large trees are present. Warbling Vireos are often found in willow or cottonwood stands along rivers. They are not found in large, unbroken tracts of woods, but prefer smaller patches and edges, including logged areas,

Common Name	Scientific Name	PIF[a] *"Long term Planning and Responsibility Species"*	NVPIF[b] "Priority Species"	Habitat Associations*
Western bluebird	Sialia mexicana	No	Yes	Open coniferous and deciduous woodlands, wooded riparian areas, grasslands, farmlands, and edge and burned areas.
White-breasted nuthatch	Sitta carolinensis	No	No	White-breasted Nuthatches are birds of mature woods, and they're more often found in deciduous than coniferous forests (where Red-breasted Nuthatches are more likely). You can also find them at woodland edges and in open areas with large trees,
White-throated swift	Aeronautes saxatalis	Yes	No	Found in rocky cliffs and canyons
Willow flycatcher	Empidonax traillii	Yes	Yes	Breeds in moist, shrubby areas, often with standing or running water. Winters in shrubby clearings and early successional growth.
Western meadowlark	Sturnella neglecta	No	No	Found in grasslands, savanna, cultivated fields, and pastures. Summers in grasslands and valleys; ranges up to higher elevations in foothills and open mountain areas. Female builds nest on dry ground.
Western scrub jay	Aphelocoma californica	No	No	Found in scrub (especially oak, piñon and juniper), brush, chaparral and pine-oak associations. Nest in low trees or shrubs.
Wilson's warbler	Wilsonia pusilla	No	Yes	Breeds in shrub thickets of riparian habitats, edges of beaver ponds, lakes, bogs, and overgrown clear-cuts of montane and boreal zone. Winters in tropical evergreen and deciduous forest, cloud forest, pine-oak forest, and forest edge habitat; also found in mangrove undergrowth, secondary growth, thorn-scrub, dry washes, riparian gallery forest, mixed forests,

Common Name	Scientific Name	PIF[a] *"Long term Planning and Responsibility Species"*	NVPIF[b] "Priority Species"	Habitat Associations*
				brushy fields, and plantations.
Yellow-breasted chat	Icteria virens	No	Yes	Dense second-growth, riparian thickets, and brush.

[a]Partners in Flight North American Landbird Conservation Plan. (March 2005).
[b]Nevada Partners in Flight (Neel 1999).
*References: NatureServe 2010 and Great Basin Bird Observatory 2005.

3.8. Native American Religious Concerns

In accordance with the National Historic Preservation Act (P.L. 89-665), the National Environmental Policy Act (P.L. 91-190), the Federal Land Policy and Management Act (P.L. 94-579), the American Indian Religious Freedom Act (P.L. 95-341), the Native American Graves Protection and Repatriation Act (P.L. 101-601) and Executive Order 13007, the BLM must provide the affected Tribes and Bands the opportunity to comment and consult on proposed BLM land management actions. The BLM must also make efforts to identify locations having traditional cultural or religious values to Native Americans and insure that land management actions do not unduly or unnecessarily burden the pursuit of traditional religion or life ways by inadvertently damaging important locations or hinder access to them.

The Western Shoshone and possibly other tribes of the Western Great Basin traditionally occupied the lands within the Elko BLM District Office administrative boundary. Historically, the people hunted and gathered, built temporary shelters and participated in the various social gatherings, activities, and ceremonies that define a culture. The Western Shoshone found and continue to find strength or spirituality in all living things upon the land including the land itself. Therefore, it is believed that the area in question may contain locations of religious/spiritual importance or concern.

Such sites of importance include, but are not limited to: Existing antelope traps; certain mountain tops used for prayer, guidance, and reflection; medicinal and edible plant gathering locations; prehistoric and historic village sites and gravesites; sites associated with creation stories; hot and cold springs; material used for basketry and cradle board making; locations of stone tools such as points and grinding stones (mono and matate); chert and obsidian quarries; hunting sites; sweat lodge locations; locations of pine nut ceremonies, traditional gathering, and camping; rocks or boulders used for offerings and medicine gathering; tribally identified Traditional Cultural Properties (TCP's); TCP's found eligible to the National Register of Historic Places; rock shelters; "rock art" locations; lands that are near, within, or bordering current reservation boundaries; lands that conflict with tribal land acquisition efforts that involve the Nevada Congressional Delegation; water sources in general, which are often considered the "life blood of the Earth and all who dwell upon it."

3.9. Public Health and Safety

Human health and safety was evaluated in the Final Programmtic Environmental Impact Statement for Vegetation Treatments Using Herbicides on BLM Lands in 17 Western States (BLM, 2007). The EIS identified two possible receptors to exposure to herbicides: occupational

receptors and public receptors. Occupational receptors would be limited to those workers who mix, load, and apply herbicides. Public receptors would be limited to members of the public most likely to come in contact with herbicides, i.e ranchers, hunters, etc.

3.10. Lands with Wilderness Characteristics

BLM staff competed a Lands with Wilderness Characteristics Inventory (LWC), in fall of 2011 for the areas that are proposed for treatment. The LWC inventory covered over 100,000 acres in the Spruce Mountain area. The updated inventories determined that none of the proposed treatment areas are within lands that have wilderness character. Therefore, LWC's will not be discussed any further in this document. A complete record of the LWC inventory is on file at the Bureau of Land Management, Elko District Office.

3.11. Livestock Grazing

Grazing of domestic cattle, sheep and horses has occurred on public and private lands in the area since at least the 1860's. Livestock grazing on public lands remained unregulated until the passage of the 1934 Taylor Grazing Act established the U.S. Grazing Service. Public lands were then adjudicated and forage allocated for livestock. It is anticipated that levels of livestock grazing or equivalent use would remain consistent at or near present levels on public lands within the study area. Animal numbers on private lands could increase or decrease at the landowner's discretion.

Livestock grazing is one of the most important economic activities in Elko County. A 2003 study identified 142 economic sectors within the Elko County economy. Cattle ranching recorded $53.8 million in output value, which ranked this industry 8th out of the 142 sectors; the sector employed 482 people, representing 2.53% of the total workforce, which ranked this sector 9th out of the 142 sectors; the industry realized $43.5 million in export sales, representing 5.77% of Elko County's total exports, which ranked this sector 4th out of the 142 sectors. Total economic impact of the industry to Elko County amounted to $96.6 million dollars, with a total direct and indirect payroll of 905 jobs representing $14.4 million in income (Alevy, Jonathan, et al., 2007; Fadali, Elizabeth, et al., 2007; Fadali, Elizabeth, and Thomas R. Harris, 2006; Harris, Thomas R., et al., 2006).

Elko County has a land base of just less than eleven million acres, of which 71.5% is in federal ownership. Private farm and rangelands occupy another 26% of the county's land base, with the remaining 2.5% of the land base occupied by other uses. Hay is the principle crop raised on the private farmlands. The 1997 Census of Agriculture counted 402 farms and ranches in the county, with an aggregate cow herd ranking Elko County fourth in the nation in terms of animal numbers. Approximately 68% of all Elko County beef cow operations held federal grazing permits. The average Elko County ranch derives 49% of its annual forage requirements from public lands. Each Animal Unit Month (AUM) utilized on public lands in Elko County is estimated to have a total production value of $38 and a total economic impact of $68 when considered independently of private land resources; when combined with private lands involved in livestock operations, these figures increase to an annual production value of $84 per AUM and a total economic impact of $148 per AUM. In 2006 an estimated 152,000 cows grazed within the county.

There are currently two grazing permits for the Spruce Allotment. Livestock grazing under both permits is in accordance with the 1998 Spruce Final Multiple Use Decision (FMUD). The Spruce Allotment is divided into 16 unfenced pastures, or use areas. Under the 1998 Spruce FMUD a grazing system was implemented that rotates grazing use and rest in the use areas. Livestock

grazing generally occurs in the mountain use areas in the summer and in valley use areas in the fall, winter and spring. One permit allows cattle to graze from 3/01 to 2/28 annually, with 10,908 AUMs (active) and 2,458 AUMs (suspended). Based on the 2003 study, this grazing permit represents a total potential annual economic impact of $741,744 to the Elko County economy for the active AUMs on public lands alone ($1,614,384 including private lands). The second permit allows cattle to graze from 11/1 to 5/31 annually, with 57 AUMs (active). Based on the 2003 study, this permit represents a total potential annual economic impact of $3,876 to the Elko County economy for the active AUMs on public lands alone ($8,436 including private lands). These grazing permits are most likely an important source of feed for the associated grazing operations.

Livestock require food for energy to maintain body function and growth. A combination of carbohydrates, fats, proteins, minerals and vitamins are required for animal development, weight gain and milk production; these are obtained through the consumption of forage. The nutrients found in forage vary by plant species and by season, so a wide variety of forage plants is desirable for providing nutrients for livestock. Because of the natural variation in forage nutritional content, livestock operators may supplement the diet of their livestock with minerals and protein. The successful and prolific production of livestock is necessary for the viability of the grazing operation and for the stability of the operator's livelihood.

3.12. Recreation

Recreation in the Study Area consists of mostly dispersed recreation, no developed recreation opportunities exist. The BLM has placed trail counters in the area to try and get accurate accounts of the number of visitors to the area. Data has been sporadic showing that the area gets used year-round, including winter months, and higher use occurs on weekdays rather than weekends. Field observations suggest that recreationists are scouting for big game in preparation for a hunting season or users comb the area for wildlife antler sheds. All Terrain Vehicle (ATV) or 4–wheeleruse is popular for the activities mentioned previously and for sightseeing and riding for pleasure. Approximately 280 big game tags (Antelope, Mule Deer and Elk) are issued by the Nevada Department of Wildlife on a yearly basis for Hunt Unit 105 and the surrounding areas. Camping occurs at the lower elevations and at some historic sites on the western edge of Spruce Mountain. There are no designated camp areas, only cleared areas within the trees. OHV use, driving for pleasure, hunting, and wildlife viewing are the major recreation uses of the area.

In 2004 the Elko Convention and Visitors Authority (ECVA) began promoting the Spruce Mountain Area as a recreation destination. Focus was on camping and riding Off Highway Vehicles (OHV) in the area. Participants were encouraged to view wildlife, scenery, and historic sites. BLM in cooperation with the ECVA, Nevada Department Of Wildlife (NDOW) and other interested parties, began developing a management plan for the Spruce Mountain area to balance recreation use with protecting crucial wildlife habitat and sensitive cultural sights in the area.

BLM is in a planning process for amending the Wells Resource Management Plan (RMP) for Recreation at Spruce Mountain. Public scoping occurred in fall 2011 and the BLM is working on a final project proposal and alternatives. BLM's objectives are to amend the existing OHV Area designation in the Wells RMP from "Open" (unrestricted cross-country travel), to "Limited" OHV travel. Limitations could include type or mode of travel; time or season of use; vehicle type; administrative use only; or limited to only those routes that are designated through this planning process. The plan would also designate the area an Extensive Recreation Management Area, where recreation is planned and actively managed on an interdisciplinary basis, in concert with

other resources. The project also includes a defined travel network in the area. A decision record for the Spruce Mountain Recreation Amendment to the Wells RMP is expected in winter 2012.

Currently Hunt Unit 105 has a travel restriction for motorized use, requiring vehicles to stay on existing roads and two-tracks, through a Federal Register Notice. The purpose of the restriction is to temporarily manage OHV use until a management plan for the Spruce area can be completed. The restriction protects important cultural resources and wildlife habitat and addresses imminent adverse impacts from OHV use off of existing roads and two-tracks.

3.13. Soils

Soils in the Study Area are Aridisols that vary in depth, texture, erosion potential, and other characteristics based upon several soil forming factors. These soils typically have a mesic or frigid temperature regime and aridic soil moisture regime. Isolated patches of hydric soils may be present near water resources. Topography within proposed treatment areas typically consists of mountains, hills and dissected alluvial fans. Soils on these features are generally shallow over bedrock or duripan and formed from colluvium and residuum in mountains, and alluvium on dissected alluvial fans. All soils in the various treatment areas have medium textures, typically silts and loams, and are well drained. These soils have a low hazard of erosion by wind and a slight to moderate hazard of erosion by water when disturbed. The maximum amount of erosion that can occur on these soils without affecting crop productivity is one ton per acre per year over a sustained period. Additional information for these soils can be found in The Soil Survey of Elko County Southeast Part, Nevada (NRCS 1993).

Soils in some treatment areas have a biological soil crust cover. These crusts occur in the interspaces between gravels on the lower fan remnant slopes. On the southern end of Spruce Mountain where limestone outcrops occur there is a very high crust cover which provides the soil surface a pinnacled micro topography. Sites with the densest crust cover occur on the most calcareous sites in the pinyon-juniper and mahogany vegetation types (BLM 2005). Biological soil crusts are important for reducing wind erosion, inhibiting weed growth, improving infiltration and preventing soil splash (Belnap, 2001).

Soils within and near the project areas are currently impacted by a wide variety of natural and anthropogenic influences. Actions which affect soil quality include but are not limited to recreation, historic mineral exploration/mining, wildfire, climatic variability, grazing, and hoof action. These activities can result in a variety of impacts which vary in spatial and temporal scale and severity.

Most existing impacts to soils are dispersed; however, there are some impacts from fencing road construction, livestock improvements, livestock/wild horse trailing and historic mining which result in small scale, potentially severe impacts to soils. These activities result in removal of vegetation, soil compaction, and other impacts to soil quality factors. Impacts from most temporary roads, past vegetation treatments, fences and other temporary disturbance have not been observed to impact soil quality in the long term. Continued use of historic mining roads, livestock/wild horse trails and historic mining however, continue to result in small scale impacts to soils which are not likely to recover without targeted restoration.

Proposed treatment areas also receive long term low intensity impacts from livestock/wild horse grazing, dispersed recreation, and climatic variability. Although cattle have not grazed the area since 2009, the area has been grazed historically by cattle and wild horses likely resulting in

some impacts to soil quality. In general, grazing impacts soil quality directly through alteration of physical soil properties and indirectly through removal of vegetation. Recent drought and climatic variability in general has likely affected soil quality by reducing vegetative productivity, infiltration, aggregate stability, and other soil quality factors. These impacts are likely exacerbated by the effects of global climate change.

Existing soil quality has likely been affected in the Spruce Mountain area by the increase in the extent and density of the pinyon juniper vegetative community. Lack of wildfire impacts to the pinyon juniper communities in most treatment areas has likely led to changes in soil factors. In general, soils that support pinyon juniper woodlands experience greater soil erosion, lose more water, and experience lower soil productivity than soils on similar landscapes that support a more diverse vegetative community (Bunting et. a.l 1999, Roundy et. al. 1999).

A detailed evaluation of soil quality for proposed project areas has not been completed; however, BLM and NDOW specialists have visited proposed treatment areas and can offer general observations of regarding existing soils and impacts. Soils in most of these areas appear to have characteristics which support existing vegetation and watershed function. Although observers noticed some locally heavy impacts as mentioned above with respect to roads and trails, there was no indication of any excessive impacts to soils such as compaction or erosion which would result in reduced vegetative productivity or other negative effects on a watershed scale. The one exception to this observation is the East Spruce Ridge treatment area in the northwest portion of Spruce mountain. This area never developed a native vegetation community subsequent to the 1996 Cole Creek fire. The current vegetation community consisting primarily of cheatgrass is likely resulting in declining soil quality.

3.14. Special Status Species

The BLM's policy for management of special status species is in the BLM Manual Section 6840. Special status species include the following:

- Federally Threatened or Endangered Species: Any species that the United States Fish and Wildlife Service (USFWS) have listed as an endangered or threatened species under the ESA throughout all or a significant portion of its range.
- Proposed Threatened or Endangered Species: Any species that the USFWS has proposed for listing as a federally endangered or threatened species under the ESA.
- Candidate Species: Plant and animal taxa that are under consideration for possible listing as threatened or endangered under the ESA.
- BLM Sensitive Species: 1) Species that are currently under status review by the United States Fish and Wildlife Service (USFWS); 2) Species whose numbers are declining so rapidly that federal listing may become necessary; 3) Species with typically small and widely dispersed populations; or 4) Species that inhabit ecological refugia or other specialized or unique habitats.
- State of Nevada Listed Species: State-protected animals that have been determined to meet BLM's Manual 6840 policy definition. Nevada BLM policy is to provide State of Nevada listed species and Nevada BLM sensitive species with the same level of protection as is provided to candidate species in BLM Manual 6840.06C. Per the wording in Table IIa in BLM Information Bulletin (IB) No. NV-2003-097, Nevada protected animals that meet

BLM's 6840 policy definition are those species of animals occurring on BLM-managed lands in Nevada that are: 1) 'protected' under authority of the Nevada Administrative Code (NAC); 2) have been determined to meet BLM's policy definition of "listing by a state in a category implying potential endangerment or extinction;" and 3) are not already included as federally listed, proposed, or candidate species.

The Study Area contains ridges, cliffs, canyons, rocky outcrops, and ephemeral drainages. The only permanent source of waters within the Study Area consists of a small number of springs scattered over the entire mountain area (Chase Spring, Mound Spring, Townsite Spring, Spruce Spring, Basco Spring, Boone Spring, Upper and Lower Boone Springs, Section 6 Spring, and 4 unnamed springs). Many of these springs have been developed and have trough systems that can provide a dependable year-round water source for wildlife. The ephemeral drainages within the Study Area only carry water during snowmelt or rain events.

The Study Area contains six key habitats for wildlife as defined in Nevada's Wildlife Action Plan (NDOW 2006) including sagebrush, lower montane woodlands, intermountain conifer forests and woodlands, springs and spring brooks, cliffs and canyons, and barren landscapes. Sagebrush provides nesting cover and structure, protection from predators, thermal cover, and foraging for wildlife. Lower montane woodlands provide nesting cover, structure, and cavities, protection from predators, thermal cover, and foraging for wildlife. Intermountain conifer forests and woodlands provide nesting cover, structure, and cavities, roosting, protection from predators, thermal cover, and foraging for wildlife. Springs and spring brooks provide water availability and food resources to wildlife. Cliffs and canyons provide structure for ledges and crevices for nesting, roosting, or denning, protection from predators, protection from the summer sun, and areas for foraging. Barren landscapes such as rocky slopes and talus are frequently found under cliffs and provide foraging, protection from predators, thermal cover, and food storage (NDOW 2006). There is also an artificial habitat that has been created from historic mining development that occurred on Spruce Mountain in the form of artificial cave systems from old adits and shafts that provide roosting cover, protection from predators, thermal cover and foraging opportunities.

- Federally Listed Species: No federally-listed plant species are known to occur in the Study Area: therefore, federally-listed plant species are not addressed further in this EA. No federally listed threatened or endangered wildlife species occur within the Study Area. One federal candidate wildlife species occurs in the Study Area, greater sage-grouse (*Centrocercus urophasians*). Greater sage-grouse is also a BLM sensitive species. The nearest greater sage-grouse lek (strutting ground) from any of the treatment areas is 2.5 miles and there are only 2 active leks within 5 miles of any of the treatment areas. A large section of the Study Area lies within summer greater sage-grouse habitat and is located in BLM and the Nevada Department of Wildlife (NDOW) designated nesting and brood rearing habitat. Abundant winter habitat for greater sage-grouse is located around the Project Area. The greater sage-grouse is found throughout Nevada in sagebrush-dominated habitats. Sagebrush is a key component of greater sage-grouse habitat on a year-long basis (USFWS Mountain Prairie Region [USFWS MPR] 2007). Sagebrush provides forage and nesting, security, and thermal cover for this species. Moist areas that provide succulent herbaceous vegetation during the summer months are used extensively as brood rearing habitat. Open, often elevated areas within sagebrush habitats usually serve as breeding areas (strutting grounds or lek sites) (USFWS MPR 2007). Greater sage-grouse males begin displaying on leks in March, and hens typically begin nesting in April and May. During winter, greater sage-grouse often occupy wind exposed areas where sagebrush is available (e.g., drainages, southern or western slopes,

or exposed ridges). Greater sage-grouse summer range and winter range is found throughout the study area. The potential for this species to occur within the study area is considered high.

- BLM Special Status Species: There is one BLM sensitive plant species identified as occurring within the Study Area; the stalked whitlowcress (*Draba pedicellata*). The plant has been identified in the higher elevations of Spruce Mountain and none have been observed in any of the potential treatment areas. BLM special status bird species that occur within the Study Area include the following: gray vireo (*Vireo vicinior*); juniper titmouse (*Baeolophus griseus*); loggerhead shrike (*Lanius ludovicianus*); pinyon jay (*Gymnorhinus cyanocephalus*); and Vesper sparrow (*Pooecetes gramineus*). (See migratory bird section for full listing and habitat information). All of these species have foraging and nesting habitat within the Study Area. BLM special status raptor species that have been observed within the Study Area include burrowing owl (*Athene cunicularia*), prairie falcon (*Falco mexicanus*) and ferruginous hawk (*Buteo regalis*) (Refer to migratory bird section).
    - Pinyon jays have been observed throughout Spruce Mountain and all throughout northern and eastern Nevada. The following was collected from the Great Basin Bird Observatory:

      > "During the same period when the species has been declining at a rapid rate, its preferred habitat, pinyon-juniper woodland, has been expanding.....In 2007 the Great Basin Bird Observatory conducted an initial radio-telemetry study of five Pinyon Jay flocks in White Pine County. The data collected during this study indicated that Pinyon Jays prefer a mixed-age mosaic of woodland transitioning into, or interspersed with, sagebrush shrubland. Although Pinyon Jays were observed to roost and build nests within relatively dense groves of trees, these groves were typically located within 2 km [1.2 mi] of the woodland-sagebrush habitat edge. These findings, if representative of all Great Basin populations, would suggest that the large expanses of closed-canopy pinyon-juniper woodland that have become more common in Nevada over the past century are largely unsuitable for Pinyon Jays. Mixed-age woodland mosaics with shrubby openings and a complex habitat edge, in contrast, appear to have decreased in extent during the same period. Thus, one hypothesis for the species' declines involves changes in the age profile and structural features of pinyon-juniper woodlands, not in their overall extent (GBBO, 2011)."
      >
      > "Pinyon Jays make heavy use of pine nut crops during their production period (early to late fall), but rely for the rest of the year on seed caches or other food sources. Seed caches are usually located in the woodland-shrubland transition zone, or in pure shrublands within ~ 2 km [1.2 mi] of the woodland edge (GBBO unpublished data). It therefore seems likely that the Pinyon Jay's association with edge habitat is at least partly related to the location of cache sites (GBBO, 2011)."

      The potential for this species to occur within the study area is considered high.
    - Ferruginous hawk nests have been observed throughout Spruce Mountain. Nest sites are normally located at the interface between pinyon and juniper woodland and open sagebrush. Nest trees typically overlook broad expanses of open sagebrush or grassland (Herron et al. 1985). The ferruginous hawk commonly breeds in many areas of Nevada. This species often nests in trees, on promontory points, rocky outcrops, cut banks, or on

the ground. Ferruginous hawks begin nesting in March, and young fledge by July. This species has been observed nesting within the project vicinity (BLM 2004-2009). There are nine confirmed nest sites within the study area (BLM 2011). Suitable foraging habitat occurs within the study area. The potential for this species to occur within the study area is considered high.

- Burrowing owls have suitable nesting habitat of abandoned mammal burrows west and south of the Study Area. The burrowing owl is known to breed throughout Nevada. The majority of the breeding population is known to migrate from northern Nevada during the winter months. However, observations of this owl have been recorded throughout Nevada during all months of the year (Herron et al. 1985). Breeding by burrowing owls is strongly dependent on the presence of burrows constructed by prairie dogs, ground squirrels, or badgers. Prime burrowing owl habitat must be open, have short vegetation, and contain an abundance of burrows. Burrowing owls begin nesting in April, and young typically fledge by August. Suitable foraging habitat exists within the study area. The potential for this species to occur within the study area is considered high.

- Prairie falcons have been observed within the Study Area and there is an active nest identified near the Westside Upper proposed treatment area. Other suitable prairie falcon nesting habitat of cliffs and rock outcrops occurs throughout Spruce Mountain. Prairie falcons range throughout the Great Basin and are permanent residents of Nevada. Habitat requirements include steep cliff ledges and outcrops for nesting that border semi-arid valleys (BLM 2005). The highest nesting densities in Nevada occur in northern counties, particularly located in or near the mouth of narrow canyons, overlooking riparian vegetation and agricultural lands (Herron et al. 1985). Prairie falcons begin nesting in March, and young typically fledge by July. This species has been recorded numerous times flying over the Spruce Mountain area (NDOW 2011). The potential for this species to occur within the study area is considered moderate.

- Other BLM special status raptors observed within the Study Area include the bald eagle (*Haliaeetus leucocephalus*), golden eagle (*Aquila chrysaetos*), northern goshawk (*Accipiter gentilis*), and Cooper's hawk (*Accipiter cooperii*).

  - Golden eagles have foraging habitat within the Study Area and vicinity. In eastern Nevada, suitable nesting habitat for golden eagle is primarily cliffs and ledges. Golden eagle nests have also been observed throughout Spruce Mountain. The golden eagle is a year-long resident and is considered to be commonly breeding throughout Nevada; however, eagle densities and nesting activity are greatest in the northern third of Nevada (Herron et al. 1985). Nesting golden eagles prefer suitable cliffs that overlook sagebrush flats, pinyon-juniper forests, salt desert shrub, or other habitat capable of supporting a suitable prey base. Highest densities of nesting eagles typically are found along river systems where cliffs border the entire length of the river, and lower densities are found in pinyon-juniper habitat and salt desert shrub communities (Herron et al. 1985). Golden eagles begin nesting in March, and young fledge by July. Wintering golden eagles tend to congregate in broad valleys interspersed with agricultural croplands or sagebrush and desert shrub communities. Suitable foraging habitat exists within the study area. The potential for this species to occur within the study area is considered high.

  - The bald eagle is found throughout Nevada but mainly as a migrant and winter resident (Floyd et al. 2007). Bald eagles have a nesting distribution that is largely restricted

to coastal areas, lakes, and rivers (WAPT 2006). Nests are typically very large stick nests located in large trees such as cottonwoods. Bald eagles typically begin nesting in February, and young fledge by July. One bald eagle nest has been reported in northeastern Nevada and one nest has been reported near Lahontan Reservoir in western Nevada. Although no bald eagle nests or roosts have been observed in the Study Area, bald eagles do winter in the vicinity of Spruce Mountain. However, due to the exclusively seasonal use, the potential for this species to occur within the study area is considered moderate.

- Northern goshawks have suitable foraging habitat within the Study Area. In Nevada, northern goshawk most commonly nests in aspen stands (*Populus tremuloides*) which are not prevalent on Spruce Mountain. There is a historic reference of a northern goshawk nest located in a white fir in the Pequop range; therefore, there is potential atypical nesting habitat present within and near the Study Area. Suitable foraging habitat exists within the study area. The potential for this species to occur within the study area is considered moderate.

- Cooper's Hawks seem to prefer deciduous and mixed forest or open woodlands. Areas where woodlands tend to occur in patches, groves, or as well-spaced trees are typically used. Riparian woodlands, semiarid woodlands, and mixed groves often support Cooper's Hawks. They rarely occur in dense forest, but when they do, they are often near forest edges such as along clearings or meadows, streams, or lake edges. In Nevada, 76 percent of documented nests occurred in aspen, 12 percent in cottonwood, and six percent in conifers, willow, or birch (Gary Herron, pers. comm.). Habitat suitability index models for Cooper's Hawks in coniferous forest (Zeiner et al. 1990) specify that vegetative structure within a nest site should be at least 21 to 49 feet high. Tree canopy cover should be at least 41 to 69 percent, slope no greater than 49 percent (28°), and the nest stand should be no more than three kilometers (1.86 miles) from water and 1.6 km (1 mile) from an opening (of undefined size). Nests are usually placed high in a conifer just below the crown (10.7 to 16.4 meters) (35.1 to 53.8 feet) for protection from direct sunlight and predators. Some nests are built upon clumps of mistletoe. Open flying space is important in the mid- and lower understory levels. Snag density information is lacking but snags are deemed important for providing habitat for prey, plucking posts, and fledgling flying skills development. Cooper's Hawks have been found nesting in Nevada from 4,000 feet elevation (Mason Valley, Lyon County) up to at least 9,000 feet. Cooper's Hawks migrate down slope or go further south for the winter, where they often are found in urban settings. Most nests are located within relatively close proximity to water (<1 kilometer) (>.62 miles), occur on slopes under 49 percent (28°), and are most often located on north and east aspects. No nests are known to occur on Spruce Mountain, but there is suitable foraging habitat within the project area. The potential for this species to occur within the study area is considered low.

- A total of 11 BLM special status bat species have been detected within the Project Area. Bat surveys conducted on Spruce Mountain from 2004 through 2009 by BLM and NDOW specialists detected the following BLM special status species: little brown myotis (*Myotis lucifugus*); silver-haired bat (*Lasionycteris noctivagans*); long-eared myotis (*Myotis evotis*); Brazilian free-tailed bat (*Tadarida brasiliensis*); Townsend's big-eared bat (*Corynorhinus towndendii*); big brown bat (*Eptesicus fuscus*); small-footed myotis (*Myotis ciliolabrum*); California myotis (*Myotis californicus*); long-legged myotis (*Myotis volans*); pallid bat (*Antrozous pallidus*) and the Yuma myotis (*Myotis yumanensis*).

- Little Brown Myotis: The little brown bat is probably a year-round resident primarily found at higher elevations. This species often is associated with coniferous forests. Foraging occurs in open areas among vegetation, along water margins, and above open water. Roost sites include hollow trees, rocky outcrops, buildings, and for Spruce Mountain in mines and caves (Bradley et al. 2006). This species has been documented within the project region. Scattered foraging habitat occurs within the study area. The potential for this species to occur within the study area is considered moderate.

- Silver-haired Bat: The silver-haired bat is a transient spring and fall migrant that occupies low to middle elevations (1,500 to 8,200 feet) (Bradley et al. 2006). This species inhabits coniferous and mixed deciduous/coniferous forests of pinyon-juniper, subalpine fir, white fir, limber pine, aspen, cottonwood, and willow (Bradley et al. 2006). This species gleans insects and moths in or near wooded areas and along edges of roads, streams, or water bodies. This species roosts both singly or in small groups in hollow trees, rock crevices, mines, caves, and houses. This species has been documented in the project region. Scattered foraging habitat occurs within the study area. The potential for this species to occur within the study area is considered moderate.

- Long-eared Myotis: The Long-eared myotis is found throughout Nevada from approximately 2,260 to 6,790 feet in elevation but primarily is found at the higher elevations (Bradley et al. 2006). The Long-eared myotis primarily is associated with coniferous forests, including pinyon-juniper woodlands; however, the species also utilizes sagebrush and desert scrub habitats. Day roosts include hollow trees; under loose tree bark; crevices in rock cliffs and fissures in the ground; and for Spruce Mountain in caves, abandoned mines, and buildings. Night roosts primarily occur in caves, mines, and abandoned buildings (AGFD 1993; Bradley et al. 2006; Harvey et al. 1999). This species is known to roost singly or in small groups. This species gleans insects (primarily small moths) over vegetation and open water (e.g., rivers, streams, and ponds) (Bradley et al. 2006). This species has been documented within the project region (BLM 2004 -2009). Suitable foraging habitat occurs within the study area. The potential for this species to occur within the study area is considered high.

- Brazilian Free-tailed Bat: The Brazilian free-tailed bat is found throughout Nevada in a wide variety of habitats ranging from desert scrub to high elevation mountain habitats (680 to 8,200 feet) (Bradley et al. 2006). This species roosts in a variety of structures including cliff faces, caves, mines, buildings, bridges, and hollow trees. Some caves are used as long-term transient stopover roosts during migration (Bradley et al. 2006). The Brazilian free-tailed bat is known to travel long distances to foraging areas and often forages at high altitudes. This species has been documented within the project region. Suitable foraging habitat occurs within the study area. The potential for this species to occur within the study area is considered moderate.

- Townsend's Big-eared Bat: The Townsend's big-eared bat is a year-round resident found throughout Nevada from low desert to high mountain habitats (690 to 11,400 feet in elevation) (Bradley et al. 2006). The Townsend's big-eared bat primarily occurs in pinyon-juniper, mountain mahogany, white fir, blackbrush, sagebrush, salt desert scrub, agricultural lands, and urban habitats (Bradley et al. 2006). This species prefers caves, mines, and buildings that maintain stable temperatures and airflow for nursery colonies, bachelor roosts, and hibernacula (Harvey et al. 1999). It does not make major migrations and appears to be relatively sedentary, not traveling far from summer foraging grounds

to winter hibernation sites (Harvey et al. 1999). Its distribution seems to be determined by suitable roost and hibernation sites, primarily caves and mines. This bat is believed to feed entirely on moths (Harvey et al. 1999) and gleans insects from foliage and other surfaces (Bradley et al. 2006). This species has been recorded throughout the study area at abandoned mine shafts (BLM 2004-2009). The potential for this species to occur within the study area is considered high.

- Big Brown Bat: The big brown bat is a year-round resident in Nevada. This species is found from low to high elevations (980 to 9,800 feet) and occupies a variety of habitats including piñon-juniper, blackbrush, creosote, sagebrush, and salt desert scrub (Bradley et al. 2006). This species gleans insects over water and open landscapes, as well as in both forested and edge settings (Bradley et al. 2006). The big brown bat is a colonial species, roosting in groups up to several hundred. Roost sites include caves, mines, buildings, bridges, and trees. This species is known to be more tolerant of human habitation than other bat species. This species has been documented at several locations in the project region (BLM 2004-2009). The potential for this species to occur within the study area is considered high.

- Western small-footed Myotis: The Westrern small-footed myotis is found throughout Nevada from approximately 3,500 to 5,900 feet in elevation (Bradley et al. 2006). This species inhabits a variety of habitats including desert scrub, grassland, sagebrush steppe, blackbrush, greasewood, pinyon-juniper woodlands, pine-fir forests, agricultural lands, and urban areas (Bradley et al. 2006). Day and maternity roosts of western small footed myotis have been found in crevices in cliffs, boulders, and on talus slopes. Summer roosts are highly variable and include buildings, mines, under the bark on trees, and crevices in cliffs and boulders (AGFD 1993; Harvey et al. 1999). This species prefers small protected dry crevices. Night and hibernation roosts are located in small caves and abandoned mine adits. Buildings also are used as temporary night roosts between flights. Western small-footed myotis forage for insects over the edge of rocky bluffs, in clearings, near rocks, and over forests (AGFD 1993; Bradley et al. 2006; Harvey et al. 1999). This species has been documented within the Study Area(BLM 2004-2009). Suitable foraging habitat occurs within the study area. The potential for this species to occur within the study area is considered high.

- California Myotis: The California myotis is a year round resident found throughout Nevada at low and middle elevations (689 to 8,957 feet) (Bradley et al. 2006). This species occurs in a variety of habitats from Lower Sonoran desert scrub to forests. The California myotis gleans insects above open habitat. This species typically roosts singly or in small groups, although some mines are known to shelter colonies of over 100 individuals. Roost sites include mines, caves, buildings, rock crevices, hollow trees, and under exfoliating bark (Bradley et al. 2006). This species is known to forage throughout the winter. This species has been documented within the project region. Suitable foraging habitat occurs within the project region. The potential for this species to occur within the study area is considered high.

- Long-legged Myotis: The long-legged myotis occupies pinyon-juniper and montane coniferous forest habitats from approximately 3,050 to 11,220 feet in elevation in Nevada (Bradley et al. 2006). Individuals typically day roost singly or in small groups in buildings, rock crevices, caves, abandoned mines, or in hollow trees, particularly large diameter snags or live trees with lightning scars (AGFD 1993; Bradley et al. 2006; Harvey

et al. 1999). Night roosts and hibernacula are often in caves and mines. Foraging typically occurs in open areas, often at canopy height (Bradley et al. 2006). This species has been documented within the project region (BLM 2004-2009). Suitable foraging habitat occurs within the study area. The potential for this species to occur within the study area is considered high.

- Pallid Bat: The pallid bat is a year-round resident in Nevada. Found primarily at low and middle elevations (1,300 to 8,400 feet), this species occupies a variety of habitats such as pinyon-juniper, blackbrush, creosote, sagebrush, and salt desert scrub (Bradley et al. 2006). This species feeds primarily on large ground-dwelling arthropods (e.g., scorpions, centipedes, grasshoppers), but also feeds on large moths (Bradley et al. 2006). The pallid bat is a colonial species, roosting in groups of up to 100 individuals (Arizona Game and Fish Department [AGFD] 1993). Roost sites consist of rock outcrops, mines, caves, hollow trees, buildings, and bridges (AGFD 1993; Bradley et al. 2006). The pallid bat is intolerant of roost sites in excess of 40°C (Bradley et al. 2006). This species has been documented specifically at well ventilated adits and shafts on Spruce Mountains (BLM 2004-2009). Based on its known range and suitable habitat within the study area, the potential for this species to occur within the study area is considered moderate.

- Yuma Myotis: The Yuma myotis is a year round resident found primarily in the southern and western half of Nevada at low to middle elevations (1,476 to 7,677 feet). This species occurs in a wide variety of habitats, including sagebrush, salt desert scrub, agriculture, playa, and riparian habitats. This species gleans aquatic insects over open water and above vegetation. Roost sites include buildings, trees, mines, caves, bridges, and rock crevices. Night roosts are usually associated with buildings, bridges, or other man-made structures (Bradley et al. 2006). This species has been documented within the project region. Suitable foraging habitat occurs within the study area. The potential for this species to occur within the study area is considered moderate.

Over 100 abandoned mine openings provide roosting, maternity and hibernacula habitat for the area bats. One hibernaculum has been confirmed, but it is not within any of the proposed treatment areas. Due to mist netting capture techniques a bachelor colony and a maternity colony was determined to exist, though the exact locations of either are not known. Numerous large, extensive rock outcrops that could also provide roosting habitat for bats are present in the Project Area. Also the presence of the silver-haired bat indicates that tree roosting species are present on Spruce Mountain. Observations of silver-haired bats have been recorded in the Coyote Basin Bottom treatment unit of the proposed project.

Pygmy rabbits, a BLM special status mammal species, were detected in the Study Area during the 2004 through 2009 period in which wildlife surveys were being conducted on the abandoned mine features of Spruce Mountain. Occupied pygmy rabbit habitat is located along the western and southern flanks of Spruce Mountain within Sections 1, 2, 12 of T39N, R63E, Sections 1-6, 10-12, 14 of T29N, R64E, Section 6 of T29N, R65E, Sections 2, 5-8, 13-15, 22-27,34-36 of T30N, R63E, Sections 10-11, 13-36 of T30N, R64E, Sections 30-31 of T30N, R65E, and Sections 7-8, 17-20, 29-32 of T31N, R63E. Confirmed occupied habitat also occurs in the portion of Independence Valley that lies between Spruce Ridge and the Pequop range in Sections 2-5, 8-11, 15-17, of T31N, R64E and Sections 32-35, of T32N, R64E. The Westside Upper, Westside Lower, Lower Spruce Spring, Honeymoon, Coyote Basin Bottom and Brush Creek treatment units of the proposed project fall within known and potential pygmy rabbit habitat. Typical pygmy rabbit habitat consists of dense stands of big sagebrush growing in deep loose soils that are deeper than 20 inches, have at least 13 to 30 percent clay content, and are light colored and friable. Pygmy rabbit

habitat is generally on flatter ground or moderate slopes in Wyoming big sagebrush (*Artemisia tridentata ssp. wyomingensis*) uplands, basin big sagebrush (*Artemisia tridentata ssp. tridentata*) drainages, and in ephemeral drainages in between ridges of low sagebrush (*Artemisia arbuscula*) (Ulmschneider 2004); however they have been found in greasewood (*Sarcobatus sp.*) and rabbitbrush (*Chrysothamnus sp.*) (Enviroscientists 2006). The pygmy rabbit is believed to be one of only two rabbits in North America that digs its own burrows. Pygmy rabbits dig burrows three inches in diameter and a burrow may have three or more entrances (NatureServe 2010). Burrows are relatively simple and shallow, often no more than seven feet in length and less than four feet deep with no distinct chambers. The reported elevation range for this species is 4,500 to 7,450 feet ; however, they occur in elevations up to 8,000 feet in the mountains in central Nevada. Pygmy rabbits have been observed at the higher range elevations on Spruce Mountain. The winter diet of pygmy rabbits is composed of up to 99 percent sagebrush. During spring and summer, their diet may consist of roughly 51 percent sagebrush, 39 percent grasses, and ten percent forbs. During winter, pygmy rabbits use extensive snow burrows to access sagebrush forage, as travel corridors among their underground burrows, and possibly as thermal cover (USFWS 2003). Pygmy rabbit burrows, scat, runways, and individuals have all been observed in the areas outlined above.

3.15. Vegetation

Dominant vegetation communities within the treatment areas include the following:

- Pinyon-juniper woodlands.
- Pinyon pine woodlands.
- Pinyon pine woodland communities with occasional curleaf mahogany (*Cercocarpus ledifolius*) stands scattered on northern slopes and ridgelines.
- Black sagebrush (*Artemisia nova*) with minimal understory.
- Wyoming and basin big sagebrush communities with bluebunch wheatgrass (*Aropyron spicatum*), Idaho fescue (*Festuca idahoensis*), Indian ricegrass (*Orizopsis hymenoides*), basin wildrye (*Elymus cinereus*). Among Wyoming and basin big sagebrush communities are Cliffrose (*Purshia stansburiana*), Antelope bitterbrush (*Purshia tridentata*), rabbitbrush (*Chrysothamnus ssp.*) stands.
- Mountain sagebrush (*Artemisia tridentata var vaseyana*)/bitterbrush with bluebunch wheatgrass and Idaho fescue understory.
- Crested wheatgrass (*Agropyron cristatum*) has been seeded historically throughout portions of the allotment. Other species such as forage kochia (*Kochia prostata*) have been seeded throughout portions of the allotment to reduce livestock impacts on crucial mule deer winter range.

  There has been an overall reduction in the production and vigor of perennial grasses, forbs, and shrubs within the proposed treatment areas; sagebrush communities have become even-aged stands with little understory vegetation. Pinyon and juniper is becoming established on sagebrush habitats within the proposed treatment areas. Although the sagebrush habitat understories are compromised of native shrubs and grasses, these understories are declining in vigor & being suppressed by the expansion of pinyon-juniper woodlands.

3.16. Visual Resource Management

Visual Resources are managed through the 1985 Wells Resource Management Plan (RMP) and BLM 8400 Manuals. In the Wells RMP there are Visual Resource Management Class (VRM) designations for the entire Elko District, ranging from the highest protection of Class I in Wilderness Study Areas to the least protective, Class IV. Contrast ratings are completed for surface disturbing projects to compare the level of change in the existing environment to the changes proposed with the action. Projects will be designed to meet Visual Resource Management classes by either being temporary in nature or implementing mitigation and best management practices to minimize visual contrasts. The Honeymoon Chaining Maintenance /Expansion, East Spruce Ridge, Westside Upper, the northern portions of Demonstration Westside Lower, and the southeastern portion of Basco Chaining Maintenance areas are all in VRM Class IV areas. Lower Spruce Spring, Upper Spruce Spring, Coyote East, Coyote North Bowl, Coyote Basin Bottom, Indian Creek Treatment Area, and Brush Creek areas are all in VRM Class III areas. The Class II areas are the southern part of Demonstration Westside Lower, and the very northern tip of Basco Chaining Maintenance.

The Class I objective is to preserve the existing character of the landscape. This class provides for natural ecological changes; however, it does not preclude very limited management activity. The level of change to the characteristic landscape should be very low and must not attract attention.

The Class II VRM objective is to retain the existing character of the landscape. The level of change to the characteristic landscape should be low. Management activities may be seen but should not attract the attention of the casual observer. Any changes must repeat the basic elements of form, line, color, and texture found in the predominant natural features of the characteristic landscape.

The Class III VRM objective is to partially retain the existing character of the landscape. The level of change to the characteristic landscape should be moderate. Management activities may attract attention but should not dominate the view of the causal observer. Changes should repeat the basic elements found in the predominant natural features of the landscape. So changes caused by management activities may be evident and begin to attract attention, but these changes should remain subordinate to the existing landscape.

The Class IV VRM objective is to allow for management activities which involve major modification of the existing character of the landscape. The level of contrast can be high, dominating the landscape and the focus of viewer attention. However, every attempt should be made to minimize the impact of these activities through careful location, minimal disturbance, and repeating the basic elements of the characteristic landscape.

The characteristic landscape is focal in general with Spruce Mountain and it's adjacent range being the focus. The surrounding area is panoramic and made up of flat, wide basins, bordered by tall, pyramidal mountain ranges. The vegetation texture in the lower elevations and foothills is mostly smooth and regular but as you move up-slope, trees begin to dominate and there are irregular shaped polygons of smooth looking sage with clusters of trees. In project areas where trees are located and have not been treated in the past, you also find very uniform patterns of trees with spaces in between that have no vegetation. Vegetation colors vary depending on elevation and vegetation type from dark greens and blacks in the trees, to greys and light greens and yellows in the sage and grass areas.

Man-made features are found throughout the project and include fencelines, livestock developments, roads, radio towers, kiosks, and historic structures. From Highway 93 the area appears to be natural and there are not many man-made features that attract attention. Viewers are drawn to the smooth texture of the basin area leading up to Spruce Mountain. Vertical towers and rectangular features on top of Spruce Mountain, some reflective during certain times of day, can be contrasting and draw the attention of the casual observer. Once in the project areas, man made features become more prevalent. Historic structures are made of natural features from the surrounding area so buildings tend to blend in with the surroundings and do not contrast to a great extent. Old mining tailings piles occur on the western flanks and on top of the mountain. These piles are usually a different color than the surrounding soil and are noticeable to the casual user. Livestock watering or development areas are sparsely vegetated and there is trampling around the sites. Roads and trails in the area create horizontal lines and breaks in the vegetation. Vegetation treatments have occurred in the area since the 1970's and can be seen on the landscape with the trained eye, but to the casual observer, these treatments are not evident. Historic treatments are more noticeable when directly in the treatment area rather than from afar.

3.17. Wilderness Study Areas

To the northeast of Brush Creek and the Indian Creek Treatment Areas is the South Pequop Wilderness Study Area (WSA). The WSA is 41,090 acres in size and is bounded on all sides by existing roads. No proposed treatments would occur in the WSA but since treatment areas are located across a two-track road from a WSA, possible impacts to the WSA will be analyzed.

The South Pequop WSA is predominately natural with densely-forested, highly-dissected terrain. Vegetation ranges from sagebrush and grasses on the south-facing slopes to dense stands of white fie and limber pine on the northern exposures. Pinyon-juniper woodlands occupy much of the mountain range, while nearly impenetrable shrub thickets cover many slopes. This area's 11 miles of vehicle ways are generally unnoticeable and do not affect naturalness.

Within the area recommended for wilderness there are outstanding opportunities for solitude. There are many steep canyons extending both east and west from the knife-edged ridgeline. Dense vegetation in these canyons provides outstanding seclusion. Although the souther exposures are not densely vegetated, the WSA has overall outstanding opportunities for solitude. Elevations range from 5,650 to 8,950 feet amsl.

Military aircraft sometimes disrupt the solitude. A Military Training Route, used for low-level, high speed exercises, covers almost all the WSA. Flight elevations vary, but aircraft fly as low as 100 feet above ground level. Disruption of the silence, which contributes to the feeling of solitude, is still infrequent. At times, aircraft can be seen and/or heard all day. Other times, one can travel for days and not see or hear a military jet.

The area recommended for wilderness contains outstanding opportunities for primitive and unconfined recreation. Opportunities for hiking, backpacking, and camping are available along the ridgelines and in the canyons. Long-distance scenic vistas in some directions are available from the ridgeline. The WSA provides outstanding opportunities for fossil collecting or viewing bristlecone pine trees. (United States Dept. of Interior, Bureau of Land Management. Nevada Wilderness Study Area Notebook)

3.18. Wild Horses

The proposed Study Area would occur within the Spruce-Pequop Wild Horse Herd Management Area (HMA). The Antelope Valley and Goshute HMA's are located just south and east of the Spruce-Pequop HMA. The wild horses in the Spruce-Pequop HMA move freely back and forth to the adjacent HMAs (Antelope Valley and Goshute HMAs).

An aerial population inventory flight conducted in October 2010 of the Antelope Valley, Goshute, and Spruce-Pequop HMAs observed 2,166 wild horses of all age classes. A wild horse gather in Jan-Feb. 2011 removed 1,107 wild horses from the within the HMAs. The current estimated population within the Antelope Valley, Goshute and Spruce-Pequop HMA's is 1,059 wild horses, which is 782 wild horses above the low range Appropriate Management Level (AML).

3.19. Wildlife

The wildlife species that inhabit the Spruce Mountain area are typical of the arid/semi-arid environment in the central Great Basin. Wildlife species detected in the Study Areainclude insects, reptiles, birds, raptors, and mammals. No perennial, ephemeral or intermittent streams and no fish habitat occur in the Project Area. There are three vegetation cover types located within the study area. The vegetation cover types include pinyon-juniper forest, sagebrush shrubland, and grassland habitats. Sagebrush shrubland and pinyon -juniper is the most common vegetation communities within the study area. A variety of terrestrial wildlife species are associated with all of these upland communities, with greater species diversity occurring in areas exhibiting greater vegetative structure and soil moisture.

Available water for wildlife consumption is limited in the project region. Water sources in the vicinity of the project, particularly those that maintain open water and a multi-story canopy, support a greater diversity and population density of wildlife species than any other habitat types occurring in the region. The only riparian/wetland habitat occurring on the mountain and its vicinity is a scattering of springs. These springs are discussed in Section 3.5, "Hydrology and Riparian/Wetland" (p. 31).

Information regarding wildlife species and habitat within the study area and CESA's was obtained from a review of existing published sources, BLM, NDOW, and USFWS file information, as well as Nevada Natural Heritage Program (NNHP) database information.

A diversity of nongame species (e.g., small mammals, passerines, raptors, and reptiles) occupies a wide range of trophic levels and habitat types on Spruce Mountain:

- Insects

  The following common insect species have been observed in the Project Area: anise swallowtail (*Papilio zelicaon*); Behr's hairstreak (*Satyrium behrii*); dotted blue (*Euphilotes enoptes*); grasshopper (Family: Acrididae); ground spider (Family: Gnaphosidae); house fly (*Musca domestica*); juba skipper (*Hesperia juba*); Melissa blue (*Plebejus melissa*); mourning cloak (*Nymphalis antiopa*); Orange sulfur (*Colias eurytheme*); painted lady (*Vanessa cardui*); Queen Alexandra's sulphur (*Colias alexandra*); red admiral (*Vanessa atalanta*); red ants (Family: Formicidae); silvery blue (*Glaucopsyche lygdamus*); small wood nymph (*Cercyonis oetus*); spring azure (*Celastrina argiolus*); spring white (*Pontia sisymbrii*); Weidemeyer's admiral (*Limenitis weidemeyerii*); western admiral (*Limenitis weidemeyerii*); Western

swallowtail (*Papilio zelicaon*); western tiger swallowtail (*Papilio rutulus*); western tortoise shell (*Nymphalis californica*); and zerene fritillary (*Speyeria zerene*).

- Snails

There is one known colony located within the Project Area. This colony (*Pyrgulopsis sp*.) resides in a stock pond in the Westside Lower treatment unit.

- Reptiles

The following reptiles were observed in the Project Area: common side-blotch lizard (*Uta stansburiana*); western fence lizard (*Sceloporus occidentalis*); great basin skink (*Emueces skiltonianus utahensis*); great basin whiptail (*Cnemidophorus tigris*); mountain short-horned lizard (*Phrynosoma hernandesi*); and sagebrush lizard (*Sceloporus graciosus*).

- Birds

Nongame birds encompass a variety of passerine and raptor species including migratory bird species that are protected under the Migratory Bird Treaty Act (MBTA) (16 USC 703-711) and Executive Order (EO) 13186 (66 Federal Register [FR] 3853); see Section 3.7, "Migratory Birds" (p. 33), for further details. Passerine or songbird species occupy the entire range of habitats found within the study area. The following common bird species have been detected in the Project Area: American robin (*Turdus migratorius*); black-throated gray warbler (*Dendroica nigrescens*); black-throated sparrow (*Amphispiza bilineata*); blue-gray gnatcatcher (*Polioptila caerulea*); Brewer's blackbird (*Euphagus cyanocephalus*); brown-headed cowbird (*Molothrus ater*); bushtit (*Psaltriparus minimus*); chipping sparrow (*Spizella passerina*); Clark's nutcracker (*Nucifraga columbiana*); cliff swallow (*Petrochelidon pyrrhonota*); common poorwould (*Phalaenoptilus nuttallii*); common raven (*Corvus corax*); dark-eyed junco (*Junco hyemalis*); gray flycatcher (*Empidonax wrightii*); gray vireo; green-tailed towhee (*Pipilo chlorurus*); hairy woodpecker (*Picoides villosus*); house finch (*Carpodacus mexicanus*); house wren (*Troglodytes aedon*); juniper titmouse; lark sparrow (*Chondestes grammacus*); loggerhead shrike; MacGillivray's warbler (*Oporornis tolmiei*); mountain bluebird (*Sialia currucoides*); mountain chickadee (*Parus gambeli*); northern flicker (*Colaptes auratus*); plain titmouse (*Parus inornatus*); pinyon jay; red-winged blackbird (*Agelaius phoeniceus*); rock wren (*Salpinctes obsoletus*); sage sparrow (*Amphispiza belli*); sage thrasher (*Oreoscoptes montanus*); vesper sparrow; western meadowlark (*Sturnella neglecta*); grey partridge (*Perdix perdix*), blue grouse (*Dendragapus obscures*), chukar (*Alectoris chukar*), common nighthawk (*Chordeiles minor*); and western scrub jay (*Aphelocoma californica*). Gray vireo, juniper titmouse, loggerhead shrike, pinyon jay, and Vesper sparrow are BLM special status species and are discussed in the Special Status Species section.

- Raptors

The following raptors species were observed in or near the Study Area: American kestrel (*Falco sparverius*); burrowing owl; Cooper's hawk (*Accipiter cooperii*); great horned owl (*Bubo virginianus*); northern harrier (*Circus cyaneus*); prairie falcon; red-tailed hawk (*Buteo jamaicensis*); rough-legged hawk (*Buteo lagopus*); bald eagle (*Haliaeetus leucocephalus*), golden eagle (*Aquila chrysaetos*) and turkey vulture (*Cathartes aura*). Burrowing owl, prairie falcon, Cooper's hawk, golden and bald eagles are BLM special status species and are discussed in Section 3.14, "Special Status Species" (p. 49).

Appropriate foraging habitat for all of the aforementioned raptor species occurs within the Study Area. A prairie falcon nest and two golden eagle nests were found in or near the Study Area. Appropriate nesting habitat of open ground and shrubs occur in the Study Area for common nighthawk and northern harrier, but only one sighting of the northern harrier has been recorded for the Spruce Mountain area. Appropriate nesting habitat for Cooper's hawk of tall trees occurs within the Study Area. Appropriate nesting habitat for great horned owl of trees, rocky ledges, and artificial platforms occur within the Study Area. Appropriate nesting habitat for red-tailed hawk and rough-legged hawk of tall trees and cliffs occurs within the Study Area. Appropriate nesting habitat for Turkey vulture of trees, snags, and ground occur within the Project Area.

- Mammals

Common mammal species such as coyote (*Canis latrans*), kit fox (*Vulpes macrotis*), cougar (*Puma concolor*), bobcat (*Lynx rufus*), desert cottontail (*Slyvilagus audubonii*), black-tailed jackrabbit (*Lepus californicus*), woodrat (*Neotoma* sp.), cliff chipmunk (*Eutamias dorsalis*), long-tailed weasel (*Mustela frenata*), golden-mantled ground squirrel (*Spermophilus lateralis*), montane vole (*microtus montanus*), deer mouse (*Peromyscus maniculatus*), kangaroo rat (*Dipodomys* spp.), Belding's ground squirrel (*Spermophilus beldingi*), Uinta chipmunk (*Neotarnias umbrinus*), long-tailed vole (*Microtus longicaudus*), spotted skunk (*Spilogale putorius*), striped skunk (*Mephitis mephitis*) and least chipmunk (*Tamias minimus*) have been detected within the Study Area either directly or by observation of tracks, scat, carcass, prey remains, burrow, or other sign.

Other important non-game species include several bat species. The Study Area contains suitable foraging habitat for several bat species. All of the bats identified on Spruce Mountain are currently BLM sensitive species and/or Nevada protected species (BLM 2007d; NDOW 2007a). These species are presented in detail inSection 3.14, "Special Status Species" (p. 49).

- Game Species

Big game species that occur on or around Spruce Mountain include mule deer (*Odocoileus hemionus*), pronghorn antelope (*Antilocapra americana*), and elk (*Cervus canadensis*). Mule deer occur throughout the Elko District. Spruce Mountain is in the Nevada Division of Wildlife's hunt unit 105. The NDOW conducted post-season survey flights of the Northeastern Elko County area, Unit 105 through 108 in January 2010. A total of 7,739 mule deer were classified during the survey with a resulting ratio of 24 bucks to 100 does to 44 fawns (NDOW 2010). Spring surveys were flown in late March and early April. A total of 9,407 mule deer were classified during the survey, yielding a ratio of 31 fawns to 100 adults. Although over-winter survival was good for fawns this winter, fawn ratios going into the winter were below average. This year's recruitment rate of 31 fawns to 100 adults is 6 percent higher than last year's population estimate. The increase is likely a result of good spring and summer precipitation and a relatively mild winter resulting in increased fawn recruitment. Until last year, where the recruitment rate dipped to 20 fawns to 100 adults, population estimates in Area 10 had increased for 7 of the last 8 years.

Table 3.5. Big Game Habitat Types and Acres Impacted by Proposed Treatments

Treatment Name	High Value Habitat Type Present	Treatment Type	Analyzed Acres	Habitat Type Acres	Percent Habitat Impacted
Spruce Ridge Burn	None	seeding/seed bed preparation/ herbicide/fencing	2671.4	0	0
Honeymoon Chaining	None	maintenance	2880.2	0	0
Coyote Basin Bottom	None	chaining/ mastication	357.3	0	0
Brush Creek	Elk Crucial Summer	Broadcast Burn/ Handthinning	1490.1	94.3	6%
Coyote North Bowl	Elk Crucial Summer	Broadcast Burn/ Handthinning	1370.6	1370.6	100%
Indian Creek	Mule Deer Crucial Winter	chaining/ mastication/hand thinning/pile burning	1219.2	1091	89%
Coyote East	Mule Deer Crucial Winter	chaining/ mastication	1220.6	1220.6	100%
	Elk Crucial Summer			566.1	46%
Upper Spruce Spring Mastication	Mule Deer Crucial Winter	mastication/hand thinning/pile burning	606.8	606.8	100%
Lower Spruce Spring	Mule Deer Crucial Winter	chaining/ mastication/ maintenance	1453.8	1453.8	100%
	Antelope Winter			1393.4	96%
Westside Lower	Mule Deer Winter	chaining/ mastication/hand thinning/pile burning	718.2	707.5	99%
Westside Upper	Mule Deer Winter	Broadcast Burn/ Handthinning	732.8	484.4	66%

The Study Area is located within known mule deer winter range for the Area 10 deer herd. Mule deer scat, tracks, and dis-articulated skeletal remains are observed throughout the Study Area during visits to Spruce Mountain. Throughout the western U.S., big game relies on seasonal ranges to satisfy their annual nutritional and energetic requirements (Sawyer et al. 2005). Because seasonal ranges often occur great distances apart and across a mix of vegetation types and land ownership, maintaining migration corridors is often difficult and is considered a top priority by state game agencies (Sawyer et al. 2005). There are two migrations of mule deer north-east and west of Spruce Mountain. One consists of deer that travel through the Pequop Mountains to the vicinity of the Study Area and the other travels across Butte and Clover valleys. Historic studies and current satellite telemetry studies have documented that some of the deer wintering south of Spruce Mountain have summer ranges to the north and west in the Jarbidge Mountains and the East Humboldt Mountains. Deer from the Jarbidge Mountains, (located in NDOW Management Unit 072), and the Snake Range, (located in NDOW Management 075), migrate to the south and east in the fall, through NDOW Management Unit 077 and onto their winter ranges located in NDOW Management Units 078 and 105. Deer from the East Humboldt Mountains, (located in NDOW Management Unit 101), migrate to the south and east in the fall, through NDOW Management Unit 104 and into their winter ranges located in NDOW Management Unit 105.

Unlike other deer migrations in northeastern Nevada, the migration from the Jarbridge Mountains begins before winter weather forces the deer to migrate. Typically, the migration southward begins in early October. The deer arrive on the winter ranges sometime before the end of October or the early part of November. The deer then remain on the winter ranges until early April when they begin their return migration to the summer ranges in and around the Jarbrige Area. During the migrations, a number of deer are struck by vehicles on both Highway 93 and Interstate 80. The NDOW and Nevada Department of Transportation NDOT are working on projects to reduce deer mortality due to vehicle collisions, including big game overpasses on Highway 93. Additional data on deer/vehicle incidents is discussed in Section 4.18, "Wildlife" (p. 127).

About half a dozen small to medium scale fires (> 5,000 acres) have impacted forage quality and increased non—native invasive species such as cheatgrass between the Spruce Mountain Ridge arm and the Pequop arm of Spruce Mountain. However, these fires have had a limited effect on mule deer and pronghorn as they have occurred in low-density habitat, consisting primarily of sagebrush shrublands.

Pronghorn antelope occur throughout the lower elevations surrounding Spruce Mountain on a year-round basis. Wintering areas occur in the valleys between Wood Hills and Spruce Mountain Ridge and between Spruce Mountain and the Dolly Varden Mountains (see Figure B.12, "Antelope CESA" (p. 174)). The Study Area falls within Hunt Units 078, 105-107, 121-Southeastern Elko County (NDOW 2010). Survey efforts for this unit group were reduced compared to the previous year. A total of 215 animals were classified in mid-January, yielding sex and age ratio of 22 bucks: 100 does: 32 fawns. Despite the above average fawn ratio observed in the 078, 105-107, 121 unit groups this year, the 2011 population estimate of approximately 1,000 pronghorn reflects a 17% decline over last year's estimate. This decline was a result of a model adjustment based on a historic winter mortality event (1992-1993) which had originally been underestimated. Although increased mortality rates were applied to the model for the winter of 1992-1993, this population continues to show a long-term upward growth trend. The fawn ratios which had been observed in 2008 and 2009 were well below the long-term average of 30 fawns: 100 does. This year's observed fawn ratios were the highest since 2007. Should fawn ratios continue to stay at or above the long-term-average, positive population growth should be realized.

The spring of 2010 provided significant moisture and cool weather, facilitating a strong onset of forbs and grasses. Summer moisture was sporadic; however, its frequency seemed to sustain the growth of succulent summer forbs and grasses providing quality forage throughout the summer months. Despite having good spring moisture in 2010, water availability throughout the year continues to be an issue for both animal water requirements and forage production and was evidenced by the boom and bust cycle of observed fawn ratios. Antelope have been especially challenged in areas where they face stiff competition from wild horses for the little water that is available. The Department of Wildlife is in the process of identifying and developing water developments in these unit groups which would provide more consistent water sources for pronghorn on a year-round basis and protecting perennial water sources from degradation.

Elk observations, scat and tracks occur throughout the Project Area. Elk typically stay at the higher elevations of Spruce Mountain, moving and residing at the top in the summer months and utilizing areas near the valley floor during the winter. Elk will also cross South US 93 to utilize the area around Palomino Ridge in the winter and the Cherry Creek Range in

the summer. The elk within the Study Area fall within Hunt Unit 078 and portions of 104, 105-107: Spruce Mountain- Elko County (NDOW 2010). The majority of past surveys in this area were conducted in conjunction with spring and fall deer surveys. This year a dedicated elk only survey was conducted. Elk surveys were completed in January, 2011. Units 078, 104, 105, 107 and portions of 121 were surveyed with the majority of animals observed in units 104 and 105. A total of 278 elk was observed, yielding sex and age ratios of 69 bulls: 100 cows: 42 calves. The observed calf ratio was exceptional compared to the long-term average of 34 calves: 100 cows and was the highest observed calf ratio since 2006. Animal movements observed during both this survey and the Unit 121 elk and deer survey indicated interchange between Units 104,105 and 121.

In the winter of 1997, 146 elk were released in Unit 105 on Spruce Mountain. It has been 14 years since the release and elk have established themselves throughout the entire unit group. Although the long-term average calf ratio remains relatively low, positive population growth is occurring and mature bulls have been observed. Elk have established in Unit 078 and more frequent observations of elk in Unit 106 indicate the herd is still expanding its distribution and range. Movement between adjacent units such as 077 and especially Unit 121 is also occurring and evidenced by elk numbers observed in Unit 105 during late winter surveys in 2010. The total number of elk classified during winter helicopter surveys exceeded the modeled estimate for the unit group. Despite good recruitment observed this year, poor recruitment in recent years would likely not have allowed for population growth. It is expected that some of the elk observed during this year's survey emigrated from adjacent areas, especially Unit 121. Plans for a telemetry study are underway and should help to depict seasonal movements of this elk herd.

The increase in observed calf ratios and subsequently, the modeled population estimate, are likely reflective of favorable forage conditions which occurred during the last growing season, in conjunction with a relatively mild winter.

The mountain lion (*Puma concolor*) also is classified as a big game species. Mountain lions are fairly common in north-central Nevada and occupy the higher elevations of Spruce Mountain. They often travel between mountain ranges and valleys depending on prey availability.

Small game species that have been detected within the Study Area during wildlife surveys include blue grouse (*Dendragapus obscurus*), California quail (*Callipepla californica*), chukar (*Alectoris chukar*), greater sage-grouse, and pygmy rabbit. Chukars are found on rocky ridges and hillsides. Mourning doves are found in a wide range of habitats in close proximity to water and are most likely to occur within the Study Area during spring, summer, and early fall. Although greater sage-grouse and pygmy rabbits are considered game species in Nevada, they are also BLM special status species and are discussed in Section 3.14, "Special Status Species" (p. 49). There are also historic records of gray partridge (*Perdix perdix*) being present within the Project Area.

Furbearers that may occur within the study area include the badger (*Taxidea taxus)*, gray fox (*Urocyon cinereoargenteus)*, kit fox, bobcat, and raccoon (*Procyon lotor)*.

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Chapter 4. Environmental Effects:

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As defined in 40 CFR 1508.7 (Council on Environmental Quality [CEQ] regulations for implementing the NEPA) a cumulative impact is an impact on the environment that results from the incremental impact of the action when added to other past, present, and Reasonable Forseeable Future Actions (RFFA's), regardless of which agency (federal or nonfederal) or person undertakes such other actions. Cumulative impacts can result from individually minor, but collectively significant, actions taking place over a period of time.

The Cumulative Effect Study Areas (CESA's) were determined by BLM and NDOW specialists. The geographic extent of resources potentially impacted varies by the type of resource and impact. The CESA's that have been developed for all affected resources are listed in (Table 4.1, "Cumulative Effects Study Areas" (p. 69) .

Table 4.1. Cumulative Effects Study Areas

Resource	Cumulative Effects Study Areas (CESA's)		
	Name	Acres	Description
Air Quality	Air Quality CESA	1,157,321	Independence Valley, Clover Valley, Butte Valley, and Goshute Valley Airsheds.
Cultural Resources	Cultural CESA	351,896	Spruce Mountain Area.
Fire Management	Fire Management CESA	1,423,414	Spruce Fire Management Unit (FMU).
Forestry and Forest Products	Forestry CESA	546,964	Spruce Grazing Allotment.
Hydrology & Riparian/Wetlands	Hydrology CESA	351,896	Spruce Mountain Area.
Invasive, Non-Native Species	Invasive, Non-Native Species CESA	546,964	Spruce Grazing Allotment.
Migratory Birds	General Wildlife CESA	464,218	NDOW Hunt Unit 105
Native American Consultation	N/A		No CESA Identified.
Public Health and Safety	Public Health and Safety CESA	546,964	Spruce Grazing Allotment.
Livestock Grazing	Livestock Grazing CESA	546,964	Spruce Grazing Allotment.
Recreation	Recreation CESA	464,218	NDOW Hunt Unit 105.
Soils	Soils CESA	351,896	Spruce Mountain Area.
Special Status Species	General Wildlife CESA	464,218	NDOW Hunt Unit 105.
Special Status Species	Sage Grouse CESA	3,005,777	East Valley and Ruby Valley Sage Grouse Population Management Units.
Vegetation	Vegetation CESA	546,964	Spruce Grazing Allotment.
Visual Resource Management	Visual Resource Management CESA	464,218	NDOW Hunt Unit 105.
Wilderness Study Area's (WSA's)	Wilderness CESA	464,218	NDOW Hunt Unit 105.
Wild Horses	Wild Horse CESA	1,010,934	Antelope Valley, Spruce—Pequop, and Goshute Herd Management Areas.
Wildlife-Small Mammals	General Wildlife CESA	464,218	NDOW Hunt Unit 105.

Resource	Cumulative Effects Study Areas (CESA's)		
	Name	Acres	Description
Wildlife-Big Game	Mule Deer CESA	4,431,873	Mule Deer Range (summer, winter, and crucial) and Migration Corridors.
	Elk CESA	1,838,493	Elk Range (summer, winter and crucial)
	Pronghorn CESA	882,754	Pronghorn Antelope Range (summer, winter, and crucial)

4.1. Air Quality

Alternative A (Proposed Action)

Air quality would be affected in airsheds intersecting the Study Area as a result of fugitive dust associated with proposed surface disturbance along with smoke from proposed burning. Smoke from any prescribed burning would result in some impact to air quality within the project area. Prevailing winds would minimize impacts for travelers along U.S. Highway 93. Smoke management measures would be specified in the burn plan. Smoke and particulate matter released into the atmosphere by burning would provide limited impact to the public because of the remote location of the project area. There would be short term (24-36 hours) degradation to air quality in the Study Area while burning operations are taking place. Creation of fugitive dust would occur as a result of the many proposed surface disturbing actions causing some impact to air quality. Revegetation and stabilization of treated areas would reduce these impacts in the long term. Vehicles used in treatments would generate emissions which would have no measurable impact to air quality. Local impacts to air quality from smoke, vehicles and fugitive dust would be transitory in nature and would remain below the State of Nevada Bureau of Air Quality emission standards.

The proposed action includes some activities which would result in emission and sequestration constituents known to affect global climate change. The project would result in the emission of a small amount of greenhouse gases as result of vegetation burning vehicle emissions, and decay of treated vegetation. Vegetation restoration would also result in sequestration of carbon as a result of improved vegetative productivity and improved soil quality in the long term. These emissions and sequestrations would be a very small portion of the global budget of constituents affecting global climate change.

Alternative B

Impacts would be similar to those described under Alternative A (Proposed Action), except that temporary increases in smoke and emission of greenhouse gases from controlled burning would not occur.

Alternative C

Impacts would be the same those described under Alternative A (Proposed Action).

Alternative D

Impacts would be the same those described under Alternative A (Proposed Action).

No Action Alternative

Under the No Action alternative existing impacts to air quality would continue to occur and the impacts of the proposed action would not occur.

Cumulative Impacts

The Cumulative Effects Study Area for this project is the Independence Valley, Clover Valley, Butte Valley, and Goshute Valley airsheds. See Figure B.1, "Air Resources CESA" (p. 163)Air quality in this area is influenced by wildfire, agriculture, travel on native surfaces and blowing dust from native surfaces. These occurrences are expected to continue and effects will slowly increase, however air quality would still likely be good resulting in no substantive impacts under the No Action alternative. The Proposed Action and action alternatives include activities which may temporarily increase air pollutants, but air quality standards would still be met. The Proposed Action and action alternatives would not result in substantive cumulative impacts to air quality.

4.2. Cultural Resources

The primary concern of a cultural resources cumulative effect analysis for the area of potential effect centers on prehistoric pronghorn hunting sites. The sites of concern are unique and fragile archaeological site types that are comparatively rare outside the APE (78% fall within the APE), are in the infancy of research, and played a significant role in the prehistoric lifeways of this region of the Great Basin.

Past, Present, and Reasonably Foreseeable Future Actions (PPRFFAs) for the APE include livestock grazing, wild horse sanctuary, mining, fuel woodcutting, commercial wood products and recreation.

Alternative A (Proposed Action)

The Proposed Action contains a number of design features which should effectively prevent any impacts to significant cultural resources. To facilitate the reader's evaluation of whether these design features are adequate to prevent adverse impacts to significant cultural resources the general effects of the proposed action (design features) are presented first, followed by a description of design features for the action, and summarized with a discussion of how the design features prevent adverse impacts to eligible cultural resources.

- **Herbicide Application**

  The proposed action of herbicide application involves hand spraying, ground application (including All Terrain Vehicles, Vehicles, and Tractor Mounted Units), and aerial application (including fixed-wing aircrafts and helicopters). Because the proposed action of herbicide application does not involve any significant resource disturbance (e.g. ground, vegetation, water, etc.) there is no significant potential for adverse effect to cultural resources and therefore no specific design features are proposed for protection of cultural resources.

- **Prescribed Fire (including management of wildland fire)**

Proposed prescribed fire treatments include broadcast burning and/or the burning of hand-stacked piles of wood generated from hand thinning treatments. Pile burns would be of high intensity but have a zero rate of spread, and so would have no impact to cultural resources provided the piles are placed away from historic properties. Broadcast burning will be of high intensity with a slow rate of spread, and thus has high potential to adversely affect historic properties. To ensure that no adverse effect is created for historic properties via broadcast burning, avoidance areas will be closely monitored/defended by fire crews to prevent spread into the avoidance area; in some cases fire retardant may be applied to historic properties as an added insurance measure against a slow-intense burn.

- **Mechanical Treatments**

  Proposed mechanical treatments may include chaining, mastication, and selective cutting. Each of these proposed treatments is discussed in more detail below:

  - *Chaining*

    An Ely chain, of approximately 200 feet in length (weighing a total of approximately 36,000 pounds, or 16 tons), would be pulled behind two bulldozers (D8 or equivalent). The intent of the chaining is to increase the mortality rate of trees in the area to be treated by uprooting trees. This treatment may result in portions of surface and subsurface soils being mixed when trees become uprooted. In addition to this disturbance to the vertical integrity of the soil, the dragging of the chain and the movement of the heavy equipment tramples and moves items on the ground surface.

    This type of disturbance to an archaeological site could result in negative impacts to both vertical and horizontal integrity of cultural deposits. Depending on where the treatment is implemented, contextual data (in the form of chronological and climatic data obtainable from tree species) important to the understanding of highly significant archaeological sites in the area would potentially be compromised.

    Prior to chaining a complete Class III cultural resource inventory (i.e. a pedestrian survey using 30 meter or closer transects) would be performed for the entire APE of the proposed treatment. The footprint of the proposed treatment area would be designed to avoid all eligible archaeological sites identified from the Class III inventory, with the preferred method of design having the eligible sites outside the treatment boundary (i.e. no “island” avoidance areas) and a minimum buffer zone of 50 meters between the boundary of the site and the boundary of the treatment area. Contextual data will be preserved via a series of tree core samples obtained from a stratified sample within the proposed treatment area.

    To assure that the design specifications are effective in preventing adverse impacts to cultural resources, eligible sites identified from the inventory will be monitored before, during, and after treatment implementation.

  - *Mastication & Selective Cutting*

    This proposed treatment may include such equipment as Bull Hog, Hydro Axe, or any machine designed for the shredding and/or mulching of tree species and would be mounted onto a tracked or wheeled vehicle.

This proposed treatment has the potential to adversely impact cultural resources if wood structures (e.g. wickiups, lean-to's, hunting blinds, bow-stave trees, etc.) are located within the proposed treatment area.

Prior to mastication a complete Class III cultural resource inventory (i.e. a pedestrian survey using 30 meter or closer transects) would be performed for the entire APE of the proposed treatment. The footprint of the proposed treatment area would be designed to avoid all significant archaeological sites that may be impacted by tree removal (e.g. bow stave trees, wickiups, etc.), with the preferred method of design having the significant sites outside the treatment boundary (i.e. no "island" avoidance areas) and a minimum buffer zone of 50 meters between the boundary of the site and the boundary of the treatment area. Contextual data will be preserved via a series of tree core samples obtained from a stratified sample within the proposed treatment area.

To assure that the design specifications are effective in preventing an adverse impacts to cultural resources, significant sites identified from the inventory will be monitored before, during, and after treatment implementation.

- **Seeding**

A variety of seeding methods may be used for the proposed treatments. Seeding methods proposed may include; broadcast and drag, drill, aerial broadcast, harrow, disking, hand planting of seed (using either no tools or hand-held broadcast spreaders), and/or hand planting of seedlings. Aerial broadcast and hand planting of seed or seedlings are treatments that do not cause any disturbance to cultural resources; and therefore will not be discussed further in this section. The remaining proposed treatments are discussed in more detail below.

  - *Broadcast and Drag, Drill, Harrow, and Disking*

    This proposed treatment involves the broadcast application of seed followed by dragging a heavy chain (drag) or a series of spikes (harrow) across the seeded area to enhance ground-to-seed contact (broadcast and drag), drilling the seed into the soil (drill), or plowing the area to prepare the seed bed (disking).

    These proposed treatments have the potential to impact the horizontal integrity of cultural resources on the ground surface and disking has the additional effect of destroying the vertical integrity of sub-surface cultural resources. Horizontal spatial patterning within archaeological sites represents an important data component of many significant archaeological sites, and so the proposed treatment may adversely impact such sites. Sites with a sub-surface component are rare and fragile and so the proposed treatments (especially disking) could adversely impact these sites as well.

    Prior to treatment implementation a complete Class III cultural resource inventory (i.e. a pedestrian survey using 30 meter or closer transects) would be performed for the entire APE of the proposed treatment. The footprint of the proposed treatment area would be designed to avoid all significant archaeological sites, with the preferred method of design having the eligible sites outside the treatment boundary (i.e. no "island" avoidance areas) and a minimum buffer zone of 50 meters between the boundary of the site and the boundary of the treatment area.

To assure that the design specifications are effective in preventing an adverse effect to cultural resources eligible sites identified from the inventory will be monitored before, during, and after treatment implementation.

- **Vegetation Treatment Protection**

  It is proposed that protection fences (standard three to four wire range fencing) be installed around treatment boundaries and three springs.

  In general, the potential for adverse impacts to cultural resources is found with associated trailing along the fence rather than the installation of the fence itself. Livestock, wildlife, wild horses and human land users all have a tendency to travel along a fence line because it typically offers the path of least resistance in an otherwise roadless area. This traffic has the potential to increase erosion, trample artifacts and features, and put archaeological sites at greater risk for illicit artifact collection and thus protection fences have the potential to adversely impact cultural resources.

  Prior to treatment implementation a complete Class III cultural resource inventory (i.e. a pedestrian survey using 30 meter or closer transects) would be performed for the entire APE of the proposed treatment. There are two design measures by which adverse impacts to cultural resources can be avoided: avoidance of eligible archaeological sites (using a minimum buffer of 50 meters) and keeping fence construction traffic restricted to the centerline of the fence.

  To assure that the design specifications are effective in preventing an adverse impact to cultural resources eligible sites identified from the inventory will be monitored before, during, and after treatment implementation.

- **Firewood Cutting**

  Proposed treatment areas would be open to green and dead fire woodcutting for commercial and non-commercial uses prior to treatments. Designated areas would be signed and project boundaries would be appropriately flagged to avoid unauthorized off-road travel out of cutting units. Islands of trees that are to be left intact within project areas would also be appropriately flagged to prohibit firewood cutting.

  Increased traffic, and potential for non-compliance on the part of the public may place archaeological sites within the APE at risk for damages caused by off-road travel, wood cutting, and illicit artifact collection.

  All proposed treatment areas would be inventoried for cultural resources prior to opening the area for firewood cutting. Snow fencing (or similar) may be used to delineate cultural avoidance areas.

Cumulative Effects

The Cumulative Effects Study Area (CESA) for cultural resources is the area (see Figure B.2, “Cultural Resources CESA” (p. 164)). Past and present effects to cultural resources includes erosion (both natural and that caused by livestock grazing and mechanized travel), illegal artifact collection (especially within historic sites), trampling (via livestock and mechanized travel), and firewood harvesting. These existing cumulative impacts have resulted in significant impacts to cultural resources within the CESA. Future occurrences of the cumulative effects listed would continue to occur under the No Action Alternative. Under other action alternatives there would

be a greater presence of monitoring personnel which is likely to serve as a deterrent to human induced impacts to cultural resources (e.g. illegal artifact collecting, inappropriate firewood harvesting, inappropriate mechanized travel, etc.) and would alert the BLM to other potential impacts (e.g. erosion, trampling, etc.). Impacts may increase to pre-project implementation levels once the project(s) are complete and there is no longer the mitigating presence of monitoring personnel. In sum, there will be a temporary slowing of cumulative effects under the Proposed Action and Alternatives as compared to the No Action Alternative.

4.3. Fire Management

Alternative A (Proposed Action)

Under the proposed action, fire intensity would be decreased as a result of reduced fuel loading. Future natural fires would be less extensive and smaller in size. Smaller wildfires would be easier to manage, reducing the risk to multiple natural resources, private withholding's, and physical structures. The danger of large, uncontrolled wildfires would be reduced under this alternative.

- **Prescribe Fire** (including the Management of Wildfire): Burn units would be constructed with irregular edges. In areas that would be broadcast burned, fuel loading would reduced and most combustible fuels would be removed. “In the short term, prescribed burning could decrease wildfire size and severity by removing ladder fuels and excess litter accumulation” (BLM, 2000). These burns would not be a selective treatment method and would remove the current vegetation and allow for shrubs and herbaceous vegetation to become reestablished on sites that were tree dominated. The threat of insect and disease throughout the stands would be greatly reduced. Burning would reduce the threat of a large uncontrolled wildfire that may be ignited in adjacent areas to move through entire landscape. Following broadcast burns grasses and forbs would be the first to establish on site. Next to follow grass and forbs, shrubs and junipers would be the next to establish on site. Pinyon trees would be the last to establish on site.

  Removing all vegetation from the site would open a niche and annual grasses like cheatgrass may establish throughout the site. If annual grasses become established on site the threat of wildland fire would significantly increase. These grasses sprout and cure earlier then perennial grasses and forbs. The early curing of these annual grasses allows for fires to come through the site earlier than ever naturally occurring. When fires burn through a site early in the summer before the perennial grasses can become established and produce seed, the revegetation of perennial grasses would decrease. Fire occurrence would also increase with perennial grasses and forbs that are established on site; however, if a fire occurs on a perennial grass and forbs site, the intensity would be low and all perennial plants would have already produced seed and are likely to revegetate after the fire.

  Pile and burning methods would not reduce as much of the existing fuel loading as the broadcast burning method. However the pile and burn, when combined with selective cutting methods, would be more selective and only desired vegetation would remain. When this method is used in coordination with mechanical thinning methods, much of the debris and dead and down fuel would be consumed in the piles. This burning method results in less disturbance to the site and the risk of cheatgrass establishment would be greatly reduced when compared to the broadcast burning method. On locations where piles were constructed and

burned, impacts to the site would the same as broadcast burning and the threat of annual grass establishment could increase on the locations.

In summary, prescribed fire; including broadcast burning, management of wildland fire, and pile and burning would benefit the site, from a fire management perspective, by the reduction of fuels on the site. Broadcast burning and management of wildland fire would remove most of the fuels from the site while pile an burning would remove the fuels that were selectively cut an piled. Threat of invasions of annual grasses increases with broadcast burning when compared to pile and burning. Sites that annual grasses have established on may burn earlier in the year and would retard the establishment of desired perennial grasses and forbs to the site. Fires occurring after treatments on grass and forb dominated sites would be of low intensity. As shrubs and trees become established the threat of higher intensity fires would increase through time.

- **Mechanical:**
  - *Chaining* : Using this method, the fire behavior would be decreased as a result of reduced fuel continuity. These treatments modify stand structure and fuel loading. Chaining does not remove any of the fuel off of the site, however, the fuel structure is altered continuous fuel would be eliminated. This method creates large piles of heavy fuels ("jackpot"). In the short term, fire danger may increase on site until dead foliage is lost from dead vegetation. The disturbance included with chaining increases the risk of annual grasses establishing on the disturbed sites. Similar to prescribed fire impacts, chaining would favor grasses and forbs to establish initially to establish on site. In the event of a fire occurring on grass and forb dominated sites, fire impacts would be minimal due to the low intensity of the fire. In the event of a natural occurring fire within a chained area the fire intensity would be low throughout the units, however if a fire was established in the jackpots of fuel then fire intensity and burning periods would be greatly increased.

  - *Selective Cutting (including Green/Dead Woodcutting, and Mastication):* This method when combined with pile and burning can be an effective fuel break in using natural barriers and selecting for desired traits on leave vegetation. Dead and downed material as well as debris would be consumed by burning piles.

    Using thinning with out burning would leave the fuel and biomass on site and the threat of high intensity wildfire to pass through the project would still exist. This treatment would change the fuel continuity as well as the fuel structure. Areas that are thinned without the removal, or burning, of the biomass would significantly increase the heat produced from a wildfire and therefore, negatively impact the soils and the reestablishment of desired vegetation. Mastication methods would uniformly disperse the debris across the landscape and would allow for a fire to burn throughout the Study Area but not with the intensity as it would under the No Action Alternative. Trees that are removed from the site through selective cutting or mastication would allow for grasses and forbs to reestablish on site. Similar to all of the above treatments, fire intensity would decrease on grass and forb dominated sites.

    In summary, selective cutting; including thinning, green/dead wood cutting, and mastication would change the fuel structure and fuel continuity on the site. Hand thinning when combined with pile burning would remove fuels from the site. Mastication and hand thinning without pile burning both would leave fuels on site; however, fuels on site would

not be in large concentrations but scattered throughout the site. Fires occurring on site after treatment would likely burn at lower intensity than if no treatment was completed.

- **Herbicide Application**: Active ingredients proposed for treatment in this project include, Imazapic, Glyphosate, 2–4–D, and Dicamba. These proposed active ingredients would be used to suppress and control annual grasses and forbs such as cheatgrass and halogeton. Annual grasses are of concern for fire management as they increase fire frquency on site and out compete desired perennial vegetation. All disturbances that are proposed within this document would provide a vector for cheatgrass and halogeton establishment on site. The presence of cheatgrass negatively impacts fire management in that once cheatgrass is established, the time periods between fires is significantly shorter and continually negatively impacting the reestablishment of native more desirable species.

  Imazapic: Imazapic would be applied as a preemergent for annual grasses and halogeton. Halogeton is not a species of concern from a fire management background, and the emphasis for fire management would be the removal of annual grasses including cheatgrass. Imazapic would suppress the germination and establishment of cheatgrass on the site for at least two consecutive growing seasons. This reduces the threat of cheatgrass initially after treatment and would allow for desired, more fire resistant species to establish. Therefore, fire management would benefit from imazapic applications on the site.

  Glyphosate: Glyphosate applications would impact all vegetation on site. This active ingredient may kill all grasses, forbs, shrubs and trees that are contacted. The application of this herbicide would greatly reduce fuels within the treatment area if all grasses and forbs are removed from the site. Seeding would be needed following glyphosate applications. Glyphosate application would stress shrubs and trees. Stressed shrubs and trees may attract forest pests to the site. Forest pests outbreaks in pinyon andjuniper woodlands pose an increased threat to fire management. Infected tress trees would have dead needle cast on standing trees and pose a threat for large scale high intensity fires.

  2,4–D: The primary use of this herbicide would be to reduce and/or eradicate halogeton from sites. 2–4–D applications pose a threat to broad-leaf forbs, shrubs, and trees. Grasses would not be affected herbicides containing 2–4–D. Forbs, shrubs, and trees may be removed from the site with 2–4–D applications. The removal of forbs and shrubs, through repeated applications, eliminates the possibility of increasing fire intensity. Annual grasses if established on site would benefit from 2–4–D applications due to decreased competition on site following treatment.

  Dicamba:

  In summary, herbicide application would positively impact fire management throughout the project area. The use of herbicides on the landscape to control invasive weed species would positively impact current fire management activities and goals. The removal of cheatgrass would reduce the threat of fire throughout the landscape and allow for native, more fire resilient, species to establish. With the use of herbicide, cheatgrass establishment may be prevented or removed from the site and allowing for restoration activities to be more successful and less threatened by wildfires. Herbicide application would give desired perennial vegetation advantages to establish and out compete annual grass invasions. All herbicides proposed in this document reduce the amount of fine fuels within the project area.

- **Seeding**: The seeding of, fire resistant and more competitive, perennial vegetation would positively effect fire management throughout the project area. Establishing desired perennial plants on site after treatments would greatly reduce the risk of cheatgrass and halogeton to establishing on the site. Fires occurring on desired perennial grasses and forbs dominated sites would be of low intensity, after seed maturity, and would mimic historic fire disturbances. However, without seeding of desired species and the establishment of annual grasses, fires would also be of low intensity but may be earlier in the summer before native perennial grasses and forbs have reached seed maturity. Annual grass monocultures have shortened native fire cycles drastically when compared to native fire regimes. These shortened fire interval, would greatly benefit annual grasses, and negatively impact native ecosystems and fire management throughout the region.

- **Vegetation Treatment Protection**: The BLM is proposing to protect treatment areas from livestock and wild horse grazing during initial development and establishment of vegetation. Providing protection from grazing would increase the amount of grasses and forbs that reestablish on site; in turn this would increase the amount of fine flashy fuels. Grazing to the site would reduce the amount of fine flashy fuels annually from the site. With repeated heavy grazing to a treatment area, all perennial herbacouse species may disappear through time and be replace with annual grasses and forbs. However, without intense grazing use, the site would revegetate with desired perennial, more fire resistant, species. If site was to be heavily grazed following treatment, invasions and establishment of annual grasses and halogeton would likely increase. Heavy grazing over a long period may result in increased establishment and development of wood vegetation on site, therefore fire intensity would increase far faster on sites that have been heavily grazed.

- **Maintenance**: Maintenance, including the use of any of the above treatments, would reduce fuel loadings or alter fuel continuity on site. As plant and community succession continue through time the BLM may reenter site with treatments to reduce the amount of fuels that have established and to meet resource benefits.

Alternative B

Under this alternative the BLM is proposing to complete all treatments outlined above in Alternative A (Proposed Action) except for the use of prescribed fire and the management of wildland fire. This alternative would allow all of the mechanical treatments as well as, pile burning, livestock and wild horse grazing protection, herbicide application, seeding, and maintenance. From a fire management view, this alternative would be less beneficial to fire management than the other alternatives. Prescribed fire and management of wildfire would remove the most amount of fuel from the site. With the exception of pile burning and green wood cutting, all other methods would leave fuels on the site. Mastication would not remove the fuels from the site, however this method would change the fuels structure on site form large standing fuels to smaller chips scattered throughout the site. Hand thinning would also change the fuels on the scattered debris from hand thinning that was not consumed in pile burning would be small in nature and fire intensity would be lower when compared to the no action. Seeding, herbicide application and maintenance would all benefit fire management in the long term. The establishment of desired, fire resistant, perennial vegetation would out compete, and prevent invasion of, annual grasses.

In summary, under this alternative with the exception of pile burning and green wood cutting, no fuels would be removed from the site and the threat of wildfire would still exist. Debris left

behind from mastication efforts would be scattered throughout the site providing more continuous fuels throughout the site. These lower intensity fires would do less damage to the site. This debris would also burn at a much lower intensity when compared to large amount of standing trees and jackpot fuels from chainings. Debris left behind from hand thinning efforts that were not piled and burned would be scattered throughout the site may provide a continuous fuel and may serve as latter fuels to allow for fires to establish in the crowns of live trees. Mastication and hand thinning debris would burn at much lower intensities when compared to the no action alternative. All of these methods would benefit fire management in the long term if maintained. The prevention and removal of annual grasses through herbicide application and seeding would benefit the site to be more resistant to fires and the negative impacts related to wildland fires.

Alternative C

Under this alternative the BLM would complete all treatments outlined above in Alternative A (Proposed Action) except for the use of chaining. This alternative would allow the BLM to; complete prescribed fires, manage wildland fires, perform mastication activities, allow green wood cutting, apply herbicide, seed desired species, and maintain the project for the long term objectives. As described above, all of these activities would benefit fire management in the long term. Areas that were proposed to be chained would need to be treated by other methods or would remain at high risk of large-scale stand replacing fires.

In summary, impacts to would be similar to the above alternatives. However, “Jackpots” of fuel would not be created from chaining operations, and under this alternative fire intensity would generally decrease when compared to the no action alternative. Fuels would be removed from the site through prescribed fire, management of wildland fire, pile and burning and green wood cutting. As stated above under Alternative A, fuels structure and continuity would change. In the long term this alternative would benefit fire management and resource objectives.

Alternative D

Under this alternative the BLM is would complete all of the treatment outlined above in Alternative A (Proposed Action) except for the applications of herbicides. If annual grasses become established on site after treatments are completed, the BLM would not be able to treat those outbreaks with herbicides under this Environmental Assessment. Suppression and eradication of annual grasses would not be completed in a timely manner and risk of wildfires establishing on site would increase. As described above, annual grasses disperse seed and cure much earlier than perennial grasses, this allows for fires to move through a site before native grasses mature. Multiple fires occurring before native grasses can produce seed would most definitely convert the site to a annual grass monoculture.

In summary, without the use of herbicides, annual grasses may become established on disturbed sites. In the event that annual grasses become established, and fire return intervals would be decreased. Increased fire activity may convert the entire site from desired vegetation to annual grass monocultures. Impacts to the site would be negative if annual grasses became established. Fire management objectives would also be negatively impacted from this alternative.

No Action

Under the no action alternative, fuel conditions would continue to increase and accumulate beyond levels representative of the natural (historic) fire regime which would increase the burn intensity potential. The risk of a large, uncontrolled, high intensity wildfires would remain much greater. If a wildfire does occur in the area, fuel loading and the associated fire intensity would be reduced. Impacts to the cheatgrass infested sites within the Study Area and adjacent areas would likely expand with any disturbance including fire.

Cumulative Impacts

The Cumulative Effect Study Area (CESA) is the Spruce Fire Management Unit (FMU). See Figure B.3, “Fire Management CESA” (p. 165). The Spruce FMU is described in the Northeastern Nevada Fire Management Plan and is 1 of 28 FMU's within the Northeastern Nevada Fire Planning Unit (FPU). This FMU lies generally within the Long/Ruby Valley and Spruce/Steptoe Valley subbasins and ranges from 5,000 and 10,000 feet mean sea level (msl). This FMU is comprised of:

	Public Acres	Private Acres	Bureau of Indian Affairs Acres	Total Acres
Spruce FMU	1,249,341	173,936	142	1,423,419
	88%	12%	<1%	

Past, Present and Reasonable, Foreseeable Future Actions (PPRFFA's) within this CESA include livestock grazing, wild horse sanctuary, mining, fuel woodcutting, commercial wood products, and recreation.

The potential exists for future wildfire events in the area, as does additional fuels management activities and possible wildland fire management for resource benefit. With planned disturbances such as the use of fire, mechanical vegetation manipulations, herbicide treatments, and seeding efforts, opportunities for reducing fuel loads, detecting invasive weeds, and improving habitat would be greatly increased. Implementing the Alternative A, B, and C would improve the ability of the vegetation community to compete with existing invasive species and assist in preventing further establishment of such species. Completing more treatments in patches over time would reduce the potential for large-scale wildland fires, and invasion of these species over a large area by increasing the composition of desirable, perennial, understory species that would successfully compete with noxious weeds and invasive species. Overall, cumulative impacts from the proposed action when combined with above PPRFFA's would be minimal and no further analysis is needed.

4.4. Forestry and Forest Products

Alternative A (Proposed Action)

The proposed treatments would reduce tree numbers initially and open up areas within the stand. Herbaceous cover would inhabit treatment areas over time adding more plant diversity to the site. Areas of dense closed canopy and limited desired understory vegetation may be slow to respond after treatment due to the lack of seed source. Herbicide application may be included with applications to reduce the amount of cheatgrass and halogeton to establish on disturbed sites. Seeding may be needed to revegetate these sites in a timely manner.

Treating these areas, should provide a healthier forest of uneven aged trees, with tree numbers more evenly distributed through out the different age classes.

- **Prescribed Fire (Including the Management of Wildland Fire):**

  Broadcast burning is non selective and all trees within in the burn unit are subject to loss. Competition established after the burn would be reduced significantly. Mosaic, low intensity fires would leave irregular edges and would result in uneven aged stands, and more diverse vegetation composition, when compared to the overstocked tree dominated sites. Burning would remove trees from sites for a longer period of time before reestablishment when compared to mechanical treatments. Pinyon seed "pine nuts" production would be significantly reduced in burned portions of units, however, unburned islands would increase in seed production due to decrease in competition on single tree and stand levels.

  Areas that are mechanically treated and piled to be burned would need to be timed so that cutting and the biomass left behind to be burned. As discussed in the mechanical treatment portion of this section the issues of leaving biomass on site and the risks of forest pests.

- **Mechanical Treatments:**

  Effects common to all mechanical treatments:

  All mechanical treatments outlined below would be treated in months when forest pests are least active. The cutting of green trees during late spring and early summer months would attract forest pests to neighboring stands. By implementing mechanical treatments in the late summer through winter and incorporating the Environmental Design Features, described above in the proposed action section, forest pests attractions would be minimized and excess mortality in conjunction with mechanical treatments would be eliminated.

  Mechanical treatments described below may be selective and leave islands would be implemented to provide and uneven aged stands. Leave islands would include all ages of trees from mature trees to saplings. Species composition among leave islands (dependent of species present on site) would incorporate Singe leaf Pinyon, Utah Juniper, and Curlleaf Mahogany as well as desired shrubs and understory vegetation. Form of crown and cone production capability would be incorporated into islands and leave trees. Pinyon trees with large spreading crowns and lots of old cones on the grounds are typically the most prolific nutbearers (McClain and Frazier, 2008). Juniper trees that are not completely up rooted will re-sprout and re-establishment of pinyon and juniper is relatively short term.

  All of the treatment methods described below could be used to retain and manage uneven aged stands. Uneven aged stands provide a multitude of diversity from wildlife habitat to forest products production/utlization. Impacts to forest products would initially be negative with the implementation of the mechanical treatments described below. Some seed producing trees would be removed from the site, and intern, pine nut crops would be negatively impacted within the treated sites and would decline in the short term. Chaining, hand thinning, and green wood cutting would dramatically increase the amount of biomass available for harvest within the treated sites in the short term. In the long term pine nuts, wildings, posts and Christmas trees will increase on site.

  - *Chaining*: Chaining would occur on overstocked forested areas with minimal desired understory vegetation. Chaining would be completed by the pulling of approximately 200 foot Ely Chain by two bulldozers. Double chaining would be preferred method when implementing this treatment. The first chain completely up roots some trees; however, many trees are not completely uprooted and are laid down in the direction of the chaining

with some roots still in the ground. The second chaining would occur in the opposite direction, this generally uproots and tips the downed trees over. Double chaining increases tree mortality on site. Small junipers can be up rooted and killed more effectively than small pinyons that tend to be more flexible than junipers. Young trees, less than 48 inches tall, may not be killed with double chaining because chain may ride over the top of the young trees (Stevens, 1999). Reducing the establishment of pinyon and juniper through chaining would allow for improvement of ecological condition of sites within the project areas and allowing for desired understory species to become established.

Residual woody vegetation which would consists of slash/biomass created from scattered trees from chaining would provide protection to regenerating grasses and shrubs. Some advantages to leaving trees in place include (Stevens, 1999):

1. Increased amount of infiltration by increased retention and detention of surface water.
2. Increased ground cover.
3. Decreased erosion.
4. Cover maintained for wildlife.
5. Wildlife and livestock movement onto and throughout the treated area is encouraged, resulting more even distribution and use.
6. Provide shade for livestock and wildlife.
7. Increased seedling establishment and seedling survival.
8. The decomposition of woody plant material would also improve soil nutrient content which would enhance the recruitment, establishment and long-term viability of the grasses and shrub community, as well as provide protection for the soil resource.

- *Mastication*: Mastication includes the mulching and/or shredding of trees on site. This treatment would be more selective than chaining treatments. This method would allow for the harvesting of disease infected and non desired trees within subjective stands. Competition within the stands would be reduced, resulting in an increase in stand health and vigor. Trees and islands left on site would be of all age classes and species on site. Leave trees would be analyzed based on age, form, and seed production capabilities. As described above mastication treatments would be implemented during months when forest pests are least active. The threat of attracting forest pests to neighboring stands would be greatly increased if mastication treatments occurred during the months when insects are most active and trees on site are stressed for nutrients and water.

- *Selective Cutting*: This method allows for harvesting of disease infected and non desired trees within subjective stands. Competition within the stand would be reduced, thus providing a healthier stand.

  Care must be used when disposing of biomass from treatments. Large accumulations of biomass will promote forest pest infestations and disease into an already stressed stand. Selective cutting and thinning with chipping and/or lop and scatter is preferred over mechanical treatments (chaining). Lop and scatter treatments should be scattered

to minimize fuel bed depth. Cut material should not be more than two feet in length. These actions will minimize the ability for treated biomass to hold moisture and provide favorable conditions for forest pests. Mechanical treatments injure trees and provide a vector for forest pests to become established. Care should be used to not damage leave trees during treatment. Timing of treatments is important in reducing the impacts of forest pests. Treatments when insects are most active, in mid summer (July — August), should be avoided or mitigated. Treatments should allow for treated biomass to dry prior to mid summer.

- **Herbicide Application**: The use of 2–4–D and glyphosate may negatively impact trees within the treatment areas. Areas to be treated with 2–4–D and glyphosate would need to be applied via ground application methods to minimize the negative impacts to non-target species. Over forest stand would benefit from herbicide application in the long term. The remaining stands would be positively effected in the regards of reducing and or eliminating cheatgrass through out the stands and disturbed areas. By reducing and or eliminating cheatgrass from the project areas flashy ground fuels would reduced and the threat of fire to move through the stand and reduce the chance of fire to becoming established in the crowns.

- **Woodcutting**: The cutting of dead and down wood is currently authorized on public lands within the Elko District. The cutting of green wood is authorized within designated portions of the Elko District, but not currently authorized for the Spruce Mountain area. The authorization of green woodcutting within the proposed treatment sites would allow for the public to cut and remove wood within the designated proposed treatments sites prior to implementation of treatments, and to be used residentially and/or commercially. This action would reduce the amount of fuel on the area before the treatment beings and allows the public to utilize a natural resource before we implement an treatments on the site. Green wood cutting would be preferred during the fall or spring months. Treatments when insects are most active, in mid summer (July — August), should be avoided or mitigated. Treatments should allow for treated biomass to dry prior to mid summer.

  In areas that are proposed for selective cutting or mechanical methods that are designed to have leave islands, the BLM would distinguish what islands are to be left with no woodcutting allowed as well as the project boundaries. Areas opened to woodcutting would be designated and properly signed so that authorized actions do not to exceed each project boundary.

Alternative B

Under this alternative, the BLM would complete all treatments described above in Alternative A except for the use of prescribed fire and management of wildland fire. Impacts of all the treatments proposed under this alternative have been analyzed above in Alternative A. All of these treatments may have less of an impact on forestry resources and products when compared to Alternative A. However, with out the use of prescribed fire and/or management of wildland fires, all treatments would be completed using mechanical methods described above. With increased mechanical treatments, throughout the project area, the risk of forest pest outbreaks may increase. Increase forest pest outbreaks would have a negative impact on intact, adjacent forest stands, and would inturn increase the amount of standing dead fuel. Under this alternative, the threat of large-scale wildland fire would not decrease as much as under Alternative A, but would be greatly reduced when compared to the No Action Alternative.

In summary, Alternative B would improve forestry and forest products within the Study Area in the long term. Increased mechanical treatments may increase the risk of forest pest outbreaks. Threat of large-scale wildland fires would not decrease as much as in Alternative A (Proposed Action). Impacts associated with all treatments under this alternative have been analyzed above in Alternative A (Proposed Action).

Alternative C

Under this alternative, the BLM would complete all treatments described above in Alternative A (Proposed Action), except for the use of chaining. Impacts to forestry would remain very similar to Alternative A (Proposed Action); however, forest reestablishment may be delayed under this alternative. Large amounts of debris left behind from chaining allows for pinyon and juniper seedlings to establish on site sooner than any other treatment methods outlined above. Sites that allow for pinyon and juniper reestablishment sooner on the site would improve the quantity and quality of forest products on site. In turn, large amounts of debris would not be left on site from chaining treatments and therefore the large amount of "jackpot" fuels associated with chaining would not be left on site. In the event of a fire establishing on sites that were treated via other methods than chaining fire intensity would be reduced and associated impacts from fire would decrease.

In summary, Alternative C would also benefit forestry and forest products in the long term. Woodlands and forest products may take longer to reestablish on site in areas that were not chained. Fuels, fire intensity, risk of large-scale wildland fires would decrease on site. Impacts associated with wildland fire would also decrease on site.

Alternative D

Under this alternative the BLM would complete all treatments described above in Alternative A (Proposed Action), except for the application of proposed herbicides. Impacts to forestry would remain very similar to Alternative A (Proposed Action); however if no herbicides were applied to the sites the chance of annual grasses to become established on site would increase throughout the project area. Treated areas may provide a open niche for annual grasses to become established and alter natural fire regimes. Annual grasses that become established on site would negatively impact forested lands and forest products in that chances for largescale fire, and fire occurrence would both greatly increase.

No Action

No action would result in trees becoming increasingly stressed with mortality coming from forest pest outbreaks. Age class distribution would shift increasing mature and over mature trees with less sapling and pole sized trees. Understory vegetation will continue to decline as stand canopy closes. Stand will become more susceptible to stand replacing fires and large-scale forest pest outbreaks.

Under the no action alternative, the potential for a large, uncontrolled wildfire would increase which could result in large acreages of trees and other areas being removed within the project area. In the event of a large — scale uncontrolled wildfire occurring, commercial products yielded by forest products would be lossed.

Cumulative Impacts

The Cumulative Effects Study Area for forestry and forest products is defined as the woodland occupied areas of the Spruce Mountain and Mountain Grazing Allotment. See Figure B.4, “Forestry CESA” (p. 166). Past, Present and Reasonable, Foreseeable Future Actions (PPRFFA's) within the CESA include livestock grazing, wild horse sanctuary, mining, fuel woodcutting, commercial wood products, and recreation.

The proposed treatments would remove vegetation and would negatively impact the amount of forest products available. However, indirectly the removal of the trees would reduce the amount of competition on the site and would promote regeneration and increase vigor among trees left on site. Increased vigor and regeneration would allow for stands to produce more volume in forest resource products. By reducing the fuel loading within the area, there is a reduced chance of a large, uncontrolled wildfire occurring and destroying large tracts of land within and adjacent to the Study Area which could remove large acreages of trees and other vegetation. With the removal of trees selectively, growth forms and desired traits may be selected in leave trees (trees to stay on site). Such traits considered would be species, age class, and growth forms to allow for commercial harvest. The decrease in tree density would improve conditions for the production of pine nuts over the long term, as the pinyon trees would have less competition and should be more productive once regeneration begins. The Alternative A (Proposed Action) when combined with PPRFFA's described above would have no cumulative impacts of concern and no additional analysis is needed.

4.5. Hydrology and Riparian/Wetland

Alternative A (Proposed Action)

The proposed treatments would initially alter soil and vegetation characteristics which would affect watershed hydrology. Proposed changes in vegetation composition have the potential to affect components of the hydrologic budget thus altering runoff, soil infiltration, soil water content etc. Researchers hold a variety of opinions regarding the effects to watershed hydrology from treatments similar to those proposed for Spruce Mountain. It is generally agreed that removal of a woody canopy such as sagebrush or pinion-juniper results in more water reaching the soil due to less rainfall interception; however, opinions vary regarding changes in runoff and deep infiltration from these surfaces (Roundy et al 1999). Greater soil water availability would be a positive effect of this treatment because it would likely lead to increased vegetative cover and more stable watersheds. A temporary increase in runoff however, could negatively affect watershed health by causing soil erosion and deposition. The proposed treatments address this potential negative impact by taking steps to ensure that runoff and erosion from affected watersheds is reduced by actions such as seeding ground cover vegetation, leaving woody litter on the soil surface and creating a rough surface during the treatments. These practices have been shown to be effective in vegetation treatments as outlined in Gifford, 1973.

Water sources and associated riparian areas could be negatively impacted by the proposed action due to increased use of water resources as a result of increased forage production from the vegetation treatment. All water sources in the Spruce mountain area have been considered for potential negative impacts, but most sources are either not susceptible to damage, are inaccessible, or are too far away from treatment areas to be affected. The only water sources which may

be potentially affected are Boone Springs and Lower Boone Springs near the proposed Indian Creek treatment. The proposed exclosure fence and repair of the existing development would prevent additional impacts to Lower Boone Spring and will likely result in riparian recovery at that source. Negative impacts from livestock and wild horses would be expected to continue to occur at Boone Spring (upper) which is located on private land.

Alternative B

Impacts to water quality and riparian resources would be similar to those described under Alternative A (Proposed Action).

Alternative C

Impacts to water quality and riparian resources would be similar to those described under Alternative A (Proposed Action).

Alternative D

Impacts to water quality and riparian resources would be similar to those described under Alternative A (Proposed Action).

No Action Alternative

Under the no action alternative existing impacts to water quality and riparian resources would continue and potential benefits to Lower Boone Spring would not occur. Watershed hydrology would not be altered as a result of treatment but may continue to be affected by gradual changes in vegetation composition or suddenly as a result of wildfire. Water resources near proposed treatment areas would likely continue to experience the existing level of impacts and would not be protected from livestock and wild horse impacts.

Cumulative Impacts

The Cumulative Effects Study Area (CESA) is the Spruce Mountain Area. See Figure B.5, “Hydrology, Riparian and Soils CESA” (p. 167). Cumulative effects to water resources occur as a result of drought, wildlife utilization, livestock grazing, wild horse use, and water development. Water quality and riparian areas are negatively affected by these impacts and it is apparent that riparian areas have already sustained substantive cumulative impacts which would continue under the no action alternative. As described above, the proposed action could result in additional impacts to water quality and riparian areas; however, the proposed action includes measures that would reduce or eliminate these impacts. It is therefore concluded that the proposed action and the other action alternatives in addition to all other PPRFFAs would not likely result in additional cumulative impacts of concern.

4.6. Invasive, Non-Native Species

Alternative A (Proposed Action)

Any ground disturbing activity would potentially increase noxious weed distribution and abundance. This would occur whether the activity was man-made (OHV use, mechanical treatments, dispersed camping, mining, etc) or natural (fire, wildlife grazing, etc). For this project each treatment will have a differing impact on weeds within the project boundary based on the types, intensities, and size of the disturbances.

Prescribed Fire and Management of Wildland Fire: Although fire can have an impact on noxious weed infestations, prescribed fire is unlikely to cause effects within the project boundary for reasons outlined below:

- Minimal soil disturbance.
- Less equipment travel throughout sites.
- Fire intensity may be minimized through firing techniques and prescriptions outlined in associated burn plan documents.

Post fire seeding, project implementation procedures, and follow-up weed treatments would limit the potential impacts of this treatment on noxious weeds.

- **Mechanical Treatments**:
  - *Chaining*: This treatment method would have the largest potential impact on noxious weeds for several reasons. This treatment would cause the most soil disturbance by pulling trees out of the ground thereby creating opportunities for noxious weed invasion and expansion. Additionally, as the chain travels across the landscape it does have the potential to drag weed seeds with the chains and spread them across the larger landscape. However, areas identified to contain noxious weeds would be avoided during chaining operations so potential for chaining to spread noxious weeds on site would be minimized.
  - *Mastication*: This treatment method would have a small impact to noxious weeds. The overland travel of equipment has the potential of transporting weed seeds. However, all equipment would be inspected prior to entering the site to be weed free and all identified noxious weeds within the Study Area would be avoided; therefore, the transportation of weed seeds with mechanical equipment would be minimized.
  - *Selective Cutting*: This treatment method would have a small impact on noxious weeds. This treatment would involve very little overland travel and very little disturbance. The pile burning would only impact a fraction of the treated area in small spots and is unlikely to have anything more that a short term and localized impact on noxious weeds.
- **Herbicide Treatments**: This treatment is specifically designed to suppress noxious and invasive weeds. By targeting them for removal this treatment will remove noxious and invasive weeds from the environment. Also by reintroducing a beneficial plant community that is resistant to noxious weed invasion, herbicide treatments within the future would be expected to be minimized.
- **Seeding**: This treatment method could generate a slight risk to increasing noxious weeds by causing some soil disturbance in order to increase the seed to soil contact. This treatment is essential to providing a future plant community that is resistant to noxious weed and invasive plant colonization. Without replanting areas that are infested with noxious weeds or invasive grasses, or other disturbed areas these locations would have the potential of expanding

infestations. Increasing infestations would threaten adjacent intact plant communities and become introduction sites for additional unwanted species.

- **Vegetation Treatment Protection**: This treatment would greatly enhance the ability of the seedings to become established. Once these seedings are established they will be able to reduce the prevalence of undesirable vegetation and be better able to out compete new infestations. Protecting the springs would greatly reduce disturbances in critical spring areas. By doing this the BLM will be able to reduce the risk of weed invasions into these critical areas.
- **Firewood Cutting**: This is a currently existing activity across much of the district and poses little risk to noxious weed introduction and invasion. The disturbances would be extremely small and light on the land (relative to other activities that occur on BLM lands). Existing vegetation (excluding the trees) is likely to be relatively unaffected throughout much of the treatment area and continue to resist weed invasion.
- **Maintenance**: This would be a combination of all the above treatments and the risks of noxious weed invasion would remain the same for all of the above mentioned treatment methods.

Alternative B

All effects would remain the same as Alternative A with the exception of prescribed fire and wildland fire management.

Alternative C

All effects would remain the same as Alternative A with the exception of chaining.

Alternative D

All effects would remain the same as Alternative A with the exception of the application of herbicides to control and or reduce cheatgrass and halogeton throughout project sites.

No Action Alternative

All cumulative effects would continue to occur and the impacts outlined above would not occur.

Cumulative Effects

The CESA for noxious weeds and invasive species for this project is the Spruce Allotment which is 546,958 acres. See Figure B.6, “Vegetation, and Non-Native, Invasive Species CESA” (p. 168)Within the CESA the BLM is responsible for managing 529,185 acres, private landowners manage 17,772 acres, and the USFS 1 acre. Past, present, and reasonably foreseeable activities that could affect noxious weeds and invasive species within the CESA include: wildland fire, gold mining and exploration, dispersed recreation (ie. Hunting, camping, etc), firewood cutting, grazing, wild horses, and a possible wild horse sanctuary.

The Proposed Action combined with past, present, and reasonably foreseeable surface disturbance has the potential to create conditions favorable for the establishment/invasion of noxious weeds,

invasive and non-native species. Wildland fire poses the greatest risk for future invasion of noxious weeds, invasive and non-native species within the cumulative area. Consistent with BLM policy, use of suitable seed mixes with only certified weed-free and tested seed, combined with implementation of prompt and appropriate reclamation techniques and re-seeding where appropriate would reduce the potential for undesired weeds to invade disturbed areas from all present and reasonably foreseeable future projects in the cumulative boundary. The minor potential impacts from the implementation of the Proposed Action including the environmental protection measures in addition to the past, present, and reasonably foreseeable future actions within the cumulative area have a minor cumulative impact to noxious, invasive and non-native species.

4.7. Migratory Birds

Alternative A (Proposed Action)

The Project proposal sites include approximately 18,314 acres. The project consists of specific areas of disturbance on Spruce Mountain within these 18, 314.5 acres that will be selected for treatments. Not all 18,314 acres would be selected; only 10,000 acres of actual disturbance would occur.

Excessive snow would preclude most restoration activities, but if conditions allow some treatments may take place during the winter months. Few birds utilize Spruce Mountain exclusively as winter inhabitants (i.e. Black-rosy finch), while there are many that are year round residents (i.e. Kestrels, Bushtit, Raven, Juniper titmouse, Pinion jay and Scrub jay). Habitat needs for such species (open areas such as mountain meadows and the surrounding valleys or pinyon/juniper forest) are abundant in the area. Except for the seeding proposal on the Independence side of Spruce Mountain, open valley areas are not the focus of the project and therefore would be minimally disturbed. Many of the treatment areas were selected for pinyon/juniper removal. Though many bird species utilize this habitat, the maximum percentage of this habitat type that could be removed only represents 11% of the entire pinyon/juniper habitat within the Spruce Mountain vicinity. Many of the proposed treatments areas would not have all standing trees removed from the site and all site tree removal would be temporary. Potential direct impacts to specific bird species would be temporary loss of suitable breeding, roosting and foraging habitat. The conversion of a juniper habitat type to a sagebrush habitat type would adversely impact gray flycatchers, juniper titmice, blue-gray gnatcatchers, and black- throated gray warblers, but it would favor greater sage-grouse, Brewer's sparrows, sage sparrows, sage thrashers, vesper sparrows, burrowing owls, and loggerhead shrikes. There is no panacea management practice that would benefit all birds. However, the proposal would increase sage/open habitat while minimally decreasing the amount of pinon/juniper habitat in the area. The proposal is expected to have little effect on the local bird populations based on the amount of suitable breeding and foraging habitat in the surrounding area. In addition, bird species that utilize edge areas would be favored.

- **Prescribed Burning (including the Management of Wildfire)**

  The use of prescribed burning would remove all nesting, roosting and foraging habitat from the treatment area until vegetation begins to reestablish. Habitat along the edges of the burn could also see a reduction in use by migratory bird species as foraging potential is reduced and the effects of fire could temporally drive bird species from the area due to smoke, heat, noise and increased human presence. The use of prescribed fire is an imprecise science and

there is a possibility that more habitat than anticipated could effected if the burn gets "away" from those managing it. Fire can change the nature of the plant community of the site, therefore modifying the types of bird species and the types of utilization (e.g. foraging instead of nesting) for the area. Species in the area that previously utilized a pinyon/juniper habitat would be replaced with species that utilized more open habitats. Pinyon/juniper habitat is abundant on Spruce Mountain, so it is not anticipated that burn areas would decrease species populations that utilize this habitat type. Also, the modification of pinyon/juniper habitats to open habitat types would not shift population dynamics of bird species in the area.

Burn areas would be reseeded and fenced after treatment completion if natural vegetation is not expected. Impacts of seeding and fencing are covered in the seeding and fencing treatment paragraphs described below.

- **Mechanical Treatments**

  Mechanical treatments are the physical removal or modification of a vegetation type. For the Spruce Mountain projects the vegetation type chosen for modification is the pinyon/juniper stands. Treatments of this type would not occur during the migratory bird breeding season (March 15 – July 31) without a qualified biologist conducted survey prior to any disturbance.

  - *Chaining*: The use of chaining would uproot a majority of the pinyon/juniper component of the site while leaving much of the understory intact. Unlike burning, the seedbed is still present and even dead, downed trees afford a habitat base for certain species. Chaining would modify habitat use and reduce nesting, foraging and roosting potential for some migratory bird species while increasing such opportunities for others. During the chaining process, increased noise, dust and human presence may temporarily drive bird species from the vicinity. Though chaining would modify the characteristics of the site, birds would return to utilizing the area sooner than with broadcast burning because vegetation would still be present.

  - *Mastication (including Selective Cutting and Green Woodcutting)*: The use of mastication would have the same effects for migratory birds as chaining, except that dead trees would not be left on site for use by species that utilize deadwood (e.g. Northern flicker).

    Selective cutting would retain habitat characteristics for those species that utilize pinyon/juniper habitat. Unlike burning, chaining or mastication there would be no modification to the understory component of the sites selected. The use of chainsaws would temporarily drive species from the vicinity due to increased noise and human activity. Cut down trees left in place would provide additional habitat for those species that utilize dead wood, but the burning of slash piles would increase the amount of time the area would be disturbed and there is the slight increased potential for wildfire.

  Mechanical treatment areas would be reseeded and fenced after completion if a sufficient recovery response by natural vegetation is not expected. Impacts of seeding and fencing are covered in the seeding and fencing treatment paragraphs described below.

- **Herbicide Treatment (Imazapic, Glyphosate, Imazapic+ Glyphosate, 2-4-D, 2-4-D + Dicamba)**

  The herbicides selected for this treatment types have been shown to have little to no toxic effects on migratory birds. Low effects include temporary, reduced physical well-being to

individuals that directly ingest newly applied pesticide. Indirect impacts are more often in the form of reduction of habitat utilized by specific species. Though herbicide spraying would not take place during the migratory bird breeding season without prior surveys, none of the products proposed have been shown to be detrimental to bird eggs. The use of herbicide application techniques could temporarily drive species from the vicinity due to increased human activity.

Herbicide treatments would be utilized after other treatment methods have been completed.

- **Seeding**

  Depending on the seeding method, birds may be temporarily driven from the area due to increases in noise, dust and human activity. Treatment seeding of areas previously disturbed and/or that have inadequate, undesirable vegetative habitats would not have an immediate impact to those species presently utilizing those sites. Depending on the success of the seeding, the area may support additional species and/or increased populations of species already present. Seeding methods would not occur during the migratory bird breeding season without prior nesting surveys. All sites are being considered for seeding treatment.

- **Livestock and Wild Horse Grazing Protection (Fences)**

  A breeding bird survey would be conducted prior to fence construction if it occurs during the nesting season (March 15 –July 31). Fence construction would be delayed if nests were discovered in the vicinity of the proposed fence. Additional fences have the potential to increase collision injuries and mortalities to resident birds and increase perching opportunities for predatory birds. However, special project procedures have been developed to minimize these potential adverse impacts. The proposed fencing is temporary and these negative impacts would be eliminated after a few years. Site fencing increases the success of the seeding treatment, which in turn would increase habitat values to area bird species. All treatment sites are being considered for fencing.

- **Maintenance**

  Maintenance of certain sites means the re-treatment of areas that are proposed to be modified from a pinyon/juniper area to a more open areas, this also includes areas that had been treated in the past. Impacts associated with the maintenance of any of the proposed treatments would be the same as those described above. Maintenance treatments would preclude the return of the dense pinyon/juniper habitat type that was present before the proposed action and its use by specific bird species. Examples of maintenance treatments are previously chained sites (Honeymoon and Lower Taush) as well as all new chaining sites considered in this EA.

Alternative B

Under this alternative the BLM would complete all treatments outlined above except for prescribed burn and management of wildland fire. This alternative would allow the use of chaining, mastication, selective cutting, pile burning, fire wood cutting, seeding, livestock and wild horse protection, herbicide application and maintenance. All impacts of these treatments to migratory birds would be the same as described above in the preferred action except for the impacts associated with prescribed fire. The removal of this treatment would reduce the possibility of accidental impacts to migratory birds and their habitats due to an unforeseen wildfire.

Alternative C

Under this alternative the BLM would complete all treatments outlined in the proposed action except for the use of chaining. Excluding chaining would also preclude the maintenance/re-treatment of the Honeymoon and Lower Spruce Spring sites, as it is proposed to retreat the chaining that occurred there in the 1960's or 1970's. All impacts of these treatments to migratory birds would be the same as described above in the proposed action except for the impacts associated with chaining.

Alternative D

Under this alternative the BLM would complete all treatments outlined in the proposed action except for herbicide application. All impacts of these treatments to migratory birds would be the same as described above in the preferred action except for the impacts associated with herbicides.

No Action Alternative

Under the No Action Alternative the pinyon/juniper habitat associated with Spruce Mountain may continue to expand into the open area habitat, benefiting certain species thet utilize woodland habitats and negatively impacting species that utilize transitional or open habitats. The proposed seedings that would increase diversity to the area and expand specific habitat types would not occur. Under the No Action Alternative the chances of wildfire will remain at the current level or increase with the increase of pinyon/juniper fuel loads. Migratory bird habitat use on Spruce Mountain will continue as it has for years, with a diversity of habitats present allowing for a diversity of bird species. Spruce Mountain is composed of openland, transitional and wooodland habitats, each supporting different migratory bird species. Habitat use patterns and population densities would fluctuate with natural modifications of habitat types or removal of habitat by fire, but overall species dynamics would remain stable. Unlike other wildlife species (such as mule deer), some migratory bird species would benefit but would not be dependent on the implementation of the proposed action.

Cumulative Impacts

The CESA for migratory birds is the same as General Wildlife which includes 464,218 acres and is shown on Figure B.11, "Wildlife: Small Mammals CESA" (p. 173).

Past and Present Actions: Past and present actions that have impacted migratory birds include mineral exploration, wildland fires, livestock grazing, wild horse use, road construction and maintenance, and dispersed recreation. Impacts to migratory birds have or would result from the following: 1) destruction of habitat associated with road building and cutting trees; 2) disruption from human presence or noise such as construction equipment, four wheel drive pickups or ATV's; or 3) direct impacts/harm to migratory birds that would result if trees containing viable nests were cut down or ground nests destroyed by construction, ranching equipment or trampling by cattle or wild horses. There are no specific data that quantify impacts to migratory birds as a result of grazing, wild horse use or recreation. However, impacts to migratory birds from recreation activities would include destruction of native vegetation or nesting areas from off road vehicles that traveled off of established roadways. Impacts to migratory birds from grazing and wild horses include trampling and consumption of vegetation of nesting areas near streams,

springs, or riparian areas. Impacts from wildland fire would include total destruction of the existing habitat and potential alteration of the habitat thereafter.

Historic Fires (1981-2010) have burned approximately 8,939 acres of habitat types in the Migratory Bird CESA (Approx. 2% percent of the CESA). No recent or foreseeable mineral exploration or mining Notices/Plans are present within the CESA. Only historic mine disturbance occurs scattered throughout Spruce Mountain and impacts fewer than 100 acres. Approximately 50 acres of ROWs were issued within the Migratory CESA that have created surface disturbance and disruption to migratory bird habitat and vegetation. Approximately 464,218 acres of the NDOW Hunt Unit 105, is located within the Migratory Bird CESA. The Migratory Bird CESA is located within seven grazing allotments, with the majority within the Spruce Allotment and the Spruce — Pequop Herd Management Area (HMA). Livestock and wild horse grazing and associated management may contribute to the spread of invasive species which can have an indirect effect on migratory bird habitat. In addition, approximately 1,800 miles of recreational travel routes are present within the Migratory CESA which has created habitat fragmentation and disturbance to vegetation structure.

However, disturbance to migratory birds from past and present actions would have been reduced through reclamation and habitat enhancement seedings of disturbed areas or suboptimal areas and natural recolonization of native species. The past and present actions that are quantifiable have disturbed only a small portion of the CESA, approximately one percent.

Reasonably Foreseeable Future Actions: Potential impacts to migratory birds from grazing, wild horse use, dispersed recreation, roads, ROWs, mineral exploration and mining activities or loss of native vegetation associated with potential wildland fires could occur. There has been no specific data on the potential impacts to migratory birds or their habitat as a result of dispersed recreation, grazing, horse use, or potential wildfires. As of 09/2011 there are no future ROW's or mining activities submitted for the Spruce Mountain area. Claim staking is the only mineral exploration activity on record that will occur on the project sites.

Cumulative Impacts: Impacts to migratory birds and their habitat from the Proposed Action would be limited to the removal of vegetation, or destruction of habitat (up to 10,000 acres), and noise associated with treatment procedures. These impacts would be localized,minimized, and temporary due to the nature of the treatment sites (small, localized sites), implementation of environmental protection measures and mitigation measures required before disturbance (e.g., migratory bird nest surveys during the nesting season to comply with the MBTA). The Proposed Action would affect approximately 4 percent of the Migratory CESA. Based on the above analysis and findings incremental negative impacts to migratory birds as a result of the Proposed Action when added to the past and present actions and RFFAs are expected to be minimal.

4.8. Native American Religious Concerns

Various tribes and bands of the Western Shoshone have stated that federal projects and land actions can have widespread effects to their culture and religion as they consider the landscape as sacred and as a provider.

Due to the fact that there is limited knowledge (BLM) of any site specific religious/spiritual or other important traditional/cultural use sites and activities within the project boundary, there exists the possibility of land management practices to adversely affect traditional life ways and the integrity of Native American religious sites or sites of traditional/cultural importance.

On January 11th, 2011 a consultation initiation letter was sent to the following tribal entities:

- Te-Moak Tribal Council.
- Wells Band Council.
- Yomba Shoshone Tribe.
- Bureau of Indian Affairs, Eastern Nevada Agency.
- Western Shoshone Committee.
- Western Shoshone Defense Council.
- Western Shoshone Descendants of Big Smoky.
- Battle Mountain Band Council.
- South Fork Band Council.
- Duck Valley Shoshone-Paiute Tribes.
- Western Shoshone Defense Project.
- Elko Band Council.
- Duckwater Shoshone Tribe.
- Ely Shoshone Tribe.
- Goshute Business Council.

On October 21st, 2011, the BLM met with the Duckwater Shoshone Tribe and completed an on-site tour of the proposed treatment sites. The Duckwater Shoshone Tribe point of contact coordinated with the BLM, staff and management, and expressed concern of potential impacts on traditional pine nut gathering, and cultural sites within the proposed treatment areas and surrounding Spruce Mountain in general. As a result of the Duckwater Shoshone Tribal tour, the BLM continues to await a formal letter of response. Consultation opportunities would be available throughout the life of the proposed project.

Alternatives A (Proposed Action), B, C, and D

Under the Proposed Action, current intact traditional/cultural/spiritual sites may be negatively impacted if not identified prior to implementation of this alternative. Cultural resource inventories will be completed throughout the project area. see Section 2.1.1, “Proposed Project Procedures” (p. 14) for cultural resource protection and vegetation leave areas. Eligible archeological sites identified during inventory would be avoided through all portions of the proposed action. Concerns have been brought forth from site tours regarding traditional pine nut harvesting in general and the removal of pinyon pine. Leave areas will be designed to minimize competition among nut producing trees, and favor traditional cone producing trees. By following the Proposed Project Procedures outlined in Section 2.1.1, “Proposed Project Procedures” (p. 14), negative impacts to known traditional/cultural resources would be minimized. Short term negative impacts are expected for pine nut production throughout the treatment sites; however, untreated

islands, leave trees, and adjacent pinyon stands would benefit in the long term from reduction in on-site competition and decreased threat of large scale wildland fire.

No Action Alternative

Under the No Action Alternative, cultural and tribal resources and important locations would not experience direct physical impacts from the project's specific treatments. However, certain traditional/cultural/spiritual sites, artifacts, and activities may experience negative impacts due to the occurrence of large-scale wildfire. For example, the thinning of trees, in an area used heavily by tribal community members for pine nut harvesting, may prevent the entire grove from being wiped out by catastrophic wild fire, due to heavy fuel loads.

Cumulative Impacts

Over the last few years, BLM and the tribes have witnessed an increase in the use of lands, administered by BLM, by various groups, organizations, and individuals. New ways to utilize the public lands are also on the rise. Grazing, pursuit of recreation opportunities, hunting/fishing, Oil, Gas, Geothermal, and Mining leasing, exploration and development, along with relatively "newer" uses such as OHV use, interpretive trails, "Geo-caching," and mountain biking are among many activities that are on the rise within the BLM Elko District Office administrative boundary. In addition to the existing, growing, and developing uses of the public lands, fuels reduction, wild land fire suppression, and subsequent rehabilitation activities and treatments have the potential to contribute to a general decline of intact traditional/cultural/spiritual sites and associated activities.

However, through the implementation of fire prevention activities (fuels reduction), opportunities may also exist that might strengthen and maintain the integrity of certain traditional activities and sites. For example: edible and medicinal plant species and their locations (pine trees, "Doza," "Indian Tea," etc…) may not fall victim to large—scale wild fire, if incorporated into any fuels reduction project planning. Also, cultural sites that wild fire may destroy (antelope traps, structures, etc…) would remain in existence if the intensity of a fire is lessened, through thinning or fuels reduction. Implementing the proposed treatments and following the proposed project procedures outlined in Section 2.1.1, "Proposed Project Procedures" (p. 14) would result in no significant cumulative impacts of concern to known traditional/cultural/spiritual sites within the project area.

4.9. Public Health and Safety

The Cumulative Effects Study Area (CESA) is the Spruce Mountain Allotment.

Alternatives A (Proposed Action), B, and C

Direct impacts, to whom comes may come in contact with herbicides, may include rashes and/or chemical burns. The chance of exposure would be minimized by workers wearing proper personal protective equipment (PPE). Material Data Safety Sheets (MSDS) would be kept at the job site, and any spills would be cleaned up appropriately. A Pesticide/Herbicide Use Proposal (PUP) will be prepared and approved prior application of proposed herbicides on project area.

There are always some human health risks when using herbicides. Risks range from disease, injury, and cancer. The chance of exposure will be limited to the personnel applying the herbicides with some small chance of exposure to the general public. The chance of exposure would be minimized by workers wearing proper PPE, establishing appropriate buffer zones, posting treated areas with signs in common public access areas, and notifying the public of the potential exposure.

Adherence to product labeling, State Law and Final Programmatic Impact Statement for Vegetation Treatments Using Herbicides insures that no negative impacts to public would result from the application of proposed herbicides.

Alternative D, and No Action Alternative

Under Alterntative D, all of the treatments proposed in Alternative A would be completed with the exception of the use of herbicides. Under Alternative D and the No Action Alternative there would be no risk of exposure of herbicides to workers or the general public.

Cumulative Impacts

The BLM is likely to continue to spray herbicides on noxious weeds throughout the Spruce Mountain Allotment; however herbicides would be applied using the same precautions taken on the herbicide treatments described in the proposed action, therefore no measurable cumulative impacts are expected.

4.10. Livestock Grazing

Alternative A (Proposed Action)

Initially, livestock grazing would be negatively impacted by the proposed vegetation treatments under the Proposed Action: treatment areas may be closed to livestock grazing for a minimum of two growing seasons or until establishment objectives are met, and the associated AUMs may be temporarily suspended. Forage in the treatment areas would be unavailable for consumption by livestock. Increased activity and equipment movement during implementation of vegetation treatments may disrupt livestock and would possibly have a short term negative impact. However, rangeland conditions are expected to improve following implementation of the proposed vegetation treatments because the health, vigor, recruitment and production of perennial grasses, forbs and shrubs would improve. After the temporarily suspended AUMs are reinstated and treatment areas are reopened, livestock would have access to increased forage with higher palatability and nutritional value. The increased quality and quantity of forage would improve overall livestock performance (increased weight gain, calf crops and weaning weights). Improved livestock performance could make for higher sale prices and improve economic stability of the permittees depending on market conditions.

The specific impacts on livestock grazing associated with the types of vegetation treatments proposed under Alternative A (Proposed Action) are analyzed below.

- **Prescribed Fire (including the Management of Wildfire)**

  Planned prescribed fire treatments would initially have a negative, short term direct impact on livestock grazing. The treatment area would be closed to livestock grazing during treatment

and possibly closed after treatment for two growing seasons or until establishment objectives are met. Forage in the treatment area would not be available for consumption by livestock. Prescribed fire would likely reduce the cover of grass and forb species available to livestock temporarily. Livestock near treatment areas could be temporarily disturbed or displaced by prescribed fire activities and associated traffic. With management of wildfire, due to the unplanned nature of natural ignitions, there is a risk of additional negative impacts from increased animal stress, possible injury or death from smoke inhalation or burns. Depending on how quickly the fire progresses, there could be very little time for the permittee to remove livestock from the area. However, the risk of these additional negative impacts is no different from that of an unplanned and unmanaged wildland fire. The burning of rangeland is expected to increase perennial grass production and grazing capacity resulting in increased forage availability from the removal of physical obstructions posed by brush and small trees. Rangeland conditions are expected to improve following the removal of excess fuels and the risk of catastrophic fires would be reduced, both of which would have a positive, long term indirect impact on livestock grazing.

- **Mechanical Treatments**

  Mechanical treatments would initially have a negative, short term direct impact on livestock grazing. The treatment area would be closed to livestock grazing during treatment and possibly closed after treatment for two growing seasons or until establishment objectives are met. Forage in the treatment area would not be available for consumption by livestock. Livestock near treatment areas could be temporarily disturbed or displaced by mechanical treatment activities and associated traffic. The proposed mechanical treatments allow for the release of understory vegetation and/or the growth of desired seeded species. This would result in an increase in the quantity and quality of forage available to livestock and rangeland conditions are expected to improve, both of which would have a positive, long term indirect impact on livestock grazing.

- **Herbicide Treatment**

  There are possible negative direct impacts on livestock grazing from herbicide treatment on rangelands. The permittee may be adversely affected by having to modify ranching operations or find alternate sources of feed to avoid having livestock exposed to herbicides. Livestock may be adversely affected by direct exposure to the proposed herbicides, because the herbicides proposed for treatments may have some or all of the following effects and attributes: is corrosive, cause eye irritation or damage, and is harmful if swallowed, inhaled or absorbed through the skin. Also, there may be restrictions on slaughter of animals following grazing on treated forage depending on the herbicide used. Risks to livestock are minimized by adhering to the application requirements, re-entry interval and grazing restrictions specified on the product label, as well as keeping livestock out of treatment areas during application. Specific label and Material Safety Data Sheet (MSDS) information, restrictions and risks associated with the each of the seven herbicides proposed for treatment are outlined below.

  - *Banvel + 2, 4–D*

    Entry to areas treated with Banvel + 2, 4-D is restricted for 48 hours. Banvel + 2, 4-D is corrosive, causes irreversible eye damage and is harmful if swallowed, absorbed through the skin or inhaled. There is no waiting period between treatment with Banvel + 2, 4-D and grazing for non-lactating animals. Meat animals being finished for slaughter should

not graze treated fields within 30 days of slaughter. Lactating dairy animals should not graze within 7 days of treatment.

- *Clarity*

  Entry to areas treated with Clarity is restricted for 24 hours. Direct exposure to Clarity causes moderate eye irritation and is harmful if swallowed or absorbed through the skin. There are no grazing restrictions for animals other than lactating dairy animals: depending on the application rate (1, 2, or 4 pints/acre), grazing by lactating dairy animals should be delayed for 7, 21, or 40 days following treatment, respectively.

- *Journey*

  Entry to areas treated with Journey is restricted for 12 hours. Journey causes eye irritation and may cause slight irritation to the skin, but is relatively nontoxic after single ingestion, short-term skin contact and short-term inhalation. There are no grazing restrictions with Journey.

- *Panoramic 2SL*: Entry to areas treated with Panoramic 2SL is restricted for 12 hours. Panoramic 2SL causes moderate eye irritation. There are no grazing restrictions for Panoramic 2SL on the product label.

- *Plateau*: Entry to areas treated with Plateau is restricted for 12 hours. Plateau may cause slight eye and skin irritation, but is relatively nontoxic after single ingestion, short-term skin contact and short-term inhalation.

- *Weedar 64*: Entry to areas treated with Weedar 64 is restricted for 48 hours. Dairy cattle cannot graze in a treated area for 7 days following application. Weedar is corrosive, causes irreversible eye damage, is harmful if swallowed and is slightly irritating to the skin.

- *Weedmaster*: Entry to areas treated with Weedmaster is restricted for 48 hours for humans. Weedmaster causes substantial but temporary eye injury and is harmful is swallowed, inhaled, or absorbed through the skin. There is no waiting period between treatment with Weedmaster and grazing for non-lactating animals. Meat animals being finished for slaughter should not graze treated fields within 30 days of slaughter. Lactating dairy animals should not graze within 7 days of treatment.

Herbicide treatment is likely to reduce, if not prevent, the successful establishment of cheatgrass and other invasive annual species. Native and seeded species would have less competition for moisture and nutrients, resulting in increased health, vigor, recruitment and production. The resulting improvement of forage and range condition would have a positive, long term indirect impact on livestock grazing.

There is a risk of herbicide drift and possible exposure to livestock with aerial and ground application; however the risk is greater with aerial application because the herbicide is initially higher in the air, has farther to travel to make contact with the target plants, and is exposed to more air movement. Both types of treatment application would possibly have negative direct impacts on livestock grazing, but ground application would have a slightly lesser negative impact.

The use of herbicide treatment is generally effective in suppression of undesirable species and, as a result, promoting the growth of desirable species. Native and seeded species

would have less competition for moisture and nutrients, resulting in increased health, vigor, recruitment and production. The resulting improvement of forage and range condition would have a positive, long term indirect impacts on livestock grazing. Exposure to harmful doses of herbicide would be unlikely, since animals would be removed from the area. If there was a chance they could be harmed by an herbicide, as required by the label instructions, or treatment would be completed when livestock are not present. The possible short term negative direct impacts to livestock grazing by the risk of exposure to the proposed herbicides, application type, and limitations on forage availability are outweighed by the positive long term indirect impact to livestock grazing by the expected improvement in forage and range conditions. Despite the initial negative impacts, herbicide treatments would have an overall positive long term impact to livestock grazing.

- **Seeding**

Seeding would initially have a negative, short term direct impact on livestock grazing The treatment area would be closed to livestock grazing during treatment and possibly closed after treatment for two growing seasons or until establishment objectives are met. Forage in the treatment area would not be available for consumption by livestock. Livestock near treatment areas could be temporarily disturbed or displaced by seeding activities and associated traffic. Of the different types of seeding methods, hand seeding and hand planting of seedlings would be the least disruptive to livestock because they do not involve the use of heavy equipment for seed dispersal. It is expected that following seeding treatment there would be an increase in forage plants. This would result in an indirect and positive impact on livestock grazing, as livestock would have access to increased forage with higher palatability and nutritional value.

- **Vegetation Treatment Protection**

Building temporary fences for protection of seeding treatments would have a negative, short term impact on livestock grazing. The temporary fences would bar livestock from entering seeded areas for possibly two growing seasons following treatment or until establishment objectives are met. Forage in the fenced seeded area would not be available for consumption by livestock. The associated AUMs may be temporarily suspended in closed areas. Livestock near treatment areas could be temporarily disturbed by fence building activities and associated traffic. Fencing seeded areas to keep livestock and other animals out facilitates the establishment of forage species without disturbance from hoof action or grazing. Rangeland conditions are expected to improve following implementation of the proposed seeding treatments because the health, vigor, recruitment and production of perennial grasses, forbs and shrubs would improve. After any temporarily suspended AUMs are reinstated and seeded areas are reopened, livestock would have access to increased forage with higher palatability and nutritional value which would have a positive, long term impact on livestock grazing.

- **Maintenance**

Maintenance of proposed treatments would have the same impacts on livestock grazing as the impacts of initial treatment discussed above. Livestock would be negatively impacted initially because the areas to be maintained would possibly be closed to livestock, AUMs possibly suspended temporarily, and forage within the treatment areas would not be available for consumption by livestock. However, rangeland condition is expected to improve following maintenance treatments, which would have a positive, long term impact on livestock grazing.

The Proposed Action would initially have a short term, negative impact on livestock grazing; however the overall improvement in rangeland condition resulting from the proposed vegetation treatments would have a positive, long term impact and outweigh the initial negative impacts.

Alternative B

The impacts on livestock grazing of the treatments proposed under Alternative B would be the same as those under Alternative A (Proposed Action) except for those associated with prescribed fire. Alternative B would result in an improvement in range condition, but without prescribed fire, excess fuels and the risk of large—scale wildland fire would not be reduced as much as they would be under Alternatives A, C and D.

Alternative C

The impacts on livestock grazing of the treatments proposed under Alternative C would be the same as those under Alternative A (Proposed Action) except for those associated with the mechanical treatment chaining. Alternative C would result in an improvement in range condition but would not have the benefits of reduced competition, mortality of target trees, seed bed preparation, and seedling protection by residual woody debris from chaining treatment.

Alternative D

The impacts on livestock grazing of the treatments proposed under Alternative D would be the same as those under Alternative A (Proposed Action) except for those associated with the application of herbicides. There would be no attempt to control or prevent the establishment of cheatgrass or other weeds following the proposed vegetation treatments, resulting in desired plant species having unnecessary competition. Alternative D would result in an improvement in range condition, but the treatments may be less successful, may have difficulty meeting establishment objectives and may have to be closed to livestock grazing for longer period of time than the vegetation treatments proposed under Alternatives A, B, and C.

No Action Alternative

Under the No Action Alternative the proposed vegetation treatments would not be implemented. There would be no reduction in excess fuels and no release of understory vegetation and related increase of forage. When compared to the other alternatives, the No Action Alternative has a neutral impact in the short term on livestock grazing because range conditions would stay the same. The No Action Alternative would have a negative impact on livestock grazing in the long term because the range conditions would continue to decline. There would be a gradual decrease in forage available for livestock, requiring the use of more energy on finding forage for consumption. There would be an increased need for supplements and increased costs to the permittee because there would be fewer kinds of forage providing essential nutrients for the livestock. Livestock would gradually decline in performance, resulting in a smaller or negative return on investment and a loss of economic stability for the permittee. Without the proposed treatments, no long term increase in forage health, vigor, recruitment and production are expected, which would have an indirect negative impact on livestock grazing.

Cumulative Impacts

The Cumulative Effect Study Area (CESA) for livestock grazing is the Spruce Allotment. See Figure B.7, "Livestock Grazing Allotment" (p. 169). The past, present and reasonably foreseeable future actions include livestock grazing, a possible horse sanctuary, mineral exploration and mining, wilderness designation, recreational activities, hunting, horse gathers, herbicide treatment of weeds, vegetation treatments.

Loss of native vegetation and deterioration of rangeland health has occurred due to the absence of fire, historic livestock grazing, wild horse populations exceeding appropriate management levels, mining, and recreation; all resulting in a reduction in the ability of public lands to support livestock grazing. Where activities and fire have disturbed the land, weeds have moved in that have little nutritional value for livestock. Under the No Action Alternative the deterioration of rangeland health would continue over time and would have a negative cumulative impact on the CESA for livestock grazing. Alternatives A (Proposed Action), B, C and D would slow, halt and/or reverse the deterioration of rangeland health over time and would have a positive cumulative impact on the CESA for livestock grazing.

4.11. Recreation

Alternative A (Proposed Action)

Recreationists would be temporarily displaced from treatment areas during project implementation. Some existing roads would be closed to public use during treatments and re-open upon completion of the treatment.. It is anticipated that recreationists would simply move to another area or travel around the treatment polygons to recreate elsewhere in the Spruce Mountain Area. It is not expected that recreationists would leave the area entirely. Smoky conditions during prescribed fires could have greater impact on recreation use in the area, causing users to vacate the area.

Cross country vehicle use within the treatment areas would be authorized for administrative use personnel only. Areas delineated for green and dead firewood cutting would have the travel restrictions lifted to allow the public to gather firewood. Polygons where off-road travel is authorized for the permitted public would be delineated and signed. After meeting treatment objectives for each polygon, areas would be rehabilitated and any new vehicle routes would be removed and closed to public use. No new routes would be created within Hunt Unit 105.

Alternative B

Effects to recreation would be the same as in Alternative A except for there would be no impacts to recreation from prescribed fire.

Alternative C

Effects to recreation would be the same as in Alternative A.

Alternative D

Effects to recreation would the same as in Alternative A.

No Action Alternative

There would be no change to recreation with the No Action Alternative in the short term. Recreationists would continue to use the area for OHV use, wildlife viewing, sightseeing, shed horn hunting, etc. Over time, not completing the proposed action could lead decreases in wildlife populations due to negative changes to habitat. This could alter recreation use of the area for those that recreate here because of a reduced presence of wildlife in the area.

Cumulative Impacts

The Cumulative Effects Study Area is delineated as Hunt Unit 105. See Figure B.8, "Wilderness, Recreation and Visual Resource Management CESA" (p. 170).

Past, Present and Reasonable, Foreseeable Future Actions (PPRFFA's) within the CESA include a plan to amend the Wells Resource Management Plan (RMP) for Recreation at Spruce Mountain. See the Recreation Affected Environment Section for description of what this project entails. Upon completion of the amendment and EA, recreation will be enhanced within the Spruce Mountain Area. Management actions will facilitate the existing recreation uses while also addressing the resources that lend themselves to the recreation setting of the area, i.e. the viewshed, wildlife habitat, and cultural sites. Sustainable recreation in harmony with other resources are expected to increase in the Spruce Mountain Area.

Development of a wild horse sanctuary in the area could increase recreation use of the area. Although details of the proposal are not clear, it is anticipated that there would be a developed recreation site within hunt unit 105 on private lands, and increased opportunities to view wild horses in the area. This could potentially draw more recreationists to the area.

Other reasonably foreseeable actions such as mining or oil and gas leasing may change recreation use patterns or prevent access to parts of the mountain. These could minimally effect use in the area by displacing visitors.

4.12. Soils

Alternative A (Proposed Action)

The proposed action would result in a variety of direct and indirect impacts to soils which are not expected to result in long term negative effects, and may lead to improvement of soil quality. Severity of impacts would depend on soil properties such as hazard of erosion by wind and water, the amount of erosion that can occur before productivity decreases (T-Value), presence/absence of biological soil crusts, as well as antecedent conditions such as existing soil quality and moisture. The proposal includes details which would consider these soil properties and plan treatments with a high likelihood of success which would protect soil resources.

The proposed action includes treatments which would directly impact soils in the short term as a result of mechanical disturbance of the soil surface. These include harrowing, disking, drill seeding dragging and chaining. These activities would disturb soils anywhere from one to six inches in depth depending on the method used and existing soil conditions. Chaining may leave

pits deeper than six inches associated with uprooted trees, but these would fill in or level out over time. Treatments that mix soil layers such as disking and drill seeding would add important organic nutrients to the root zone. This deep disturbance can improve soil porosity and aerate the root zone but may result in lower permeability resulting in less soil water availability and increased runoff and erosion. Decreased aggregate stability caused by this disturbance would exacerbate any existing problems with erosion. Similar impacts would occur with proposed harrowing and dragging but would be less extensive because disturbance would only occur up to one inch deep.

Ground disturbing treatments that would occur on soils with biological soil crusts would likely result in destruction of the soil crust impacting infiltration, erosion, and biological properties. Depending on soil characteristics, biological soil crusts may increase or reduce the rate of water infiltration. A reduction in infiltration would decrease plant water availability and increase surface runoff and erosion. Organisms in biological soil crusts can provide nutrients for plant growth (USDA, 2001). The influence of biological soil crusts in the East Spruce Ridge treatment area is not likely to be high since these soils are already heavily impacted by fire.

Proposed treatments which remove/alter cover include mowing, disking, herbicide chaining, burning, and mastication treatments; and to a lesser degree, harrowing and drill seeding. The vegetation removal caused by these treatments reduces overall protection from rainfall impact and decrease soil stability in the short term. The magnitude of this impact would depend on the number and intensities of storm events before the soil is revegetated. The most sensitive areas are on the steep slopes which in 2004 were gullied by short duration high intensity storms. If vegetation does not successfully re-establish soil quality would experience long term negative effects (Blackburn 1983). Vegetation which is uprooted, shredded, mowed or otherwise altered and left on the soil surface in a scattered fashion would improve soil cover and organic matter and may provide higher soil stability than before treatment.

Heat generated from proposed burning may cause some changes in some physical properties of soils within affected treatment areas. This includes decreased aggregate stability, reduction of porosity, loss in organic matter, and other negative impacts to soil quality. Biological soil crusts could be destroyed in areas that are burned, however lightly burned crusts still function to reduce erosion, so the benefits of small prescribed burns are better than what would happen with a large wildfire (BLM, 2005). Wildfires usually destroy crusts and leave the bare soil unprotected. Scheduling burning when soils are not extremely dry, or during cooler times of year would minimize effects to soils and soil crusts however some short term impacts would still be likely to occur (Clark, 2001).

Impacts to soils would occur as a result of compression caused by vehicles driving over un-disturbed soils. This would occur directly as a result of harrowing, drill seeding dragging, chaining and mowing as well as any incidental vehicle use outside of established routes. Soil compaction may also be created from construction and maintenance of proposed fences and spring exclosures. Soil compaction, also created by other forms of multiple use management, results in decreased porosity and conductivity of water and air affecting soil productivity and soil quality characteristics.

Proposed environmental design and resource protection would minimize impacts to soils described above. Because projects are designed around providing a vigorous post treatment vegetative community, protection of soil quality is an integral part of the proposal. For example, treatments which can result in the most soil disturbance are proposed to occur in late fall or winter months. Doing treatments during this time period ensures that seeds have the ability to germinate

and sprout in the spring. Rapid vegetative recovery would reduce the likelihood of harmful soil erosion. Treating these areas during winter months might also result in reduced impacts to biological soil crusts since they are less susceptible to destruction when soils are moist. The proposal includes restrictions for working on wet soils so that excessive compaction and rutting does not occur. Temporary grazing closure following treatment would positively impact soil quality. Absence of hoof action and grazing pressure would allow soils to re-develop physical crusts and vegetative cover. This would improve soil water infiltration, and stability.

Soils impacted by mechanical disturbance and compression would eventually recover and regain their original productivity as long as the erosion factor T is not met as a result of treatment. Reestablishment of soil cohesion and aggregate stability would occur following disturbance; however, this cohesion may take many years to reach its full potential where biological soil crusts are present.

Treatment of pinyon juniper woodlands such as chaining, burning, mastication, and selective cutting have occurred throughout the west over the course of many years and managers have generally reported that maintenance and improvement of soil quality characteristics has been successful (Roundy, 2009). Treatments would not be likely to negatively impact long term soil quality and may indirectly improve soil quality in the long term by establishing more extensive, healthier and/or more diverse vegetative cover. Vigorous vegetative canopies and root systems would provide numerous benefits for soil quality by improving aggregate stability, compaction, infiltration, organic matter, soil biota and reducing erosion by wind and water.

Alternative B

Impacts would be similar to those described under Alternative A except that impacts to soils from prescribed burning such as destruction of biological soil crusts and temporarily increased erosion rates would be less likely to occur. The potential for wildfire to impact soils would remain the same. If wildfire were to occur, soils would likely experience a greater level of negative impacts since soils are more susceptible to damage under wildfire conditions compared to conditions during a prescribed fire.

Alternative C

Impacts would be similar to those described under Alternative A (Proposed Action) except that physical impacts to soils specific to chaining would not occur. Soils within pinyon juniper woodlands would receive different levels of positive and negative impacts because other means of vegetation canopy removal such as mastication would occur instead. Soils would experience less mixing and depth of impacts than would occur with chaining, but these impacts can be both positive and negative as described for Alternative A.

Alternative D

Impacts would be similar to those described under Alternative A (Proposed Action) except that indirect benefits to soil quality from herbicide use would not occur. Continued weed infestations would negatively impact soil quality by increasing the likelihood of harmful erosion.

No Action Alternative

Under the No Action Alternative existing impacts to soils would continue and potential impacts and benefits would not occur. Soils affected by weed infestations and within pinyon juniper encroachment areas would continue to degrade and be less likely to improve if other treatments were proposed in the future. Short term impacts such as erosion from proposed soil disturbance would not occur; however, objective long term benefits such as improved soil stability from increased vegetative diversity would not be expected.

Cumulative Impacts

The Cumulative Effects Study Area (CESA) for soils is the Spruce Mountain area. See Figure B.5, "Hydrology, Riparian and Soils CESA" (p. 167). Past and present effects to soils are described above in the affected environment section. Existing cumulative impacts have resulted in some impacts to soil quality, but BLM Wells Field Office specialists do not think that widespread major degradation of soil quality currently exists there. Future occurrences such as continuing pinyon juniper expansion with associated soil erosion effects of climate change to vegetation communities, continued grazing use, weed infestation, and increasing recreation may result in a substantive cumulative impact to soil quality. This would occur under the No Action Alternative. These activities and occurrences would also occur under the proposed action and other action alternatives. In addition impacts may increase in the short term as a result of direct and indirect effects of these alternatives described above. However, the proposed action and other action alternatives include targeted restoration which would reduce the effects of pinyon juniper encroachment and weed infestation, and improve soil quality in the long term thereby reducing the effect of cumulative impacts to soils in the long term. There would likely still be substantive cumulative impacts, but these impacts would be lower in intensity under the Proposed Action and other action alternatives.

4.13. Special Status Species

Federally Listed Species

No federally threatened or endangered species are known to occur in the Spruce Mountain Restoration Project Areas; therefore, no impacts to federally listed species would result from any of the alternatives outlined below. The greater sage-grouse, a candidate species for listing, is also a BLM Special Status Species and is discussed in this section.

Alternative A (Proposed Action)

BLM Special Status Species

Direct impacts to bats, pygmy rabbits, and other special status animal species sensitive to human activity and noise could include permanent or temporary displacement as a result of Alternative A (Proposed Action). Removal of trees and other vegetation would modify habitat types in the areas designated by the proposed treatment units. The alteration of habitat types would negatively impact some special status species while other special status species would benefit from treatments. The operation of equipment used in treatment operations could disturb special status animal species due to the presence of humans and by creating noise and dust. Special status animal species foraging activities within the Study Area could continue once the treatment operations are completed or the areas may become new foraging habitat for other special status species. Habitat fragmentation could occur due to large swaths of specific habitat types being modified and the

mobility of the species effected. Habitat enhancement could occur for several species including the pinyon jay. The pinyon jay would benefit from all of the proposed treatment that would create more diverse stands as described above in Section 3.14, "Special Status Species" (p. 49).

There is the potential for up to 10,000 acres of disturbance over the life of the Project. Impacts to special status animal species would be lessened by utilizing treatment types that would leave specific habitat characteristics needed by a special status species or by removing certain treatments units from the proposed action where a special status species has been indicated to exist. Also initiating treatments at specific times that do not coincide with habitat needs or critical life-cycle periods of a species (i.e. breeding) would lessen impacts. Examples of this include, not allowing any mechanical or burn treatments in areas of known pygmy rabbit colonies or leaving dead trees undisturbed in known areas of silver haired bats. No permanent impacts to habitat are likely to occur since treatment areas will reestablish over time.

The direct disturbance of habitat within the Study Area would reduce use by sensitive species, such as greater sage-grouse and pygmy rabbits. Destruction or disruption of an active nest or burrow may affect individual success, but is not expected to contribute to any detectable loss of viability for the regional population of these species. The disruption of habitat use could extend until treatment operations cease. Lost habitat would not be replaced until the disturbed areas have reestablished at a future period in time. Some Project-related surface disturbance is proposed in pygmy rabbit habitat and there would be potential for pygmy rabbit mortality due to treatment operations. However, direct impacts to sensitive species would be minimized by the implementation of the environmental protection measures outlined in Chapter 2, *Proposed Action and Alternatives* (p. 3) including a pre-disturbance migratory bird nesting survey, a pygmy rabbit survey, modifying treatment types as needed, flagging areas to avoid, or removing specific treatment units. If surveys determine that special status species are present in a project area, a protective buffer (the size depending on the species and those species habitat requirements) would be delineated and flagged for avoidance. There would be no indirect impacts to special status animal species as a result of the Proposed Action. Some special status species may be attracted to the new open areas, increasing habitat values for these species.

West Nile Virus (WNV) is a mosquito-borne flavivirus that can cause debilitating or fatal neuroinvasive disease in humans and animals. The virus attacks the brain causing inflammation and swelling. The virus persists largely within a mosquito-bird-mosquito infection cycle. Mosquitos get the virus by feeding on infected birds and can then pass it on to other birds, and occasionally to other animals and people. The virus is not spread from person-to-person. (Walker 2009). Mosquito season in Nevada is typically April thru October.

Prior to 1999, WNV had not been reported in the United States. In 1999, the virus appeared in New York City. Between 1999 and 2003, WNV spread from the northeastern U.S. to the south central states and westward. The first report of WNV in Nevada was in 2004. Today, WNV has been reported in every county in Nevada. The number of WNV cases reported in humans in Nevada between 2005 and 2010 totaled 196 cases with 26 of those cases reported for Elko County (Nevada Dept. of Health and Human Services 2011). Less than 1% of humans infected with WNV develop a serious neurological infection (MayoClinic.com). Vaccines for humans are in clinical trials but not yet available (Nevada Dept. of Agriculture 2009). Common preventive measures include eliminating standing water suitable for mosquito breeding activity, avoiding outside activity when mosquitos are most prevalent, wearing long-sleeved shirts and pants, and applying mosquito repellent (MayoClinic.com).

Horses also appear sensitive to the virus; however, there is no evidence that WNV causes disease in cattle. The horse and other mammals are considered to be dead-end hosts, meaning that the virus doesn't multiply to high enough levels in these species to provide a source of infection for mosquitoes. There are two licensed vaccines available for horses (Nevada Dept. of Agriculture 2009).

Some bird species have experienced population declines attributed to WNV including the American Crow, Western Scrub-Jay, Blue Jay, Yellow-Billed Magpie, Steller's Jay, American Robin, Tufted Titmouse, House Wren, and sage grouse. Both resident and migratory birds can be hosts and may act as a source of virus in spring or early summer due to reactivation of a chronic infection. Infected birds are known to exhibit migratory behavior and may be able to carry the virus long distances. (Walker 2009).

The dominant vector of WNV in sagebrush habitats is the mosquito *Culex tarsalis*. This species prefers sites with submerged vegetation on which to oviposit, and warm standing water that promotes rapid larval development, including ephemeral puddles, vegetated pond edges, and hoof prints. The larvae mature from 7 days to 4 weeks to become full-fledged mosquitos, depending on temperature and food availability. *Culex tarsalis* mosquitos are most active the first few hours after sunset. (Walker 2009).

WNV is a new source of mortality that complicates efforts to conserve sage grouse. WNV can simultaneously reduce juvenile, yearling, and adult survival of sage grouse, and persistent low-level mortality and severe outbreaks may lead to local and regional population declines. For example, a comparison of mortality rates in Wyoming during 2003, a year with persistent high summer temperatures and extreme drought favorable to increased infection rates, showed a 26% decline (64% survival) of sage grouse in areas where WNV was detected, compared to 90% survival in an area where WNV was not detected. In another study in Wyoming and Montana in 2003, female survival was 20% in areas with confirmed WNV mortality and 76% survival in areas without WNV mortality. A 2005 study of mortality rates in northeastern Wyoming and southeastern Montana showed mortality rates ranged from 2.4% to 8.2%. In 2005, moderate temperatures may have reduced mosquito production and virus transmission. Regarding WNV impact on sage grouse population growth, mortality simulations projected reduced population growth (i.e. finite rate of increase) of susceptible populations by an average of 6 to 9%/yr. However, marked spatial and annual fluctuations in nest success, chick survival, and other sources of adult mortality are likely to mask population-level impacts in most years. Impacts of severe outbreaks may be detectible from lek-count data. (Walker 2009).

Infected sage grouse live sufficiently long enough to infect new mosquitos and, despite their susceptibility, sage grouse are considered competent amplifying hosts. In mid-summer, sage grouse often congregate in flocks near natural and man-made water sources. These habitats often support populations of breeding mosquitoes and, because sage grouse can be hosts, congregations of sage grouse around water sources may lead to rapid spread of the virus and lead to severe local mortality events. (Walker 2009).

In the Spruce Mountain area, there are ephemeral puddles scattered throughout the landscape in the spring where rain and snow melt collects. These puddles are depressions that occur naturally, or where depressions have developed in and along roads, or by old mining activity, or by hoof prints, etc. Some of these depressions can hold water long enough to support mosquito reproduction in the spring; however, these areas are dry by May or June and would not support mosquito production the remainder of the year. Also the few natural seeps and springs with

perennial surface water in on the mountain provide some degree of standing water capable of supporting mosquito reproduction during the spring, summer, and fall when temperatures are warm enough. The Nevada Department of Agriculture website provides a 2006 map which shows that WNV has not been found in an avian species or mosquito pools within the vicinity of Spruce Mountain (Nevada Dept. of Agriculture 2009).

The proposed water development at Lower Boone spring would divert moderate discharge from the source that dries up in the later part of the summer months to a single trough that would hold water more consistently throughout the year. Cattle pressure should decrease at the spring source reducing hoof action that can hold static puddles, but could increase herbaceous vegetation that may attract mosquitos. Water in the trough would remain throughout the known mosquito season, increasing the likely hood of increased mosquito activity in the area. There is, however, an existing tough at Lower Latham spring approximately ½ mile from the proposed Lower Boone site that currently retains water through the mosquito period that has not resulted in any know WNV outbreaks. The addition of another trough in the area is not expected to increase the likelihood of a WNV outbreak in the area.

Golden Eagles are protected by the MBTA and the Bald and Golden Eagle Protection Act, both of which prohibit take. The Interim Golden Eagle Technical Guidance: Inventory and Monitoring Protocols; and Other Recommendations in Support of Golden Eagle Management and Permit Issuance provides guidance to conduct informed impact analyses and mitigation during the NEPA process (USFWS 2010). Golden eagle foraging habitat is present throughout the Study Area and nesting habitat was observed on Spruce Mountain in the form of cliffs, ledges, and tall trees. Two known golden eagle nests are within the vicinity of the Indian Creek and the Coyote North Bowl treatment units. In order to avoid impacts to individual golden eagles and their habitat, implementation of the environmental protection measure outlined for migratory birds would ensure that prior to surface disturbance nesting surveys for migratory birds (including golden eagles) would be conducted and any identified nests would be avoided.

Prescribed Burning (including the Management of Wildfire)

The use of prescribed burning would alter habitat types and uses within the treatment area until vegetation begins to reestablish. Habitat along the edges of the burn could also see a reduction in use by special status species as cover and foraging potential is reduced, and the effects of fire could temporally drive species from the area due to smoke, heat, noise and increased human presence. The use of prescribed fire is an imprecise science and there is a possibility that more habitat than anticipated will be effected if the burn gets “away” from those managing it. Fire can change the nature of the plant community of the site; therefore modifying the types of wildlife species and the types of utilization for the area. Species in the area that previously utilized a pinyon/juniper habitat would be replaced with species that utilized more open habitats. Pinyon/juniper habitat is abundant on Spruce Mountain, so it is not anticipated that burning areas would decrease species populations that utilize this habitat type. Also, the modification of pinyon/juniper habitats to open habitat types is not expected to shift population dynamics of species in the area.

Three treatment areas are being considered for prescribed burning: Brush Creek, Coyote North Bowl and West Side Upper. A prescribed fire at the Brush Creek site would remove approximately 320 acres of potential sage grouse nesting habitat and a prescribed fire at the Coyote North Bowl site would remove approximately 941 acres. These sites are at higher elevations and the nearest lek is approximately 5 miles to the south. It has been shown that sage grouse hen usage of the habitat is incidental. Both these sites are in the vicinity of bat roosting or foraging habitat. Habitat

for tree roosters and foragers would be completely removed, while cavern roosters would lose foraging habitat. There is a Prairie falcon nest approximately .25 miles from the West Side Upper site. A prescribed burn at this site could potentially impact foraging potential of the area and therefore increase the energy expenditure of the female that utilizes this nest, as she would have to range farther to procure prey. A burn at this site could also impact bat roosting and foraging habitats and could remove potential pygmy rabbit habitat.

Burn areas would be reseeded and fenced after treatment completion if there has not been a sufficient recovery response by natural vegetation is not likely. Impacts of seeding and fencing are covered in the seeding and fencing treatment paragraphs described below.

Mechanical Treatments

Mechanical treatments are the physical removal or modification of a vegetation type. For the Spruce Mountain projects the vegetation type chosen for modification is the pinyon/juniper stands.

- *Chaining* : The use of chaining would uproot a majority of the pinyon/juniper component of the site while leaving much of the understory intact. Unlike burning, the seedbed is still present and even dead, downed trees afford a habitat base for certain species. Chaining would modify habitat use and reduce cover and foraging potential for some special status species while increasing such opportunities for others. During the chaining process, increased noise, dust and increased human activity may temporarily drive species or certain individuals of a species from the vicinity. Though chaining would modify the characteristics of the site, it is anticipated that special status species would return to utilizing the area faster as vegetation would still remain.

- *Mastication (including Selective Cutting and Green Woodcutting)*:

  The use of mastication would have the same effects as chaining for special status species, except that dead trees would not be left on site for use by species that utilize deadwood (certain bat and/or bird species).

  Selective cutting would most retain habitat characteristics for those species that utilize pinyon/juniper habitat. Unlike burning, chaining or mastication there would be no modification to the understory component of the sites selected. The use of chainsaws would temporarily drive species from the vicinity due to increases noise and human activity. Cut down trees left in place would provide additional habitat for those species that utilize dead wood, but the burning of "slash" piles would increase the amount of time the area would be disturbed and there is the increased potential for wildfire.

  Most of the proposed sites are being considered for a mechanical treatment: Coyote Basin Bottom, Indian Creek Treatment area, Coyote East, Upper Spruce Spring, Lower Spruce Spring, West Side Upper and West Side Lower. The Coyote Basin Bottom site is in the area of known silver haired bat habitat. These bats utilize dead standing trees for roosting. Removing the dead trees with chaining would result in this habitat being adversely impacted. Mastication may have less impact as specific trees can be targeted leaving the dead standing trees intact. It is not known how the removal of the pinyon/juniper forest from around these dead trees would affect the silver haired bat in other aspects. Mechanical treatments in the Indian Creek site would modify the characteristics of, but could ultimately improve habitat conditions on approximately 1,000 acres of sage grouse nesting habitat. Mechanical treatments to the West Side site would impact approximately 255 acres of sage grouse crucial

winter habitat by at least temporarily modifying thermal cover; approximately 1500 acres of known pygmy rabbit habitat, and approximately 120 acres of bat roosting and foraging habitat. The West Side lower proposed treatment would impact approximately 475 acres of known and potential pygmy rabbit habitat.

Mechanical treatment areas would be reseeded and fenced after completion if natural vegetation does not show adequate recovery. Impacts of seeding and fencing are covered in the seeding and fencing treatment paragraphs described in this section.

Herbicide Treatment (Imazapic, Glyphosate, Imazapic+ Glyphosate, 2,4-D, 2,4-D + Dicamba

All sites are being considered for herbicide treatments. The herbicides selected for this treatment types have been shown to have little to no toxic effects on birds species and have only shown adverse impacts to mammals if ingested regularly over a long period of time. Imazapic may cause irritation to the eyes and Glyphosate may cause mortality to individuals that directly inhale its aerosol form. All herbicide treatments will be as sprays, so respiratory impacts would be mitigated. Low effects include temporary, reduced physical well-being to individuals that directly ingest newly applied pesticide. Direct impacts are more often in the form of herbicide reduction of habitat utilized by specific species. The use of herbicide application techniques would temporarily drive species from the vicinity due to increased human activity.

Seeding

Depending on the seeding method, special status species may be temporarily driven from the area due to increases in noise, dust and human presence. Treatment seeding of areas previously disturbed and/or that have inadequate, undesirable vegetative habitats would not have an immediate impact to those species presently utilizing those sites. Depending on the success of the seeding, the area may support additional species and/or increased populations of species already present. All sites are being considered for seeding treatment.

Livestock and Wild Horse Grazing Protection (Fences)

Fencing may be required for treatment areas if reseeding is deemed necessary or reestablishment of desired vegetation has been compromised. Fence construction and seeding impacts of special status species at the other sites are the same as in the Migratory Bird and Wildlife sections.

Maintenance

Impacts associated with the maintenance of any of the proposed treatments would be the same as those described above. Maintenance treatments are proposed to re-treat previous sites for fuel reduction. Depending on the length of time since that initial treatment, habitat types may have started to revert to a pinyon/juniper forest area. Maintenance treatments would slow the return of the pinyon/juniper habitat type that was present before the proposed action and its use by specific special status species.

Though all new chaining sites would receive future maintenance, two sites are being considered for immediate maintenance activities: Honeymoon and part of the Lower Spruce Spring site. Maintenance of the Honeymoon site would re-treat approximately 565 acres of sage grouse nesting habitat. There are no leks in the vicinity of this treatment site and hen use is not known, but removal of encroaching pinyon/juniper would have a beneficial effect to the habitat. Maintenance treatment at this site would also impact approximately 1,800 acres of known pygmy rabbit habitat and approximately 1,500 acres of bat roosting and foraging habitat. The Lower

Spruce Spring site proposes to re-treat approximately 642 acres of known pygmy rabbit habitat. Depending on the treatment type utilized, re-treating these sites could have detrimental effects on pygmy rabbits or bats as it could remove reestablished brush vegetation utilized by these species. It has been observed that burns or mechanical treatments that remove the sagebrush from a colony area or even near a colony area will cause pygmy rabbits to abandon that site. Surveys of the proposed sites to determine if pygmy rabbits are present will determine if an area will be re-treated or what kind of re-treatment will occur.

Alternative B

Under this alternative the BLM would complete all treatments outlined above except for prescribed burn and management of wild land fire. This alternative would allow the use of chaining, mastication, selective cutting, pile burning, fire wood cutting, seeding, livestock and wild horse protection, herbicide application and maintenance. All impacts of these treatments to special status species would be the same as described above in the preferred action except for the impacts associated with prescribed fire. The removal of this alternative would reduce the possibility of accidental impacts to special status species and their habitats due to an unforeseen wildfire.

Alternative C

Under this alternative the BLM would complete all treatments outlined in the proposed action except for the use of chaining. Mechanical treatments won't leave any deadwood behind that could be utilized be specific species; but treatments will be in smaller, more confined areas, as chaining is the most commonly used mechanical treatment for large swaths of vegetation removal. More confined treatments means less direct impacts to many special status species. Conversely, restoring or enhancing specific habitat types (sage grouse habitat) will be harder to achieve through the more restricted mechanical treatment methods. All impacts of these treatments to special status species would be the same as described above in the preferred action except for the impacts associated with chaining.

Alternative D

Under this alternative the BLM would complete all treatments outlined in the proposed action except for herbicide application. All impacts of these treatments to special status species would be the same as described above in the preferred action except for the impacts associated with herbicides.

No Action Alternative

Under the No Action Alternative the pinyon/juniper habitat associated with Spruce Mountain may continue to expand into the open area habitat, benefiting certain species that utilize woodland habitats and negatively impacting species that utilize transitional or open habitats. The proposed seedings that would increase diversity to the area and expand specific habitat types would not occur. Under the No Action Alternative the chances of wildfire will remain at the current level or increase with the increase of pinyon/juniper fuel loads. Sage grouse habitat is being encroached upon by the pinyon/ juniper woodland and will continue to be incrementally reduced through the years. Pygmy rabbits, who do not utilize pinyon/juniper woodland sites, will keep their

colonies to the more open sage areas until the woodland encroachment consumes those sites. Conversely, pygmy rabbit habitat will not be impacted by treatments that could modify the sagebrush component. Habitat use patterns and population densities of the areas tree roosting bat species would fluctuate with natural modifications of habitat types or removal of habitat by fire, but overall species dynamics would remain stable. Some special status species (such as pygmy rabbits and various bats) would benefit from the proposed action, but would not be dependent on it's implementation. While other species, such as the sage grouse, have habitat requirements that can only be obtained through the implementation of the proposed action. Without the proposed actions intervention, sage grouse habitat will continue to be lost in the Spruce Mountain area.

Cumulative Effects

The CESA's for Special Status Species includes both the General Wildlife/Migratory Bird CESA (NDOW Hunt Unit 105) and the Sage Grouse CESA. The General Wildlife/Migratory Bird CESA includes 464, 218 acres as shown in Figure B.11, "Wildlife: Small Mammals CESA" (p. 173). The Sage Grouse CESA includes 3,005,777 acres as shown on Figure B.9, "Sage Grouse CESA" (p. 171).

Past and Present Actions: Past and present actions that have potentially impacted special status species, (e.g., bats, greater sage-grouse, pygmy rabbits, ferruginous hawks and bald eagles), include wildfire, ranching operations (grazing), wild horses, road maintenance, or dispersed recreation. Impacts to special status species from these activities include loss of forage, cover, and habitat as well as disturbance of mating and brood rearing practices. There are no specific data that quantify impacts to special status species as a result of grazing or recreation; however, the greatest impact would be from grazing (both cattle and horses) and off road use that destroyed habitat.

Historic Fires (1981-2009) have burned approximately 59,775 acres in the Sage Grouse CESA (approximately 3% percent of the CESA) and 8,939 acres in the General Wildlife/Migratory Bird CESA used to analyze all other sensitive species (2% percent of the CESA). As shown in Table 4.4, mineral exploration and mining Notices or Plans total 3,819 acres in the Sage Grouse CESA (0.8 percent of the CESA). There is no mining activity in the General Wildlife/Migratory Bird CESA (less than 0.2 percent of the CESA). State and federal regulations require project operators of Notices and Plans to provide financial assurance to guarantee that surface disturbance due to mineral activities will be reclaimed. Therefore, 3,819 acres in the Sage Grouse CESA of authorized surface disturbance will be reclaimed when mineral exploration and mining activities have been completed. The Kinsley mine located in the Kinsley Mountains is within the Sage Grouse CESA. US Minerals Explorations initiated the operation in 1985, but abandoned the project in 1994 with 350 acres of disturbance. Only 70 acres of the site were reseeded and 90 acres recontured at that time and an additional 30 were reseeded and 182 acres recontured in 2010.

A total of 101,750 acres of ROWs were issued within the Sage Grouse CESAs and 50 acres of ROWs were issued within the General Wildlife/ Migratory Bird CESA that has the potential to create surface disturbance and habitat fragmentation and degradation for sensitive species. Approximately 793 miles and 1,800 miles of historic race routes are present within the Sage Grouse and General Wildlife/Migratory Bird CESAs, respectively. Approximately 92,600 acres of the Commercial Christmas Tree Cutting Area and 3,020,249 acres of the NDOW Hunt Units 079, 091, and 104-106 are located within the Sage Grouse CESA and approximately 17,300 acres of the Commercial Christmas Tree Cutting Area and 464,218 acres of the NDOW Hunt Unit 105 are located within the General Wildlife/Migratory Bird CESA. Activities associated with these management units have the potential to create noise and disturbance to sensitive species and

remove or alter habitat. The majority of the Hydrology CESA and Sage Grouse CESA are located within the East and West Big Springs Grazing Allotments and livestock grazing and associated management may contribute to the spread of invasive species and change vegetation structure which could have an indirect effect on sensitive species.

Reasonably Foreseeable Future Actions: Potential impacts to special status species from grazing, wild horses, dispersed recreation, roads, ROWs, fence building, minerals activities or loss of cover, forage, or habitat associated with future wildland fires could occur. There are no specific data on the potential impacts to special status species as a result of dispersed recreation, ROWs or fence construction, grazing, wild horses or potential wildfires.

The West Pequop Project, Long Canyon Project and Victoria Mine operations areas are located entirely within the Sage Grouse CESA and have proposed a total of 568 acres of surface disturbance. Approximately 3,000 acres of potential disturbance from the proposed Southwest Intertie Project (SWIP) corridor is located within the Sage Grouse CESA. LS Power has proposed a multiple wind test site of which 11,500 acres of the ROW associated with this project is within the Sage Grouse CESA and could create surface disturbance and vegetation removal associated with installing and maintaining anemometers. No additional pending ROWs or proposed mineral exploration or mining activities were noted in the General Wildlife/Migratory Bird CESA.

The greatest impact to special status species is habitat alteration, which has or would occur from the past, present and RFFA's from reclamation of exploration areas and disturbance associated with ROWS and seeding in burn areas that would favor herbaceous species over shrubs. The primary impact relates to changes in dominant plant communities that affect habitat for wildlife (i.e., conversion from sagebrush to grasslands). Wildfires combined with displacement of native species by invasive annual grasses such as cheatgrass are the primary factors that have altered the structure, composition, and ecology of plant communities in the CESA. Vegetation from exploration reclamation of roads and drill pads would initially replace portions of the dominant Great Basin Pinyon— Juniper Woodland vegetation with grass and forb species that can exist in the environment of northeastern Nevada, are proven species for revegetation, or are native species found in the existing plant communities. This conversion of habitat is favorable to the greater sage grouse. In time, the reclaimed and seeded areas should result in stable plant communities with densities that are similar to the pre-disturbance plant densities. Impacts to vegetation from recreation activities would include destruction of native vegetation from off road vehicles that travel off of established roadways. Impacts to vegetation from grazing and wild horses would include trampling of vegetation near streams, springs, or riparian areas. Disturbed sites and recently seeded areas are candidates for invasion by undesirable species such as noxious weeds and cheatgrass.

Cumulative Impacts: Loss of forage, cover, and habitat from quantifiable past and present actions that have impacted special status species total approximately 2 % of the Sage Grouse CESA. It can be assumed that some of the disturbance has been reclaimed, seeded, or otherwise revegetated, which would decrease the impacts further. In addition, all RFFAS would require avoidance or other mitigation for the protection of special status species and their habitat.

The Proposed Action would disturb up to 10,000 acres of potential sensitive species habitat (approximately 2% percent of the Wildlife/Migratory Bird CESA and approximately 0.3% percent of the Sage Grouse CESA). The project treatment may temporarily displace special status species within the Study Area as well as enhance habitat for other special status species. There would be no cumulative adverse impacts to any listed threatened or endangered species as none of these

species are known to reside within the CESAs. Sensitive bat species, pygmy rabbits, raptors and greater sage-grouse are the only special status animal species known to occur in the Project Area. Based on the above analysis and findings and implementation of the environmental protection measures including a pre-disturbance migratory bird nesting survey, a pygmy rabbit clearance survey, bat habitat surveys, inventorying treatment areas prior to treatments and flagging areas to avoid, incremental impacts to special status species as a result of the Proposed Action when added to the past and present actions and RFFAs are expected to be minimal.

4.14. Vegetation

Alternative A (Proposed Action)

Under the Proposed Action, vegetation conditions are expected to improve following implementation of the proposed vegetation treatments. The result of treatments would include enhanced structure and diversity of vegetation for improved wildlife habitat, increased productivity of herbaceous vegetation and browse, enhanced productivity of commercially valuable products, suppression of noxious and invasive weeds, reduced fire and safety hazards, and maintenance of community in particular successional stage that best meets land use objectives for the site (BLM, 1991). The health, vigor, recruitment and production of perennial grasses, forbs, and shrubs would improve to provide a more palatable and nutritional source of forage for livestock, wildlife and wild horses and also protect the soil resource and other associated watershed values. It is expected that the plant species diversity and the plant species composition would be in better balance with native wildlife needs when at ecological site potential. The expansion of pinyon and juniper woodlands and drought-related impacts have reduced the overall health, vigor, recruitment, and production of a variety of grass, forb, and shrub species and disrupted desired plant succession.

- **Prescribed Burning** (including the Management of Wildfire):

  "Prescribed burning is used to manage unwanted plants, especially woody species that compete with herbaceous species for water, nutrients, and space; to remove excessive litter accumulation in some herbaceous species that may ignite, smolder for a long time, and kill the herbaceous species growing points; to modify species composition; to enhance herbaceous productivity; to manage plant community structure; to improve quantity and quality of wildlife habitat; and reduce fire hazard from surface fuel build up" (BLM, 1991).

  In western juniper/antelope bitterbrush associations, antelope bitterbrush appears more vigorous where fire has killed junipers (Bunting, 1985 and Richardson 1986). Antelope bitterbrush has a low (6%) sprouting success rate, low seeding establishment and short lifespan in western juniper communities (Bunting, 1984). In these communities, regular but not too frequent fires are required to clear out older, decadent antelope bitterbrush and western juniper; to establish new antelope bitterbrush seedlings; and/or to encourage sprouting (Bunting, 1984 and Gruell 1986).

  In 2006 the North Kaibab Ranger District of the Kaibab National Forest collected data to understand the affects of fire and mechanical treatments on cliff rose reestablishment. Plots were set up to observe five categories of management; no action, chainings, low intensity fires, moderate intensity fires, and high intensity fires. According to the data collected following the 1996 Bridger Fire, cliffrose plots showed that when compared to the above management

strategies; moderate and low intensity fires allowed for the highest percentage of resprouting and the highest stems per acre established within plots (Steinhardt, 2006).

Prescribed fire would remove most of the vegetation within burn sites. Productivity may significantly decrease during the initial post fire recovery period, then increase after 1 to several years. Productivity may increase after the first growing season. Total productivity may not change significantly, but it can shift among classes of vegetation on the site, such as from conifers that are killed by the fire to shrubs, grasses, and forbs (BLM, 1991).

Fire has a significant effect on plant competition by changing the numbers and species of existing plants, altering site conditions, and inducing a situation in which plants must reestablish on the site (BLM, 1991). Natural post fire establishment of species is dependant upon vegetation composition prior to burn and what seed sources are on-site. Other factors that influence the vegetation establishment on burned sites are; localized weather patterns; condition of on-site vegetation prior to burn; invasive non-native weeds present on site; and timing of burn. Table 1 shows the effects of selected vegetation that occur throughout the project areas.

Table 4.2. Summary of fire effects on vegetation of the Intermountain Region[a]

Species	Response to Fire	Remarks
Cheatgrass (*Bromus tectorum*)	Undamaged	Reduction in cheatgrass usually results from seed consumption and changes in the microenvironment caused by fire. Recovers 1 to 2 years.
Sandberg bluegrass (*Poa secunda*)	Slight damage	Slight reductions following late summer and fall burning.
Idaho fescue (*Festuca idahoensis*)	Slight to severe damage	Greatly damaged by summer burning. Burning in the spring or fall, under mild conditions and good soil and water, causes little damage.
Bottlebrush squirreltail (*Elymus elemoides*)	Slight damage	One of the most fire resistant bunch grasses. Often increases for 2 to 3 years after burning. Can be damaged by severe fires in drought years.
Wheatgrass (*Agropryon ssp.*)	Little or no damage	Bluebunch wheatgrass (*Agropyron spicata*) can be damaged if burning occurs in a drought year. Other wheatgrass, particularly crested wheatgrass (*Agropyron cristatum*) are difficult to burn in seeded monocultures.
Antelope bitterbrush (*Purshia tridentata*)	Variable, slight to severe	Decumbent forms sprout more readily than the columnar forms. Subsequent seedling establishment is higher on more mesic sites. Spring and late fall burning is less damaging than summer burning. Wildfires occurring in drought years has reportedly destroyed bitterbrush on large areas and permanently eradicated it on many sites in the Great Basin.

Species	Response to Fire	Remarks
Sagebrush species (*Artemisia ssp.*)	Slight to severe	Black sagebrush and low sagebrush are small and widely spaced. They are rarely burned and may often be used as fire breaks when burning adjacent big sagebrush. Silver sagebrush is capable of sprouting after being burned, and is only slightly damaged. Big sagebrush, including subspecies of wyoming, mountain and basin, are killed when burned.
Rabbitbrush (*Chrysothamnus ssp.*)	Usually enhanced	Vigorous sprouter that often increases following burning.
Curlleaf mountain mahogany (*Cercocarpus ledifolius*)	Variable	Mature, decadent stands, with curlleaf mountain mahogany mostly in excess of 50 years old may be rejuvenated by fire. Also may be beneficial when conifers are out competing mahogany seedlings. Damaging to younger, vigorous stands.
Pinyon pine (*Pinus monphylla*)	Severe	Mature, decadent trees have developed bark has thickened and has become slightly fire resistant. Fire with moderate intensity would damaging any part of the tree would kill the entire tree. Revegetation of burned sites may take decades.
Utah Juniper (*Juniperus osteosperma*)	Moderate to severe	Mature trees that are partially impacted by fire may still survive. However, in stand replacing fires of moderate to severe intensity all trees impacted by the fire would be lost. Revegetation of burned sites with Utah Juniper may take decades.

[a]Adapted and modified from USDA, 2004.

In summary, grasses and forbs would benefit from prescribed fire and would be the first to re-vegetate the site. If annual grasses occur on site prior to the fire, and if fire intensity were high, then annual grasses and forbs would be the first to establish on site. Without other treatments such as herbicide, annual grasses and forbs may dominate the site. Without the presence of annual grasses and forbs, perennial grasses and forbs would dominate the site for several growing seasons until woody vegetation could become established. In a post fire situation, established perennial plants that are recovering vegetatively usually have an advantage over plants that are developing from seed, because they can take up water and nutrients from existing root systems while seedings must develop a new root system. Re-sprouting woody vegetation would be the next to establish on-site followed by seeded woody vegetation, these seeded plants may come from rodent caches. Pinyon trees would be the last to establish on site. These seedlings need shade for establishment. Typically pinyon seedlings establish in the understory of shrubs; therefore, pinyon typically move onto a site after the shrubs have established. Without seeding or other rehabilitation efforts following the fires, it could take decades following a fire to fully establish all desired vegetation including understory and uneven aged stands of pinyon and juniper.

- **Mechanical Treatments**: "Native communities can only be reestablished if the density of pinyon and juniper is reduced and desired native species have an adequate seed bank or are seeded. Changes in tree density can range from near complete stand removal to limited thinning. Chaining and other mechanical treatments are subsitutes to natural tree control most

frequently attained by wildfires. The objectives of most improvement projects should not be to remove all trees, but to remove sufficient numbers to allow recovery of the understory species and to facilitate artificial seeding" (Stevens, 1999).

- *Chaining*:

  Ely chains are primarily used to uproot trees and shrubs, to create seedbeds, to top and prune large shrubs, and to cover seed (USDA, 2004). Success in removing trees and shrubs varies with species composition, age structure, density, and rooting habit. If the chaining only occurs in one direction, there is a lower mortality rate on vegetation when compared to double chaining. The more times a chain is drug over a piece of land the higher the mortality rate. Generally, the chain would pass through the treated area in one direction. Following the first passing of the chaining, seeding may occur. After seeding has occurred the chain would pass through the treatment area opposite direction of the first pass. This second pass is considered double chaining, and completely uproots the knocked over vegetation from the first pass. Trees in mature, even-aged stands can be killed more effectively and efficiently than in uneven aged stands. Young trees less than 48 inches tall may not be killed with single or double chaining because the chain may ride over them. Small junipers can be killed more effectively then small pinyons. Chainings occurring in the winter months would increase mortality. Stems become brittle during the cold winter months, the ground is frozen and often covered in snow. Not all uprooted and knocked over trees will die. In some cases when junipers are knocked over and have some roots still within the soil, they may continue to grow from the original stump or stem. In these cases junipers may return on the site a lot earlier than pinyons or junipers developing from seed. Mechanical treatments such as chaining have a negative effect on cliffrose stands and regeneration, and these stands would need to be avoided when considering chaining.

  This treatment method would alter vegetation communities on the site and would favor grasses and forbs over shrubs and trees. Native seedbanks are not harmed by appropriate chaining (Stevens, 1999). Reduced competition and ground disturbance may allow native seed banks to aid in the reestablishment of native species. Areas to be treated with this method would consist of tree dominant areas with little desired understory vegetation. Chaining when combined with seeding would reduce the existing vegetation and allow for more diverse plant community with higher production of grasses, forbs, and shrubs to establish. Residual woody vegetation which would consist of slash/biomass created from scattered trees from the chaining treatment would provide protection to regenerating grasses, forbs and shrubs. Slash and biomass left on-site would also provide shade for pinyon seedlings and increase the establishment of pinyon on the site. Therefore vegetation would respond faster and revegetate the site long before areas that had been burned.

  All vegetation within chaining treatments would be affected. However, coordination between NDOW wildlife biologist and BLM resource specialist would determine the desired treatment method and how many applications would needed (i.e., Single or Double Chaining).

  "Through extensive testing and development of alternate equipment, chaining has proven to be the least destructive technique to existing vegetation and soil. Compared with other methods of mechanical treatment (plowing, disking), or use of herbicides or fire, this practice can be selectively used to reduce tree density in desired locations without disruption of understory plants and non-target areas" (Stevens, 1999). Chaining can leave

considerable litter on the surface, which improves watershed protection by retaining and detaining surface moisture and increasing the amount of infiltration (Stevens, 1999). Downed trees, shrubs and plants increase ground cover and protect the soil from wind and water erosion (USDA, 2004). Benefits of using chainings as vegetation management tools include; increased infiltration and water retention, decreased soil erosion and plant competition and increase plant production and community health.

In summary, chaining has been determined to be a viable tool in vegetation management. Unlike prescribed fire, chaining does not remove all vegetation from the site and cause completely restarting of revegetation and establishment cycles. This treatment method along with other mechanical treatments can be somewhat selective and would result in uneven aged stand with multiple species composition. Chaining removes the larger trees and shrubs from the site while not affecting the grasses and forbs on-site. Double chaining produces a higher mortality rate than single chaining and seeding should occur after the first chain passes through. Chaining has been praised as a seed bed preparation treatment that does not affect local native seedbanks. The debris and slash left on site post treatments has been determined to be beneficial to the site by preventing soil erosion and increased water retention and infilitration.

- *Mastication (including Selective Cutting, and Green Woodcutting)*:

  This treatment is more selective than chaining and includes the mulching and/or shredding of trees on site. Areas to be treated with mastication would consist of sites that are dominated with trees that have sufficient desired understory vegetation. Similar to chaining, residual woody vegetation would be left on-site and would consist of slash/wood chips created from mastication equipment. Wood chips scattered across the site would allow for increased infiltration and water retention and decreased soil erosion. When compared to bare soils existing under closed canopy forests, mastication treatments would increase water retention, infiltration, seedling protection, and establishment. The decomposition of woody plant material should also improve soil nutrient content which could enhance recruitment, establishment and long-term viability of the grass and shrub community, as well as provide protection to the soil resource.

  Similar to chaining described above, cliffrose has been identified to be negatively impacted by mechanical treatments and stands of cliffrose would be avoided. Some understory vegetation would be impacted by the track or wheeled equipment navigating through the site. However, the negative impacts of the equipment moving through the site would be short term. Vegetation left on-site, as a whole, would benefit greatly in the long term resulting in decreased competition and increased vegetation species composition, structure and health.

  Selective cutting would remove trees throughout the designated polygons by using chainsaws. Some debris would be left on-site following selective cutting treatments. In dense stands, large amounts of debris would be piled and burned on-site. Burning piles on-site would remove the large volumes of fuel from the site reducing the threat of large-scale stand replacing fire. Trees to be left on-site would be marked prior to treatment implementation and would possess desired age classes, traits, and wildlife habitat. Leave trees would exhibit desired traits and characteristics such as form class, seed production, age, and disease free.

In summary, mastication and selective cutting have also been determined to be as viable tools in vegetation management, and would be completed in areas where desired understory vegetation is present. Methods such as mastication and selective cutting would allow for desired age classes, traits, and wildlife habitat to be left on site. These treatment methods would have less of an impact on understory vegetation than the above treatments like chaining and burning. Litter and debris resulting from mastication treatments would benefit the site and improve infiltration and water retention. Some debris may be left behind selective cutting treatments while the majority of the debris will be piled and burned on site.

- **Herbicide Treatment** (Active Ingredients):
  - *Imazapic*: The application of imazapic would be used as a pre-emergent for annual grasses such as cheatgrass and a pre and post-emergent for halogeton. At labeled and intended application rates imazapic would have minimal impacts on desired vegetation. Treating the disturbed areas with imazapic would control cheatgrass and halogeton on the site for up to three growing seasons. By controling these invasives it would allow the desirable plants that the BLM would be seeding to become established and reduce the dominance of annual plants.
  - *Glyphosate*: Glyphosate is a nonselective post-emergent herbicide that would be used to control heavy stands of annual grasses such as cheatgrass and to control invasive broad leaves like halogeton. At intended application rates this chemical would damage (but may not kill) all vegetation within the application area. The use of this chemical would reduce the competition for the desirable seeds that would be planted after the herbicide application.
  - *Imazapic + Glyphosate*: Is a mix that combines the chemicals imazapic and glyphosate. For this project we would apply it as a premixed formulation such as Journey or we would tank mix the two chemicals. This combination would be utilized primarily to treat cheatgrass monocultures in preparation for reseeding. It would also be utilized to control halogeton that is found within the treatment areas. This formulation is also nonselective and would damage or kill all vegetation to which it is applied.
  - *2,4–D*: This chemical would be used to control halogeton and other broad leaved invasive or noxious plants. The active ingredient is selective in attacking broad leaved plants such as: forbs, shrubs and trees. Any forb, shrub or tree that is applied with 2,4–D would be negatively impacted while grasses would be largely unaffected. Impacts may range from; irritation to, and removal of foliage applied with the herbicide, to total mortality of the plant. Applications with this herbicide would be done by ground application methods. Application would consist of mostly spot treatments to minimize the amount of non target mortality.
  - *2,4–D + Dicamba*: These two chemicals would be used to control halogeton and other broad leaved invasive or noxious plants. By combining these two chemicals we are enhancing the effectiveness of the chemicals. All forbs, shrubs, and trees would be negatively impacted by the application of these active ingredients. Similar to 2,4–D outlined above, when combining these to active ingredients the effectiveness of their treatment greatly increases. Applications with this herbicide would be done by ground application methods. Application would consist of mostly spot treatments to minimize the amount of non target mortality.

- **Seeding**: Seeding of desired species would be a preferred treatment method when dealing with locations that have inadequate desired understory vegetation. Seeding into disturbed areas would have no impact on current vegetation on site. Seeding would enhance success of establishing desired perennial vegetation and would also aid in the protection of each site from the establishment and expansion of invasive and non-native species. Seeded species would be determined on a case by case basis and may include native and non-native species.

- **Vegetation Treatment Protection**: The BLM is proposing to protect treatment areas from livestock and wild horse grazing during initial development of seedling and establishment of vegetation. The construction of temporary fences around seeded areas would aid in the establishment of seeded species prior to grazing. This action would give seeded species the best opportunity to develop and mature on-site.

- **Maintenance**: Maintenance of any or in combination of the above treatments would be decided based upon site-specific objectives. The vegetation would continue to improve with each maintenance and treatment described above.

Alternative B

Under this alternative the BLM would complete all treatments outlined above except for prescribed fire and management of wildland fire. This alternative would only allow the use of chaining, mastication, selective cutting, pile burning, fire wood cutting, seeding, livestock and wild horse protection, herbicide application, and maintenance. All of these treatments would benefit desired understory vegetation. As described above chaining, mastication and selective cutting would result in debris and litter scattered on the ground. This debris has been analyzed above as influential to the site by increasing infiltration, water retention, and decreased soil erosion. The scattered debris would also provide protection for seedlings to become established. Unlike prescribed fire and management of wildland fire, these treatments would continue to have vegetation on-site containing desired traits. Without the use of prescribed fire or management of wildland fire, all treated areas would rely on mechanical equipment that has environmental limitations. Areas that have been determined as overstocked with inadequate desired understory vegetation, and are outside of the limitations of mechanical treatment, would not be treated in a timely or effective manner and the site would continue to degrade.

In Summary, this alternative would have a net benefit to the vegetation on-site in the long term. The removal of tree species would allow for desired understory vegetation to establish and become prominent throughout the site. An increase in understory vegetation would result in increased community composition and diversity. The risk of large-scale wildland fire may still exist after treatment if large amount of biomass exist in treatment areas. The BLM would have more control of what vegetation was left on-site post treatment. Debris left on ground from mechanical treatment would improve site conditions by increasing infiltration, water retention, as well as seedling protection. However, not all proposed treatment areas would be treated due to environmental limitations of mechanized equipment, and areas outside of those limitations would continue to be overstocked and lack desired understory vegetation.

Alternative C

Under this alternative the BLM would complete all treatments outlined in the proposed action except for the use of chaining. This alternative would benefit vegetation on site in the long term

by using the treatment methods outlined above. Without the use of chaining, the BLM would have a difficult time reestablishing understory vegetation on-site where desired understory vegetation is lacking. Trees would not be knocked over and killed and seed would not be covered. Large woody debris would not be left on-site. Increased infiltration, water retention and decreased soil erosion may still occur if other methods such as mastication were completed. Without the use of chaining there would be less site disturbance and threat of cheatgrass and halogeton invasions would also decrease. The benefits of all other treatments proposed under this alternatives have been analyzed above. Treatment areas would be treated using other mechanical devices or hand thinning, seeding would be completed in polygons that are lacking desired understory vegetation, and herbicide application would be used to suppress cheatgrass and halogeton from the sites.

In summary, this alternative would also have a net benefit to the vegetation on-site in the long term. Excess trees would be removed from the site and desired understory vegetation would increase throughout the treatment polygons. However, large woody debris would not be left on-site. In areas where desired understory vegetation is lacking and dense stands of pinyon and junipers exist, seeding efforts may be hindered due to minimal seed and soil contact. Mastication treatments would still benefit the site with the smaller woody debris left behind. Site conditions would improve and increased species composition would result from this alternative.

Alternative D

Under this alternative the BLM would complete all the treatments outlined in the proposed action except for herbicide application. Cheatgrass and halogeton would not be treated with herbicides if established within treatment areas. Ground disturbance activities such as prescribed fire, chaining, and off road machine use may increase the risk for cheatgrass and halogeton invasions to the sites. Without the use of herbicides if cheatgrass and halogeton become established, the BLM would not be able to suppress or eradicate the invasions in a timely manner. The seeding of non-native species to out compete cheatgrass and halogeton would be needed under this alternative.

In summary, all treatments analyzed above would be completed to meet resource objectives without the use of herbicides. Trees would still be removed from the site and desired understory vegetation may increase in the long term. Species composition may improve in the long term on the site. Treatment areas would be at high risk of cheatgrass and halogeton invasions and establishment. In the event that cheatgrass and halogeton become established in treatment areas, suppression and eradication would not be completed in a timely manner. Species composition and plant production would be negatively impacted if cheatgrass and halogeton were established on the site.

No Action Alternative

Under the No Action Alternative, vegetative conditions are expected to remain the same for the short-term and decline in condition over the long-term. The health, vigor, recruitment and production of native and non-native, perennial grasses and native shrubs would decline in the long-term due to a combination of factors including potential overgrazing and browsing by livestock, wildlife and wild horses; competition for nutrients, sunlight and water with older, decadent shrubs and the establishment of pinyon and juniper. Future drought related factors would also contribute to the decline in condition of upland vegetative communities. The establishment of pinyon juniper onto sagebrush ecological sites would continue and the older, decadent even-aged shrub communities would further decline in health and vigor affecting the

recruitment and establishment of new grasses, forbs and shrubs which are important to grazing, browsing, soil protection, soil stability and other watershed values.

Cumulative Impacts

The Cumulative Effect Study Area (CESA) for vegetation is limited to the Spruce Allotment. See Figure B.6, “Vegetation, and Non-Native, Invasive Species CESA” (p. 168)

Past, Present and Reasonable, Foreseeable Future Actions (PPRFFA's) within the CESA include livestock grazing, wild horse sanctuary, mining, fuel woodcutting, commercial wood products, and recreation.

4.15. Visual Resource Management

All of the proposed Alternatives, including the No Action Alternative would have mosaic designs and irregular edges to minimize contrast in the viewshed. Projects occurring in the viewshed of Highway 93 and in particular those in VRM Class II areas would be designed in ways that meet the standards for VRM Class II. Contrast ratings would be completed for all surface disturbing treatments with design elements incorporated in order to meet the VRM objectives.

Cumulative Effects

The Cumulative Effects Study Area is delineated as Hunt Unit 105. See Figure B.8, “Wilderness, Recreation and Visual Resource Management CESA” (p. 170)

Past, Present and Reasonable, Foreseeable Future Actions (PPRFFA’s) within the CESA include livestock grazing, a wild horse sanctuary, mining, fuel woodcutting, commercial wood products and recreation. Contrast ratings are completed for all surface disturbing activities, therefore, cumulative impacts would be inconsequential and temporary in regards to Visual Resources.

4.16. Wilderness Study Areas

Alternative A (Proposed Action)

There are no direct effects to the South Pequop Wilderness Study Area (WSA) from the Proposed Action. No treatments are proposed within the WSA.

The Brush Creek polygon, in which broadcast burning or hand thinning is proposed, is across a two track road to the southeast of the South Pequop WSA. Prescribed fires threatening the WSA will be fully suppressed. If fire crossed into the WSA, minimum impact suppression tactics would be adhered to while suppressing fire in the WSA. The BLM does not anticipate this happening and foresees no negative impacts to the WSA. Due to the fact that the Brush Creek and Indian Creek Treatment areas were chosen for treatment because of their high risk to large-scale, stand replacing wildfire, treatment of the areas could potentially decrease the risk of wildfire to the WSA and entire watershed.

Vegetation treatments outside of the WSA indirectly benefit the vegetative communities within the WSA. See Vegetation write-up for benefits of treatments to vegetative communities.

Alternative B

There would be no direct impacts or potential indirect impacts to the South Pequop WSA since there would be no prescribed fire and management of wildland fire. Without a prescribed fire treatment, there is no risk of our prescribed fire crossing into the WSA. Goals and objectives would still be met for the Brush Creek and Indian Creek Treatment areas through other means besides prescribed fire, therefore Alternative B would indirectly benefit the WSA to the same degree as the Proposed Action.

Alternative C

There are no direct or indirect impacts to the WSA with the removal of chaining in the treatment areas. Goals and objectives would still be met for treatment areas through other means, such as burning, hand-thinning, mastication and pile burning. Alternative C would indirectly benefit the WSA to the same degree as the Proposed Action and Alternative B. .

Alternative D

The South Pequop WSA would be impacted by the removal of herbicide application in this alternative. Without the treatment of cheatgrass and halogeten at disturbed sites using herbicide, the likelihood of establishment of these invasive species is high. Because Brush Creek and the Indian Creek Treatment Areas are adjacent to the WSA, invasives could potentially spread into the WSA. Some other form of treatment would be required to prevent the spread of invasives onto disturbed sites.

No Action Alternative

Under the No Action Alternative there are no direct impacts to the WSA. However, indirectly, the health and vigor of the vegetative community surrounding the WSA is beneficial to the health and vigor of the vegetative community within the WSA. On an ecosystem scale, what is occurring outside of the WSA is likely occurring inside the WSA. Hazardous fuels would not be reduced and fire potential would be high and continue to worsen.

Cumulative Effects

The Cumulative Effects Study Area is delineated as Hunt Unit 105. See Figure B.8, “Wilderness, Recreation and Visual Resource Management CESA” (p. 170)

There are no cumulative impacts of concern in regards to the South Pequop WSA.

4.17. Wild Horses

Alternative A (Proposed Action)

Initially, wild horses would be negatively impacted by the proposed vegetation treatments under the Proposed Action: treatment areas may be closed to wild horses for a minimum of two growing seasons or until establishment objectives are met. Forage in the treatment areas would be

unavailable for consumption by wild horses. Increased activity and equipment movement during implementation of vegetation treatments may disrupt wild horses and would possibly have a short term negative impact. However, rangeland conditions are expected to improve following implementation of the proposed vegetation treatments because the health, vigor, recruitment and production of perennial grasses, forbs and shrubs would improve. After the treatment areas are reopened, wild horses would have access to increased forage with higher palatability and nutritional value.

Prescribed Burning (including the Management of Wildlife)

Planned prescribed fire treatments would initially have a negative, short term direct impact on wild horses. The treatment area would be closed to wild horses during treatment and possibly closed after treatment for two growing seasons or until establishment objectives are met. Forage in the treatment area would not be available for consumption by wild horses. Prescribed fire would likely reduce the cover of grass and forb species available to wild horses temporarily. Wild horses near treatment areas could be temporarily disturbed or displaced by prescribed fire activities and associated traffic. With management of wildfire, due to the unplanned nature of natural ignitions, there is a risk of additional negative impacts from increased animal stress, possible injury or death from smoke inhalation or burns. Depending on how quickly the fire progresses, wild horses could be trapped within the fire area. However, the risk of these additional negative impacts is no different from that of an unplanned and unmanaged wildland fires. The burning of the rangeland may result in increased perennial grass production and grazing capacity as well as increased forage availability from the removal of physical obstructions posed by brush and small trees. Rangeland conditions are expected to improve following the removal of excess fuels and the risk of catastrophic fires will be reduced, both of which would have a positive, long term indirect impact on wild horses. Proposed Action and the Alternatives should provide additional forage and the habitat structure should be changed for the wild horse population. Currently, wild horses in the Spruce-Pequop HMA use the pinyon and juniper for shelter and escape cover. The pinyon and juniper are important habitat for wild horses, but the proposed treatments would not eliminate enough protective and escape cover to adversely affect the existing wild horse population. The Proposed Action and Alternatives should result in an increase of perennial, herbaceous plants which are important for the maintenance of rangeland health, and multiple other values.

Mechanical Treatments

Mechanical treatments would initially have a negative, short term direct impact on wild horses. The treatment area would be closed to wild horses during treatment and possibly closed after treatment for two growing seasons or until establishment objectives are met. Forage in the treatment area would not be available for consumption by wild horses. Wild horses near treatment areas could be temporarily disturbed or displaced by mechanical treatment activities and associated traffic. The proposed mechanical treatments allow for the release of understory vegetation and/or the growth of desired seeded species. This would result in an increase in the quantity and quality of forage available for wild horses and rangeland conditions are expected to improve, both of which would have a positive, long term indirect impact on wild horses. The increased activity within the Study Area could lead to increased shyness of resident wild horses. Wild horses are not expected to be harmed by aerial application of herbicide. Wild horses are also not expected to be harmed by prescribed fire, chaining, or selective cutting as they would readily avoid these activities. The Proposed Action and Alternatives could present the public an increased opportunity for the observation of wild horses.

Herbicide Treatment

There are possible negative direct impacts on wild horses from herbicide treatment on rangelands. Wild horses may be adversely affected by direct exposure to the proposed herbicides, because the herbicides proposed for treatments may have some or all of the following effects and attributes: is corrosive, cause eye irritation or damage, and is harmful if swallowed, inhaled or absorbed through the skin. Risks to wild horses would be minimized by adhering to the application requirements, restrictions specified on the product label, as well as keeping wild horses out of treatment areas during application. Specific label and Material Safety Data Sheet (MSDS) information, restrictions and risks associated with the each of the seven herbicides proposed for treatment are outlined below. Wild horses could be impacted in the short term by protection fences as the fences could restrict their movements through the HMA. Wild horses near the treatment areas could be temporarily disturbed or displaced by seeding activities and associated traffic. It is expected that following seeding treatment there would be an increase in forage plants and fences would be removed. This would result in an indirect and positive impact on wild horse as they would have access to increased forage and unrestricted movement through the HMA.

Panoramic 2SL: Entry to areas treated with Panoramic 2SL is restricted for 12 hours by humans. Panoramic 2SL causes moderate eye irritation. There are no grazing restrictions for Panoramic 2SL on the product label.

Plateau: Entry to areas treated with Plateau is restricted for 12 hours. Plateau may cause slight eye and skin irritation, but is relatively nontoxic after single ingestion, short-term skin contact and short-term inhalation.

Weedar 64: Entry to areas treated with Weedar 64 is restricted for 48 hours. Weedar is corrosive, causes irreversible eye damage, is harmful if swallowed and is slightly irritating to the skin.

Weedmaster: Entry to areas treated with Weedmaster is restricted for 48 hours for humans. Weedmaster causes substantial but temporary eye injury and is harmful is swallowed, inhaled, or absorbed through the skin. There is no waiting period between treatment with Weedmaster and grazing for non-lactating animals. It may have an impact on lactating wild horses within seven days after application.

Herbicide treatment is likely to reduce, if not prevent, the successful establishment of cheatgrass and other invasive annual species. Native and seeded species would have less competition for moisture and nutrients, resulting in increased health, vigor, recruitment and production. The resulting improvement of forage and range condition would have a positive, long term indirect impact wild horses.

There is a risk of herbicide drift and possible exposure of wild horse with aerial and ground application; however the risk is greater with aerial application because the herbicide is initially higher in the air, has farther to travel to make contact with the target plants, and is exposed to more air movement. Wild horses would generally move away from any aerial spraying platform and this would lessen any impacts. Both types of treatment application would possibly have negative direct impacts on wild horses but ground application would have a slightly lesser negative impact.

The use of herbicide treatment is generally effective in suppression of undesirable species and, as a result, promoting the growth of desirable species. Exposure to harmful doses of herbicide would be unlikely, since wild horses would leave the area if there was a chance they could be harmed by an herbicide, as required by the label instructions. Wild horses would have a greater chance of

exposure to herbicides—either via direct contact with the herbicide upon application or indirect contact via dermal contact with vegetation or ingestion of vegetation—if their range extent was partially or completely sprayed. However, it is unlikely that the entire range of a wild horse herd would be sprayed, as these animals are wide ranging. The possible short term negative direct impacts to wild horses by the risk of exposure to the proposed herbicides, application type, and limitations on forage availability are outweighed by the positive long term indirect impact to wild horses by the expected improvement in forage and range conditions. Despite the initial negative impacts, herbicide treatments would have an overall positive long term impact to wild horses.

Seeding: Seeding would initially have a negative, short term direct impact on wild horses The treatment area would be closed to wild horses during treatment and possibly closed after treatment for two growing seasons or until establishment objectives are met. Forage in the treatment area would not be available for consumption by wild horses. Wild horses near treatment areas could be temporarily disturbed or displaced by mechanical treatment activities and associated traffic. Of the different types of seeding methods, hand seeding and hand planting of seedlings would be the least disruptive to wild horses because they do not involve the use of heavy equipment for seed dispersal; however wild horses would generally avoid any planting efforts during the activity. It is expected that following seeding treatment there would be an increase in forage plants. This would result in an indirect and positive impact on wild horses as they would have access to increased forage.

Vegetation Treatment Protection: Building temporary fences for protection of seeding treatments would have a negative, short term impact on wild horses. The temporary fences would inhibit wild horse movement throughout the HMA. Wild horses would also attempt to graze the treatment areas and would be impacted by fences. The areas would be rested from wild horses for two growing seasons following treatment or until establishment objectives are met. Wild horses try to go through fences in the fenced seeded area and could impact recovery efforts if fences are not maintained. Fencing seeded areas to keep wild horses and other animals out facilitates the establishment of forage species by eliminating disturbance from hoof action or grazing. Rangeland conditions are expected to improve following implementation of the proposed seeding treatments because the health, vigor, recruitment and production of perennial grasses, forbs and shrubs would improve.

Wild horses could be impacted in the short term by fences would riparian areas. Providing water outside of the riparian exclosures would offset direct impacts to wild horses. In the long term protecting the riparian areas from impacts by wild horses would provide a dependable water source for wild horses.

Alternative B

The impacts on wild horses under Alternative B would be the same as those under Alternative A (Proposed Action). Alternative B would result in an improvement in range condition, but without prescribed fire, excess fuels and the risk of catastrophic fire would not be reduced as much as they would be under Alternatives A, C and D.

Alternative C

The impacts on wild horses with Alternative C would be the same as those under Alternative A (Proposed Action) except for those associated with the mechanical treatment chaining.

Alternative D

The impacts on wild horses under Alternative D would be the same as those under Alternative A (Proposed Action) except for those associated with the application of herbicides. There would be no attempt to control or prevent the establishment of cheatgrass or other weeds following the proposed vegetation treatments, resulting in desired plant species having unnecessary competition. Alternative D would result in an improvement in range condition, but the treatments may be less successful, may have difficulty meeting establishment objectives and may have to be rested from wild horses for longer period of time than the vegetation treatments proposed under Alternatives A.

No Action Alternative

Under the No Action Alternative, no changes in management would occur. Habitat for wild horses would continue to change resulting in more pinyon and juniper woodlands, more decadent shrubs and fewer perennial, herbaceous plants for forage. There would be an increased user conflict among livestock, wildlife and wild horses due to competition for limited desirable forage. Rangeland health would continue to decline.

Cumulative Impacts

The Cumulative Effect Study Area (CESA) for wild horses is the Antelope Valley, Goshute, and Spruce-Pequop HMA's. See Figure B.10, "Wild Horse CESA" (p. 172).

Past and current actions on wild horses within the Study Area include livestock grazing, mineral exploration, road maintenance, recreation activities including off-highway travel, fence construction, rail line reconstruction, installation of transmission line, uncontrolled wildfire, hunting, herbicide treatment of weeds, and rights-of-way construction.

Loss of habitat due to the lack of fire, historic livestock grazing, wild horse use above established appropriate management levels, recreation, and mining have impacted the vegetative communities. Disturbed areas have been invaded by non—native invasive species which have little nutritional value for wild horses. Under the No Action Alternative the resources would continue to deteriorate and this would have a negative impact within the CESA for wild horses. Alternatives A (Proposed Action), B, C and D would slow, halt and/or reverse the deterioration of vegetative communities over time and would have a positive cumulative impact on the CESA for wild horses.

4.18. Wildlife

Alternative A (Proposed Action)

Direct impacts to wildlife would consist of temporary habitat loss, habitat modification and disturbance from increased human activity. Approximately 18,314.5 acres of existing wildlife habitat are being analyzed within the treatment areas through the Spruce Mountain Restoration Project. However, no more than 10,000 acres of the proposed 18,314.5 acres would be treated throughout the project. No long-term impacts to wildlife habitat are likely to occur since reestablishment of vegetation would take place at varying time intervals after treatment

implementation, depending on the vegetation type disturbed. A varying number of generations of specific wildlife species would have lifetime impacts, depending on if a proposed treatment modified habitat conditions enough that it was no longer viable to that species, but future vegetative reestablishment of the sites would render impacts to be temporary.

Wildlife sensitive to increased human activity and noise could be temporarily displaced as a result of the restoration activities. Proposed actions that involve vegetation treatments such as chaining, mastication or burning would disturb wildlife due to the increased presence of humans and by creating noise, dust, and smoke. Wildlife foraging activities in and around the treatment sites would continue after the completion of the treatments. Wildlife habitat fragmentation would be unlikely to occur because the treatments would be dispersed over the approximately 200,000 acre Study Area with a maximum of 10,000 acres (or five percent) of disturbance over the life of the Project. Therefore, the proposal could have high short-term direct impacts and minimal long-term direct impacts on wildlife species.

Indirect impacts to wildlife would occur due to the temporary loss or modification of vegetation as a result of treatment surface disturbance. There could be a temporary improvement of habitat in the Study Area at the onset of the vegetation treatments before the surface disturbance reclaims itself by the establishment of a greater amount of herbaceous species for wildlife foraging. Wildlife for the most part would indirectly benefit from all proposed treatments. Increase in desirable understory and transitions to more diverse ecosystems would improve wildlife habitat quality.

Treatments would not take place during the months when excess snow conditions would be non-conducive to equipment handling or when mule deer are using the Spruce Mountain area as winter habitat.

Impacts as a result of Alternative A (Proposed Action) are expected to be similar for all wildlife species encountered in the Project Area. Any disturbance to mule deer, coyotes, rodents, and birds would likely be limited to temporary auditory and visual perturbation of individuals in or near the treatment sites. Individuals foraging in the treatment areas during implementation activities would likely leave the immediate area resulting in a temporary spatial redistribution of individuals or habitat-use patterns during the Project implementation; this would not be a long-term effect since there is undisturbed and suitable habitat around the Project Area. If displaced animals move into habitat already at carrying capacity, there could be a higher mortality rate among the displaced individuals and an impact to the resident population. This in turn would cause a reduction of viable young at least for the next breeding season in the area. The disturbance due to Project-related activities would be short term. No long-term impacts are likely to occur since the treatment areas are dispersed amidst abundant original vegetation densities and displaced species populations will still have habitat present. The quality, quantity, and distribution of suitable wildlife habitat are not expected to be substantially altered by Project implementation. A minor increase in wildlife/human interactions would occur; however, the likelihood of wildlife mortalities would be minimize by species specific restrictions within the proposed project procedures outlined above. An example of such a restriction would be to avoid dead “snags” in treatment areas where silver haired bats have been observed to retain needed roosting habitat.

Prescribed Burning (including the Management of Wildfire)

The use of prescribed burning would remove the majority of the vegetation from the treatment area until vegetation begins to reestablish. Habitat along the edges of the burn could also see a reduction in use by wildlife species as cover and foraging potential is reduced and the effects of

fire could temporarily drive species from the area due to smoke, heat, noise, and increased human activity. The use of prescribed fire is an imprecise science and there is a possibility that more habitat than anticipated will be effected if the burn gets "away" from those managing it. Fire can change the nature of the plant community of the site, therefore modifying the types of species and the types of utilization for the area. Species in the area that previously utilized a pinyon/juniper habitat would be replaced with species that utilized more open habitats. Pinyon/juniper habitat is abundant on Spruce Mountain, so it is not anticipated that burn areas would decrease species populations that utilize this habitat type. Also, the modification of pinyon/juniper habitats to open habitat types would not shift population dynamics of species in the area.

Three treatment areas are being considered for prescribed burning: Brush Creek, Coyote North Bowl, and West Side Upper. There are approximately 25,000 acres of crucial elk habitat in the upper elevations of Spruce Mountain. A prescribed fire at the Brush Creek unit would remove approximately 100 acres of this habitat type (or 0.4%) and a fire in the Coyote North Bowl unit would remove approximately 1,371 acres (or 5.5%). Elk are known to be attracted to open areas on mountain slopes and once vegetation begins to reestablish it is anticipated elk will reutilize the area. The West Side Upper unit is within mule deer winter range, and a prescribed burn at this site could potentially impact foraging and cover potential of approximately 500 acres in the short term. It is anticipated that the removal of the pinyon/juniper component would improve habitat values for wintering deer, though the benefits would be delayed in the long term until the shrub component of the vegetation begins to recover (approximately 15 to 20 years).

Mechanical Treatments

Mechanical treatments are the physical removal or modification of a vegetation type. For the Spruce Mountain projects the vegetation type chosen for modification is the pinyon/juniper stands.

- *Chaining*: The use of chaining would uproot a majority of the pinyon/juniper component of the site while leaving much of the understory intact. Unlike burning, the seedbed is still present and even dead, downed trees afford a habitat base for certain species. Chaining would modify habitat use and reduce cover and foraging potential for some species while increasing such opportunities for others. During the chaining process, increased noise, dust and human activity may temporarily drive species or certain individuals of a species from the vicinity. Though chaining would modify the characteristics of the site, it is anticipated that wildlife would return to utilizing the area sooner than with prescribed burning as vegetation would still remain.

- *Mastication (including Selective Cutting and Green Woodcutting)*: The use of mastication would have the same effects for wildlife, except that dead trees would not be left on site for use by species that utilize deadwood (certain rodent, reptile and/or bird species).

  Selective cutting would retain habitat characteristics for those species that utilize pinyon/juniper habitat. Unlike burning, chaining or mastication there would be no modification to the understory component of the sites selected. The use of chainsaws would temporarily drive wildlife from the vicinity due to increases noise and human activity. Cut down trees left in place would provide additional habitat for those species that utilize dead wood, but the burning of "slash" piles would increase the amount of time the area would be disturbed and there would be the increased potential for wildfire.

  Most of the proposed sites are being considered for a mechanical treatment: Coyote Basin Bottom, Indian Creek, Coyote East, Upper Spruce Spring, Lower Spruce Spring, West Side,

and West Side Lower. The Indian Creek and the Coyote East sites are in elk crucial habitat and treatments would impact approximately 550 and 556 acres respectively. Elk are attracted to open areas on mountain slopes and it is anticipated that they would begin reutilizing the area soon after treatments are completed and activity has ceased in the area. The Indian Creek, Coyote East, Upper Spruce Spring, Lower Spruce Spring, West Side, and West Side Lower treatment sites area all within mule deer winter and crucial winter habitat. Collectively the treatments would impact 7,400 acres (or approx. 9% of these habitats associated with Spruce Mountain). It is anticipated that the removal of the pinyon/juniper component will improve habitat values for wintering deer and since most of the understory component will remain intact the benefits to mule deer should begin soon after treatment completion.

Herbicide Treatment (Imazapic, Glyphosate, Imazapic+ Glyphosate, 2,4-D, and 2,4-D + Dicamba

The herbicides selected for these treatment types have been shown to have little to no toxic effects on birds species and have only shown adverse effects to mammals if ingested regularly over a long period of time. Imazapic may cause irritation to the eyes and Glyphosate may cause mortality to individuals that directly inhale its aerosol form. Low effects of all pesticides include temporary, reduced physical well-being to individuals that directly ingest newly applied pesticide. Direct impacts are more often in the form of herbicides killing off habitat utilized by specific species. The application of herbicide would temporarily drive species from the vicinity due to increased human presence.

Seeding

Depending on the seeding method, wildlife species may be temporarily driven from the area due to increases in noise, dust and human activity. Treatment seeding of areas previously disturbed and/or have inadequate, undesirable vegetative habitats would not have an immediate impact to those species presently utilizing those sites. Depending on the success of the seeding, the area may support additional species and/or which increased populations of species already present.

Livestock and Wild Horse Grazing Protection (Fences)

Fence construction would occur on treatment areas with insufficient understory and/or treatments which are not expected to respond with desired understory vegetation. Fences would remain on site until reestablishment objectives have been met. Fences would be constructed in accordance with BLM specifications for spacing and materials to reduce wildlife impacts see Section 2.1.1, “Proposed Project Procedures” (p. 14).

Maintenance

Impacts associated with the maintenance of any of the proposed treatments would be the same as those described above. Maintenance treatments are proposed to re-treat previous sites to meet site specific objectives. Depending on the length of time since that initial treatment, habitat types may have started to reconvert back to a pinyon/juniper woodlands. Treatment maintenance would preclude the return of the pinyon/juniper habitat type that was present before the proposed action and its use by specific wildlife species. Maintenance of the Honeymoon site would re-treat elk, deer and pronghorn use areas; though there are no crucial or special use habitats present, removal of encroaching pinyon/juniper would have beneficial effects to the habitat. The Lower Spruce Spring site proposes to re-treat approximately 1225 acres of antelope winter habitat.

Alternative B

Under this alternative the BLM would complete all treatments outlined above except for prescribed burn and management of wild land fire. This alternative would allow the use of chaining, mastication, selective cutting, pile burning, fire wood cutting, seeding, livestock and wild horse protection, herbicide application and maintenance. All impacts of these treatments to wildlife would be the same as described above in the preferred action except for the impacts associated with prescribed fire. The removal of this alternative would reduce the possibility of accidental impacts to wildlife species and their habitats due to an unforeseen wildfire.

Alternative C

Under this alternative the BLM would complete all treatments outlined in the proposed action except for the use of chaining. Mechanical treatments won't leave any deadwood behind that could be utilized be specific species; but treatments will be in smaller, more confined areas, as chaining is the most commonly used mechanical treatment for large swaths of vegetation removal. Restoring or enhancing specific habitat types (mule deer crucial winter) will be harder to achieve through the more restricted mechanical treatment methods. All impacts of these treatments to wildlife would be the same as described above in the preferred action except for the impacts associated with chaining.

Alternative D

Under this alternative the BLM would complete all treatments outlined in the proposed action except for herbicide application. All impacts of these treatments to wildlife would be the same as described above in the preferred action except for the impacts associated with herbicides.

No Action Alternative

Under the No Action Alternative the pinyon/juniper habitat associated with Spruce Mountain may continue to expand into the open area habitat, benefiting certain species that utilize woodland habitats and negatively impacting species that utilize transitional or open habitats. The proposed seedings that would increase diversity to the area and expand specific habitat types would not occur. Under the No Action Alternative the chances of wildfire will remain at the current level or increase with the increase of pinyon/juniper fuel loads. Mule deer crucial winter habitat is being encroached upon by the pinyon/ juniper woodland and will continue to be incrementally reduced through the years. Species that do not utilize pinyon/juniper woodland sites, will be pushed slowly farther into the valleys. Conversely, habitat use patterns and population densities of the areas of tree roosting/ utilizing species would fluctuate with natural modifications of habitat types or removal of habitat by fire, but overall species dynamics would remain stable. Some wildlife species (such as mule deer) would benefit greatly from the proposed action, as some of their specific habitat requirements can only be obtained through it's implementation. Others, though, would not be dependent on it's implementation and there are even wildlife species (mountain lions) that would benefit from the continued advancement of the pinyon/ juniper woodland into the valleys.

Cumulative Impacts

Sage Grouse CESA

The Sage Grouse CESA boundary was developed to address impacts to the birds that utilize the Project Area. The Study Area is at the boundaries of two population management units (PMU's) that were delineated by telemetry studies to designate bird usage of specific habitats. Spruce Mountain straddles two bird groupings as shown in Figure B.9, "Sage Grouse CESA" (p. 171). The two PMU's are designated the East Valley unit and the Ruby Valley unit with a combined grouse population of about 2900 birds (Approximately 500 for East Valley and 2400 for Ruby Valley).

Big Game CESA

The Big Game CESAs were developed to assess impacts from Project activities to the Area 10 mule deer and antelope herds. To accomplish this, the entire range that the deer and antelope herds utilize in their annual life cycle within Nevada was used as the basis for the CESA boundary. These ranges include the winter and summer ranges as well as the migration corridors between them.

Historic studies have documented that most of the deer migrating to winter ranges in the Study Area have summer ranges to the north and west in the North Ruby and East Humboldt ranges, but some deer have also come from the south and west from the South Ruby, Maverick and Medicine range areas. The majority of the migrating deer from NDOW Management Units 101-3 and 107-8 funnel out of the Ruby Mountains through the East Humboldt Range via Lone Mountain in NDOW Management Unit 104 to the Spruce Mountain winter habitat in NDOW Management Unit 105. Only a small percentage of deer coming from the Maverick/Medicine ranges cross Butte Valley to access Spruce Mountain with most journeying north through the Ruby Mountains to cross at Lone Mountain. Figure B.14, "Mule Deer CESA" (p. 176) shows the Mule Deer CESA.

The majority of the antelope herd that stays in the vicinity of Spruce Mountain, utilize portions of Clover valley, Independence Valley, Goshute Valley, and the Dolly Varden range for most of the year. During the fall there is a general movement north from the Dolly Varden's and south around the west side of Spruce Mountain to winter ranges located in the Goshute Valley to the south of the peak. Figure B.12, "Antelope CESA" (p. 174) shows the Antelope CESA.

The Elk CESA was developed to display an area that would assess impacts from Project activities and other actions to the herd that resides year round at Spruce Mountain. A portion of the herd will travel south and west during the spring as they move out of winter ranges into the Cherry Creek range, but there always is a core group that heads back to the upper elevation of Spruce Mountain for the summer. Figure B.13, "Elk CESA" (p. 175) shows the elk CESA.

Past Present and Reasonably Forseeable Future Actions for Sage Grouse and Big Game CESA's

- **Past and Present Actions**

  Past and present actions in the wildlife CESAs include the following: livestock grazing and range improvements, wild horse sanctuary and wild horse use, wildland fires, wildlife and game habitat management, fire treatment/seedings, recreation, railroads, utility and other rights-of-way (ROWs), mineral exploration, and mining.

  - <u>Livestock Grazing and Range Improvements</u>

There are approximately 80 BLM-administered grazing allotments that are within or overlap the Wildlife CESAs. The largest being the Deer CESA includes 4,431,873 acres. Range improvements within the Wildlife CESAs include wells/storage tanks, reservoirs, pipelines, seedings, fences, spring/riparian exclosures, spring developments and noxious weed treatments.

- Wild Horse Management

There are six Herd Management Areas (HMA's) that are within or overlap the Wildlife CESA's. Horses from mainly four of the six (Spruce-Pequop, Goshute, Antelope Valley and Maverick-Medicine) utilize the area directly around Spruce Mountain.

- Wildland Fires

Fires have been relative few in the Study Area and Wildlife CESA's as compared to the rest of the district. There have only been approximately 8,500 acres burned on Spruce Mountain recorded for two time periods (1985: Approx. 5,000 acres and 2000-1: Approx. 3,500 acres). There has been disturbance associated with wildland fires in all the Wildlife CESA's, with a cumulative acreage of approximately 101,456 acres for the Elko district. Table 4.3, "Wildland Fire Disturbance of Habitat Acres in the CESA's" (p. 133) summarizes the disturbance acres from historic fires (1981-2009), in all Wildlife CESA's. Many of these fires were small lightning strikes associated with precipitation and burned less than one hundred acres each. However, several fires from 100 to 600 acres in size and from 1,000 to 24,000 acres in size have occurred.

Table 4.3. Wildland Fire Disturbance of Habitat Acres in the CESA's

CESA	Historic Fires (1981 — 2009)*
Sage Grouse — Winter	1,800
Sage Grouse — Nesting	357
Sage Grouse CESA — Total	2,157
Mule Deer — Winter Habitat	26,938
Mule Deer — Migration Corridor	315
Mule Deer CESA — Total	79,289
Antelope — Crucial Habitat	1,100
Antelope CESA — Total	75,571
Elk — Crucial Habitat	0
Elk — CESA — Total	23,000

*All totals are approximate

- Wildlife and Game Habitat Management

Research and management of big game and wildlife are undertaken by NDOW. The BLM manages wildlife habitat on public land, which may include modification to existing habitat and rangeland facilities. The Study Area is located in NDOW Hunt Unit 105 as shown in Figure B.11, "Wildlife: Small Mammals CESA" (p. 173). However, cumulative impacts take into consideration Hunt Units 101-04, 106-08, and 078. See Figure B.14, "Mule Deer CESA" (p. 176). Deer harvest data was supplied by NDOW and shows relatively stable harvest numbers in 2010 for Hunt Unit 101-108. In 2010, the total bucks harvested for Hunt Units 101-108 was 1,189 and in 078 was 5, which is down from previous years. All or portions of the NDOW Hunt Units 101-108 and 078 are located within the Mule Deer CESA, all of Hunt Units 105, 107, 078 and part of 106 are located within the Sage Grouse CESA, parts of Hunt Units 105, 106 and 107 are located in the

Pronghorn Antelope CESA and all of Hunt Units 105, 106, 107 and the upper portion of 104 are located within the Elk CESA.

There are numerous drill seeding, aerial seeding, and mechanical treatments located on or within approximately ten miles of Spruce Mountain. These treatments were mainly performed for wildlife habitat enhancements, but some were also range improvements to assist the grazing operator in cattle management. Approximately 32,000 acres have been treated. Juniper thinning occurred on Spruce in the 1960's to early 1970's to enhance wildlife habitat within the area. In 2008, the BLM initiated a hand thinning project of the pinyon and juniper trees on the north side of the Mountain. Hand thinned areas were piled and left for public use.

- Rights of Ways (ROWs)

The LR2000 database was used to query the various types of ROWs that have been approved in the wildlife CESA's by Sections, Township and Ranges, and include the following: railroad; irrigation and water facilities; telephone; federal aid for highways; material sites; federal roads; communication; power lines; roads; wind energy test sites, geothermal leases, other federal ROW's; and other (undefined) ROWs. The approximate acreage of each ROW within each CESA associated with these ROW's is listed in Table 4.4, "Past and Present Active and Closed Minerals Disturbance and Right of Ways Acreages in CESA's" (p. 135). The acreage of surface disturbance associated with these ROW's cannot be quantified; however it is assumed that these types of ROW's and the construction and maintenance associated with these facilities would create a level of surface disturbance that would contribute to cumulative impacts to various resources. In addition, certain types of ROW's can fragment habitat or create barriers or hazards for wildlife passage. The LR2000 database was queried on June 23, 2011. Any new approved ROW's that have been added to the LR2000 database after June 23, 2011, is not included in this analysis.

Nevada Energy set up two communication towers in the project area; one on Victoria Mountain in the Dolly Varden's adjacent to existing communication facilities and one approximately less than a mile east of Highway 93 west of Spruce Mountain. Both facilities occur within a 54 x 78 foot fenced-in area and encompass a communications shelter, generator, two propane tanks, and one 80 foot tall self-supporting antenna tower. The Spruce Site ROW also includes a 0.1 mile maintenance road(s) and 12 mile utility corridor parallel to the Highway 93 ROW. This project falls within the Sage Grouse, Mule Deer, Antelope and Elk CESA's.

- Minerals Exploration and Mining

The LR2000 database was used to query the past and present mineral exploration or mining activities (authorized Notices, expired Notices, closed Notices, approved Plan of Operations) that have been approved in the wildlife CESAs by Sections, Township, and Ranges. Past and present minerals activities in the wildlife CESAs include historic exploration and mining operations. Table 4.4, "Past and Present Active and Closed Minerals Disturbance and Right of Ways Acreages in CESA's" (p. 135) is a summary of the past and present mineral activities within each CESA based on the LR2000 database used by the BLM. The LR2000 database was queried on June 23, 2011. Any new approved Notices or Plans of Operations that have been added to the LR2000 database after June 23, 2011, are not included in this analysis.

Gold, silver, copper, lead and zinc were mined within the historic Spruce Mountain District, which is located on BLM lands. Thirteen other historic mining district occur within the CESA's (Warm Creek, Delker, Mud Springs, Dolly Varden Lafayette, Pequop, Proctor, Wendover, Decoy, Furguson, White Horse, Ferber and Kinsley) that produced gold, silver, copper, lead, zinc, barite and tungsten. These historic mining districts have hundreds of workings that have never been reclaimed and continue to modify and fragment habitat values. These workings have also created additional habitat that was not naturally present for certain species (bats).

Recent exploration has occurred at the Long Canyon site and the Pequop site in the Pequop Range. These two sites, on BLM-administered lands, are within the Mule Deer, Elk and Sage Grouse CESA's. The Victoria Mine site is an established mine site in the Dolly Varden Range that has a submitted Plan for a leach operation of the existing dump. This site, also on BLM-administered lands, is within the Mule Deer, Antelope, Elk and Sage Grouse CESA's.

Table 4.4. Past and Present Active and Closed Minerals Disturbance and Right of Ways Acreages in CESA's[a]

CESA	Acreage ROW *	Acreage Minerals*
Sage Grouse	101,750	3,819
Antelope	77,391	3,318
Elk	70,032	2,166
Mule Deer	218,646	26,271

[a] Source: LR2000 Database, June 2011

*All Acreages are Approximate

Mineral exploration activities in the Pequop Mountains first started in the 1990s. Currently, Agnico-Eagle (West Pequop Project, LLC) and Newmont (Long Canyon Project, LLC) has 100 and 170 acres of approved surface disturbance, respectively, for mineral exploration involving exploration road and drill site construction on both sides of the north Pequop range. Both these Projects fall within all or portions of the Sage Grouse, Mule Deer and Elk CESAs. Agnico-Eagle (USA) Ltd. has an acknowledged Notice for 4.70 acres of surface disturbance for mineral exploration including the construction of drill roads and drill pads at the Summit Project. The Summit Project is located in Section 16, T36N, R66E in the Pequop Range. Newmont has 99.86 acres of approved activities for mineral exploration within the 2008 Plan Boundary and on private land. These approved activities consist of surface disturbance and include maintenance of existing access roads, construction of exploration roads, construction of drill pads, and trenching and bulk sampling.

The Victoria mine was established in the mid-70's by the Hecla Corp, with a previous disturbance footprint of approximately 118.9 acres. The site included a pit, mill area and access roads. All disturbances are still present at the site. This project falls within the Sage Grouse, Mule Deer, Antelope and Elk CESA's.

- **Reasonably Foreseeable Future Actions (RFFAs)**

The RFFAs include continued livestock grazing, wild horse use, wildland fire and emergency fire rehabilitation, wildlife game and habitat management, dispersed recreation, ROW authorizations, mineral exploration, and mining.

  - Wildlife and Game Habitat Management

Wildlife and game habitat management activities are expected to continue consistent with the past and present actions discussion.

- Wild Horse Management and Sanctuary

  The Spruce and Warm Springs ranches were purchased by OTS LLC and Tommy LLC, respectively in 2010 for the purpose of establishing a wild horse sanctuary and potentially grazing domestic horses within the Warm Creek and Snow Water Lake allotments. An additional 500 domestic horses could be present in the Wildlife CESA's, in addition to wild horses already established in the Spruce Mountain HMA.

- Rights of Ways

  Rights-of-Way applications will likely continue to be submitted in the future. Data for the acres of RFFA ROWS in the CESA's is based on the LR2000 and proposed project information from the BLM. The LR2000 database was queried on July 12, 2011. Any new pending ROW's that have been added to the LR2000 database after July 12, 2011 are not included in this analysis. As of the July 12 date, there have been no new Row applications submitted for the project area.

- Mineral Exploration and Mining

  Mineral exploration activities are expected to continue in response to robust commodity prices and based on current supply of and demand for minerals and commodities. Data for the acres of RFFA surface disturbance in the CESA's is based on the LR2000 and proposed project information from the BLM and the United States Forest Service (USFS). The LR2000 database was queried on June 23, 2011. Any new pending Notices or Plans of Operations that have been added to the LR2000 database after June 23, 2011 are not included in this analysis.

  West Pequop Project LLC has submitted a Plan of Operation Amendment to the BLM for the West Pequop Project which would create an additional 300 acres of surface disturbance associated with mineral exploration activities. This would bring the total surface disturbance within their operations area to 400 acres when combined with the approved 100 acres mentioned above. The eastern boundary of the West Pequop Project is coincident with the western boundary of the Expanded Long Canyon Project Area. Exploration activities proposed on the West Pequop Project would include drilling, constructing drill access roads, trenching, and bulk sampling. Portions or all of the West Pequop Project are located within the Immediate Watershed CESA, Sage Grouse, Elk, Antelope and Mule Deer CESA's.

  Currently Telesto NV Inc. has submitted a Plan of Operation to the BLM to pursue dump leach activities on the existing waste rock dump at the Victoria Mine. All 22.54 acres of proposed disturbance would occur on previously disturbed acreage and utilize the existing mill.

Cumulative Impacts

The CESA for small mammal wildlife is the General Wildlife/ Migratory Bird CESA which includes 464,218 acres and is shown on Figure B.11, "Wildlife: Small Mammals CESA" (p. 173). The CESA's for big game wildlife is the Mule Deer, Antelope and Elk CESA's which inclusively

add to 4,431,873 acres and is shown in Figure B.14, "Mule Deer CESA" (p. 176), Figure B.12, "Antelope CESA" (p. 174), Figure B.13, "Elk CESA" (p. 175).

- Small Mammals

  Past and Present Actions: Past actions that have potentially impacted small mammal wildlife are the same as has been analyzed for special status species, and including wildfire, mineral exploration, ranching operations (grazing), wild horses, road construction or maintenance, or dispersed recreation that impacted water resources or reduced wildlife habitat within the CESA. Refer to the Section 4.13, "Special Status Species" (p. 105) for analysis.

  Reasonably Foreseeable Future Actions: The RFFA's for small animal wildlife are the same as has been analyzed for special status species. Potential impacts to wildlife could occur from grazing, wild horses, dispersed recreation, roads, ROW's, minerals activities or loss of wildlife habitat associated with future wildland fires. There are no specific data on the potential impacts that would result to small mammal wildlife as a result of dispersed recreation, grazing, or future wildfires. Refer to the Section 4.13, "Special Status Species" (p. 105) for analysis.

- Big Game

  Past and Present Actions: Past actions that have potentially impacted mule deer, antelope, and elk include mineral exploration, ranching operations (grazing), wild horses, road construction or maintenance, fence building, or dispersed recreation that impacted water resources or reduced wildlife habitat. There are no specific data that quantify habitat loss from grazing or recreation in the CESA's. However, there are 80 BLM-administered grazing allotments and six HMA's that are within or overlap the Deer, Antelope and Elk CESA's. The total number of permitted livestock AUM's included in the Antelope and Elk CESA's is 133,973 (including 34,367 suspended AUM's). The total permitted livestock AUM's is higher in the Mule Deer CESA as it extends into the Ely District and includes an 11 additional allotments. Construction of ROW's and fences may have led to fragmentation of wildlife habitat as well as caused impacts to vegetation and soils leading to soil erosion and the increased potential for the introduction of invasive, non-native species. Construction and use of the railroads and roads have created an ignition source for wildland fires, facilitated the introduction and establishment of invasive, nonnative species, and impacted the deer herd by creating obstacles within the migration corridor leading to mortality (such as vehicle-related deaths on US 93).

  Historic Fires (1981-2009) have burned approximately 116,635 acres within the Mule Deer, Antelope, and Elk CESA's. As shown in Table 4.4, "Past and Present Active and Closed Minerals Disturbance and Right of Ways Acreages in CESA's" (p. 135), mineral exploration and mining Notices or Plans total 26,271 acres in the Mule Deer CESA (0.6 percent of the CESA), 3,318 acres in the Antelope CESA (.07 percent of the CESA) and 2166 acres in the Elk CESA (. 05 percent of the CESA). State and federal regulations require project operators of Notices and Plans to provide financial assurance to guarantee that surface disturbance due to mineral activities will be reclaimed. Therefore, the Notices and Plans within the Mule Deer, Antelope, and Elk CESA's have reclamation bonds to guarantee that up to 31,755 acres of authorized surface disturbance will be reclaimed when mineral exploration and mining activities have been completed. A total of 218,642 acres of ROW's were issued within the Mule Deer CESA (5 percent of the CESA), 77,391 acres in the Antelope CESA (2 percent of the CESA) and 70,032 acres in the Elk CESA (2 percent of the CESA), that have the potential to create surface disturbance and habitat fragmentation and degradation for big game species. Approximately 2,593 miles of historic race routes are present within Mule Deer,

Antelope and Elk CESA's. Approximately 3,030,294 acres of the Christmas Tree Cutting Area and 4,431,873 acres of the NDOW Hunt Units 101-108 are located within the Mule Deer, Antelope and Elk CESA's which have the potential to create noise and disturbance to big game species and remove or alter habitat. Some private land owners have erected wildlife exclusion fences around hayfields on a limited number of acres.

According to data provided by the NDOW and received from the NDOT, approximately #? big game species (deer, antelope or elk) were killed by vehicles on United States Highway 93 (US93) in the vicinity of Spruce Mountain in the period from 20?? to 2011. These are only reported vehicle collisions that NDOT has responded to and the actual number of big game strikes are much higher than these numbers imply.

Reasonably Foreseeable Future Actions: Potential impacts to mule deer, antelope and elk could occur from grazing, wild horses, dispersed recreation, roads, ROW's, continued fragmentation of habitat due to fencing, minerals activities or loss of native vegetation associated with potential wildland fires.

The West Pequop Project, Long Canyon Project and Victoria Mine operations areas are located entirely within the Mule, Deer and Elk CESA's and have proposed a total of 568 acres of surface disturbance. Approximately 3,000 acres of potential disturbance from the proposed SWIP corridor is located within the Mule Deer and Elk CESA. Neither is in the Antelope CESA. LS Power has proposed a multiple wind test site of which 11,500 acres of the ROW associated with this project is within the Mule Deer and Elk CESA's and could create surface disturbance and vegetation removal associated with installing and maintaining anemometers.

Cumulative Impacts: In summary (from discussion above), impacts to wildlife (small mammals and big game) from the Proposed Action would be limited to the removal of vegetation, destruction of habitat (up to 10,000 acres), noise associated with treatments, and incidental mortality. The Proposed Action would affect approximately 2% of the CESA for small mammals and less than 0.1 % of the CESA's for big game. Indirectly the positive impacts from the treatments outlined above in coordination with PRFFA's greatly out weigh the negative impacts associated with the manipulation efforts. Based on the above analysis and findings, incremental impacts to wildlife species (both small mammals and big game) as a result of the Proposed Action when added to the past and present actions and RFFA's are expected to be minimal.

Chapter 5. Tribes, Individuals, Organizations, or Agencies Consulted:

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[Describe consultation efforts here.]

Table 5.1. List of Persons, Agencies and Organizations Consulted

Name	Purpose & Authorities for Consultation or Coordination	Findings & Conclusions
Nevada Department of Wildlife	Cooperator	Development of Proposed Actions and Alternatives
Western Watersheds Project	Cooperator	Development of Alternatives and Treatment Methods.
Rocky Mountain Elk Foundation	Cooperator	

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Chapter 6. List of Preparers

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Table 6.1. List of Prepares

Name	Title	Responsible for the Following Section(s) of this Document
Matt Murphy	Natural Resource Specialist	Project Lead, Vegetation, Forestry, Fire Management
Terri Dobis	Range Management Specialist	Grazing Management
Tamara Hawthorne	Recreation	Recreation, Visual Resource Management, Wilderness Study Areas, and Lands with Wilderness Characteristics
Nycole Burton	Wildlife Biologist	Wildlife, Special Status Species including, Migratory Birds
Mark Dean	Hydrologist	Hydrology, Air Quality, and Soils
Bryan Mulligan	Natural Resource Specialist	Non-Native and Invasive Weeds
Jill Jensen	Archeologist	Cultural Resources
Bruce Thompson	Wild Horse and Burro Specialist	Wild Horse and Burros

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Appendix A. Spruce Mountain Restoration Treatments

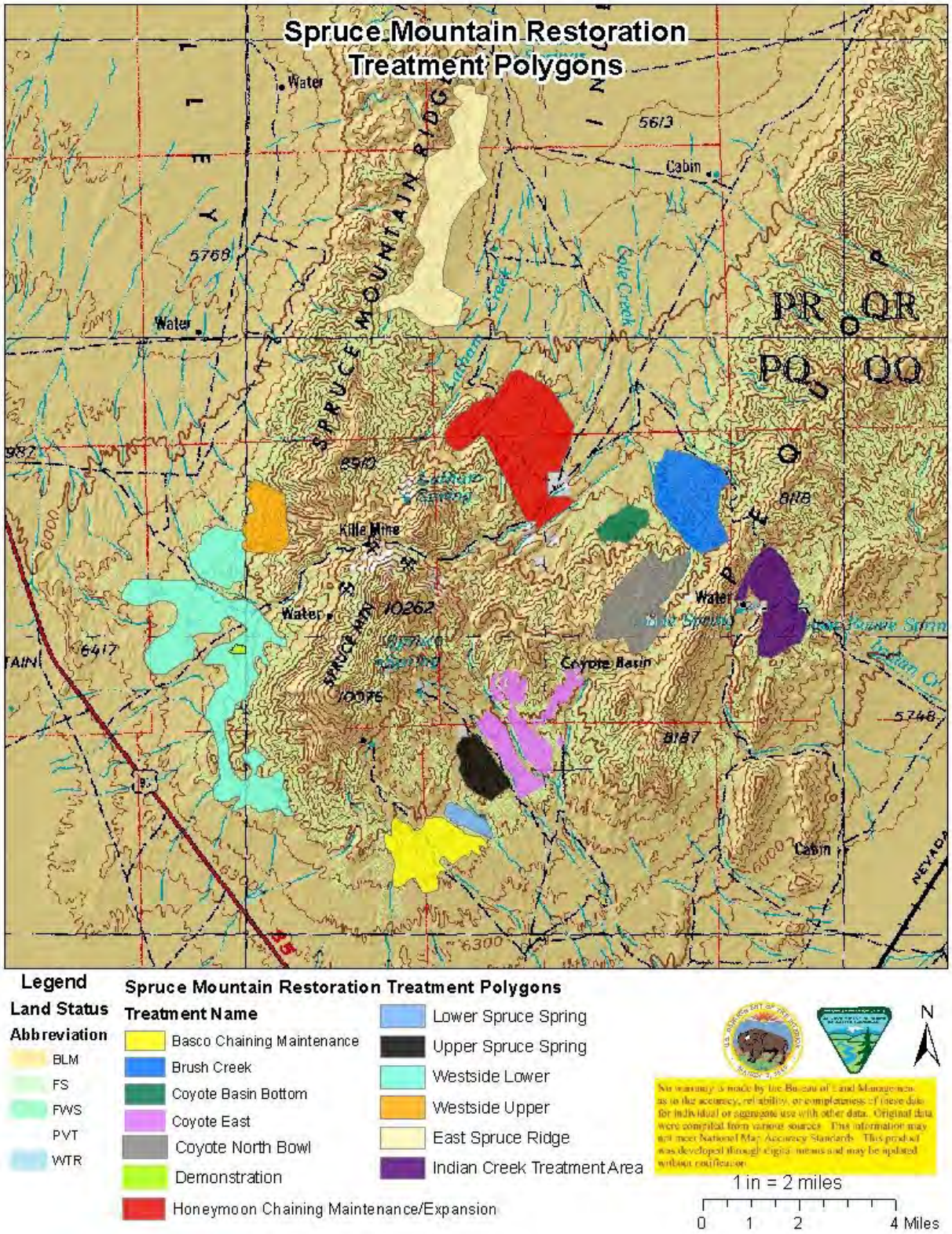

Figure A.1. Spruce Mountain Restoration Proposed Treatments

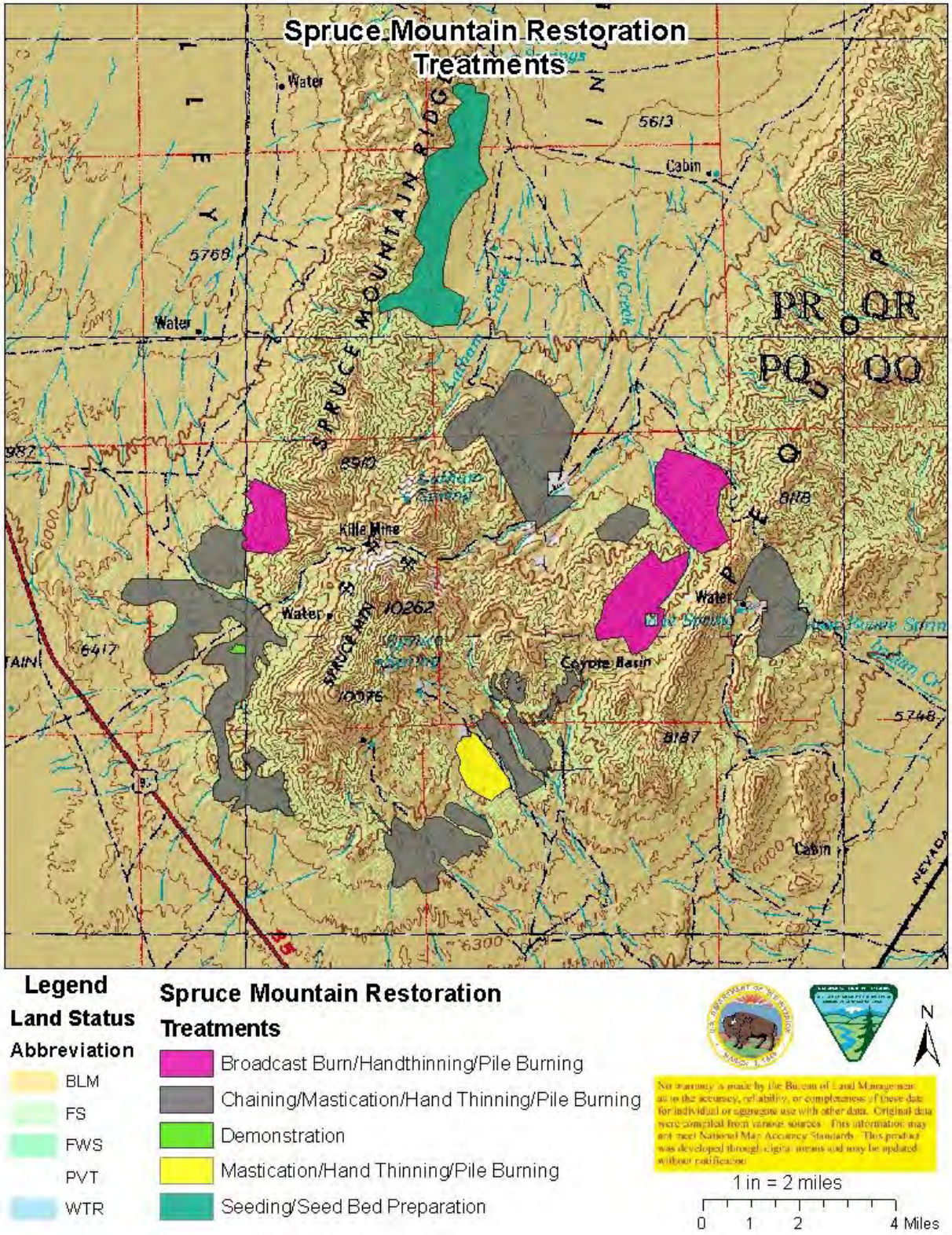

Figure A.2. Spruce Mountain Restoration Treatment Types

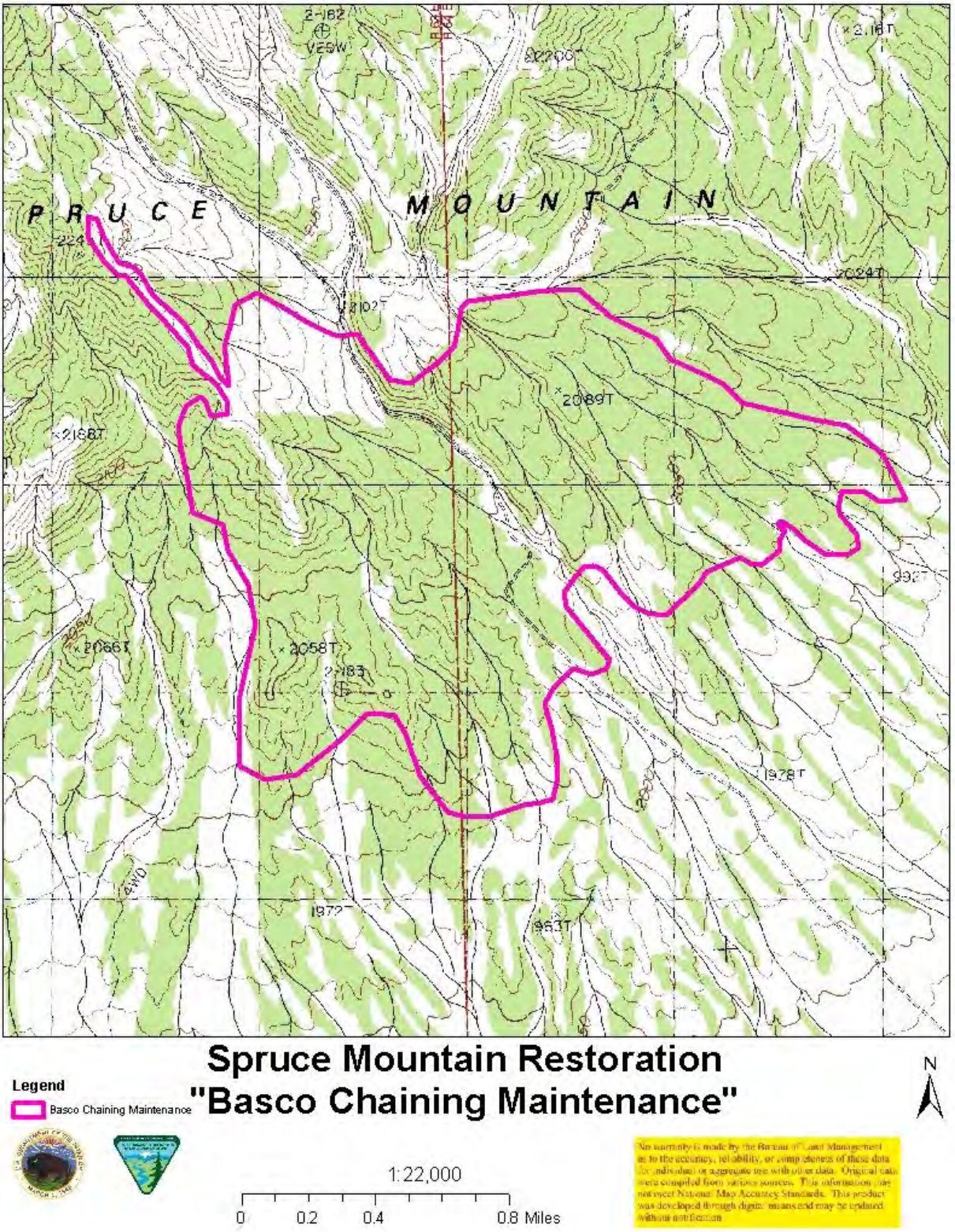

Figure A.3. Basco Chaining Maintenance/Expansion

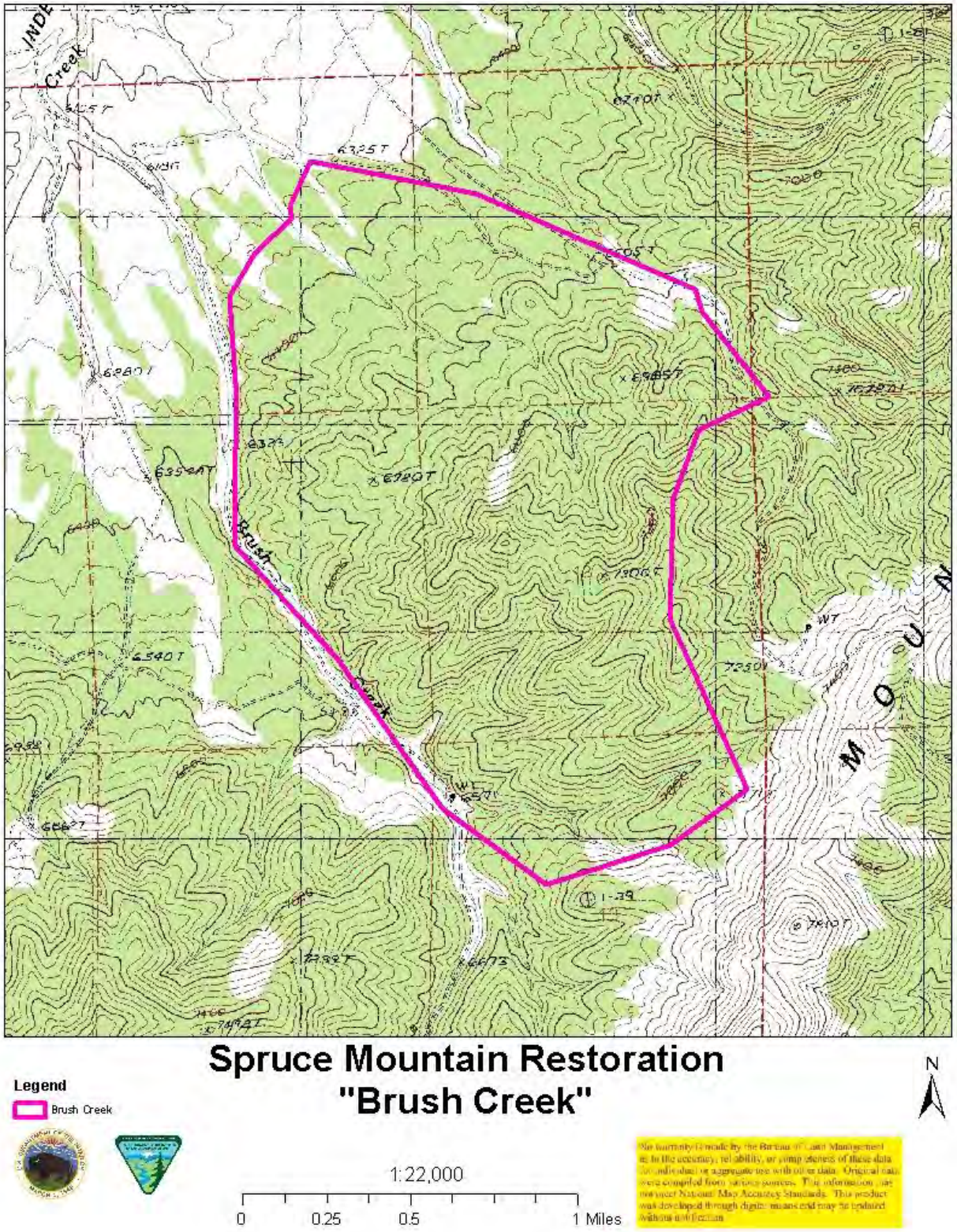

Figure A.4. Brush Creek

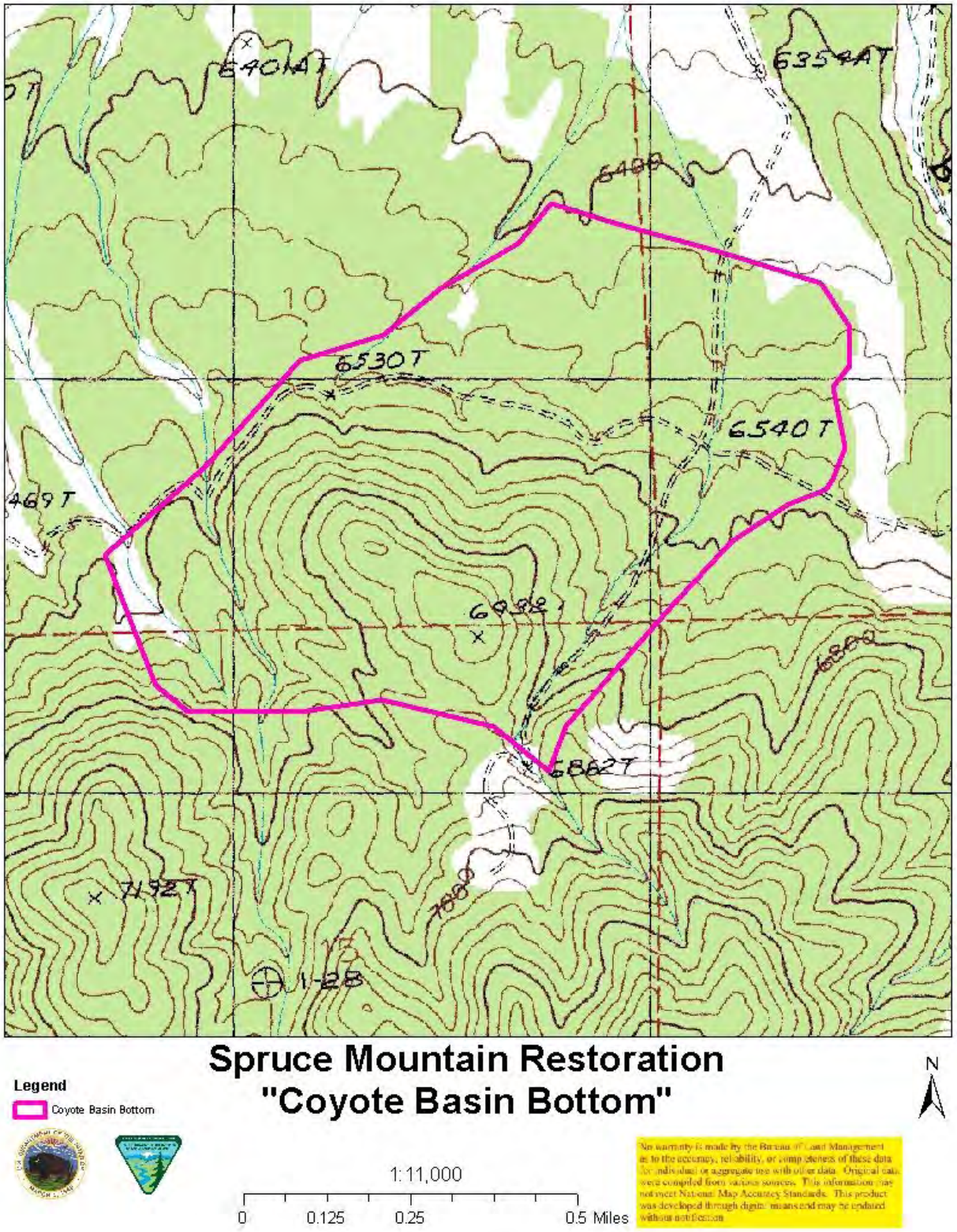

Figure A.5. Coyote Basin Bottom

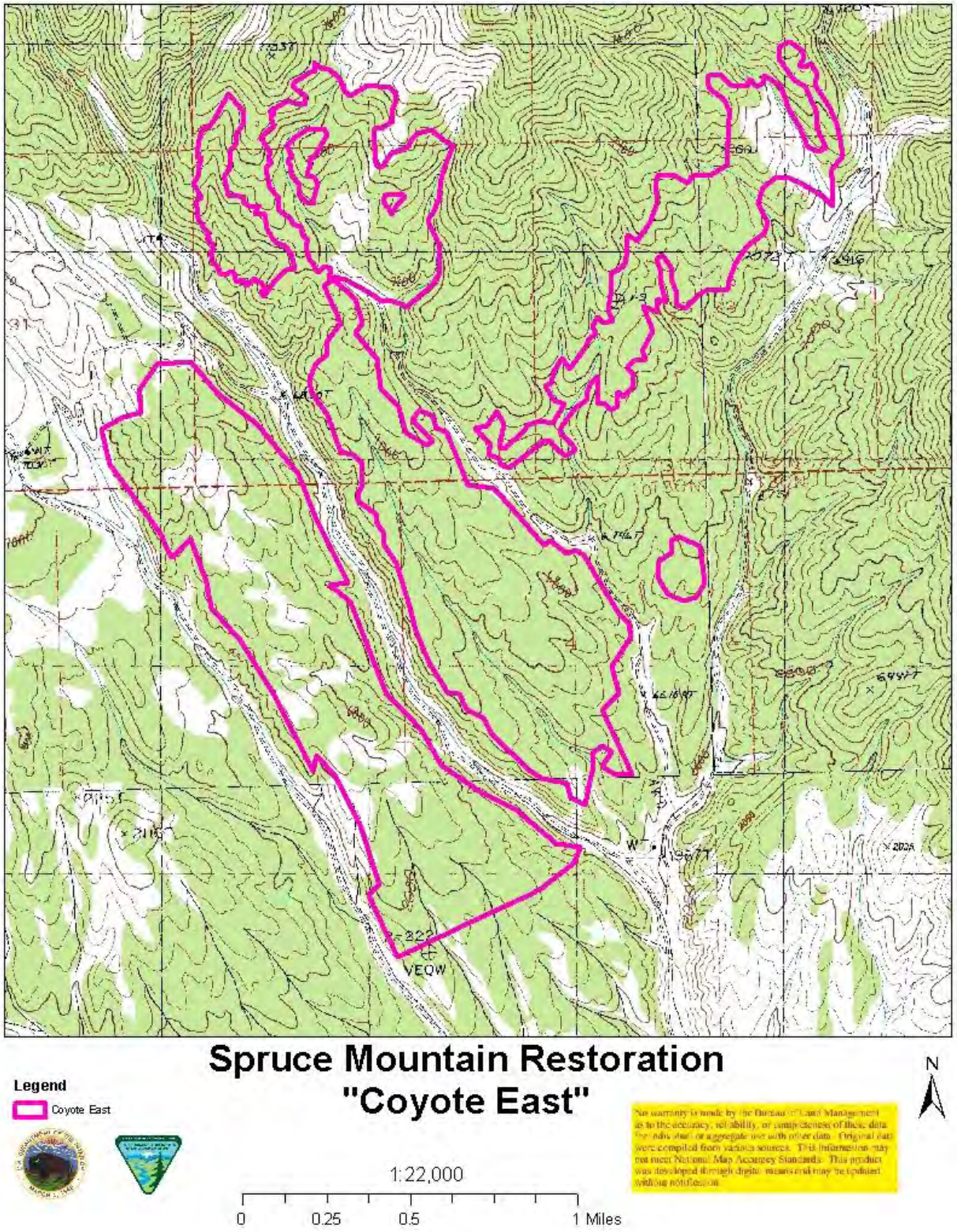

Figure A.6. Coyote East

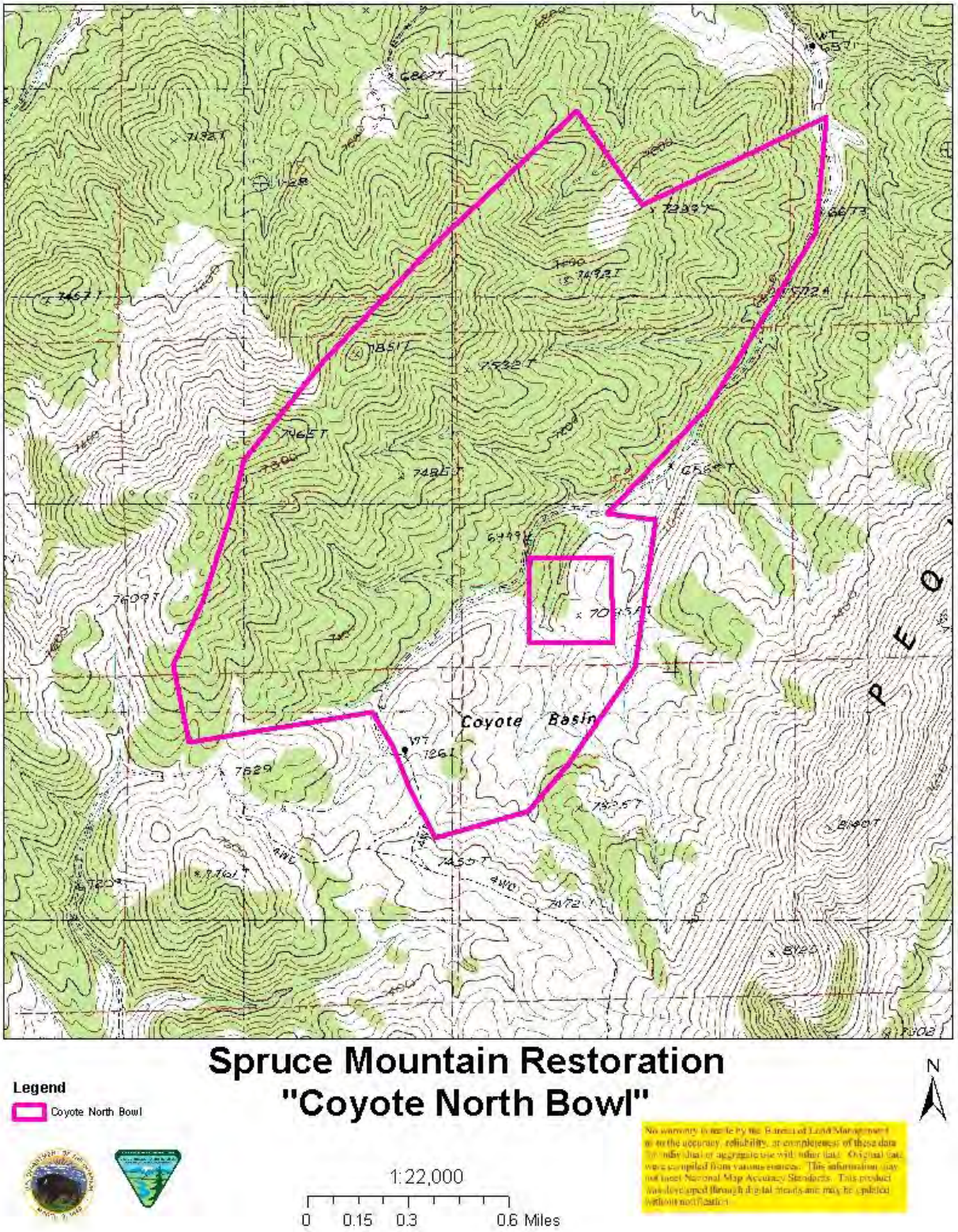

Figure A.7. Coyote North Bowl

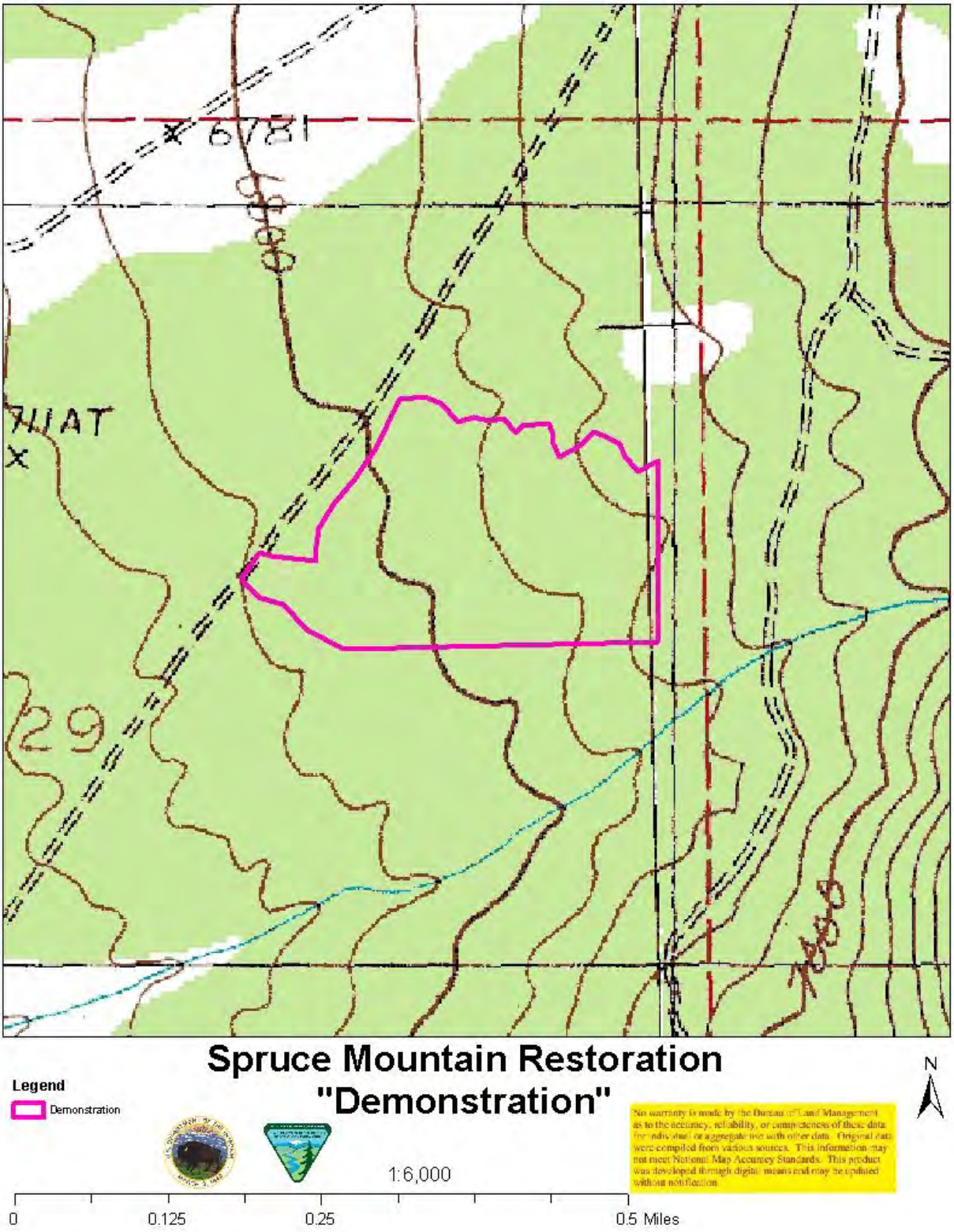

Figure A.8. Demonstration

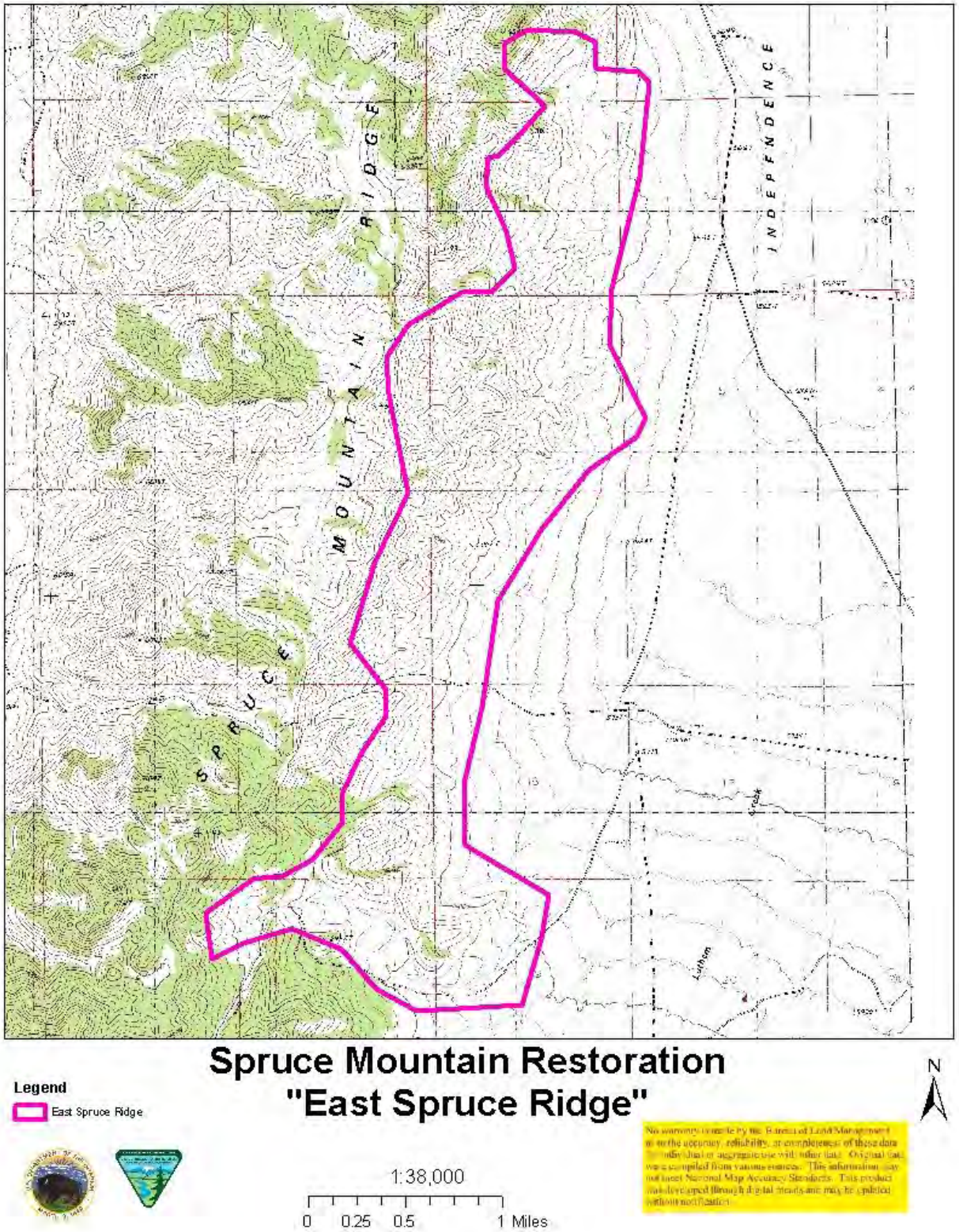

Figure A.9. East Spruce Ridge

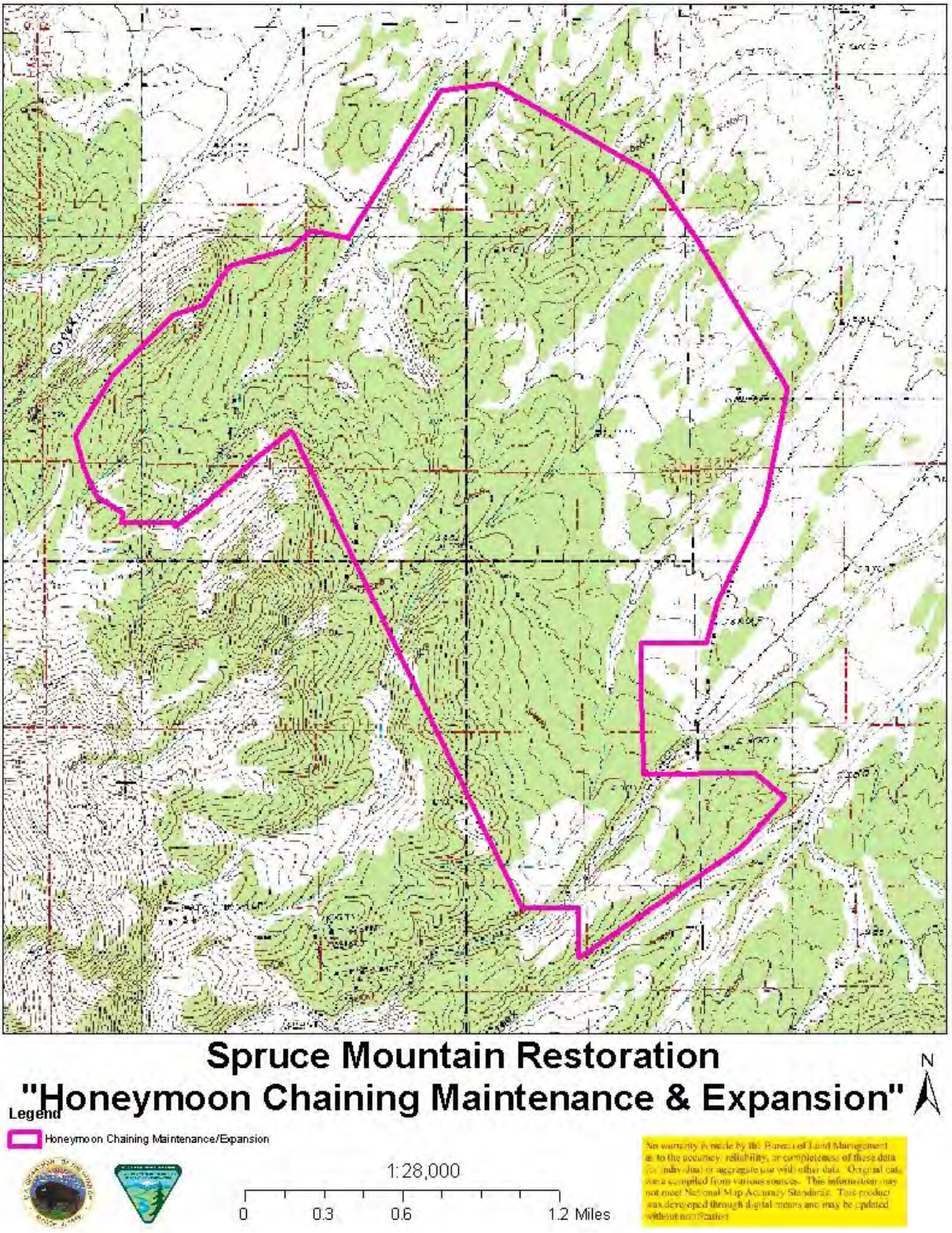

Figure A.10. Honeymoon Chaining Maintenance/Expansion

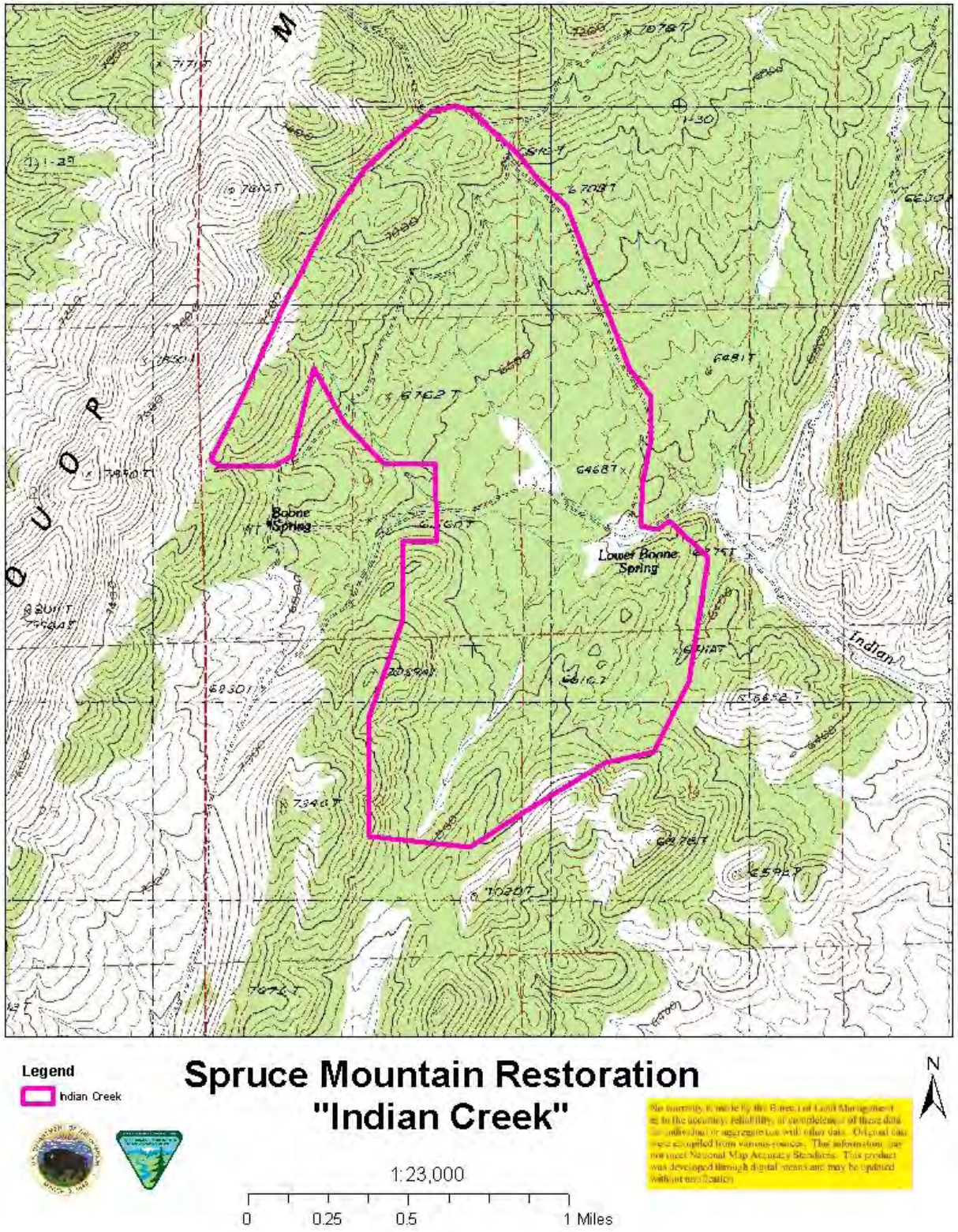

Figure A.11. Indian Creek

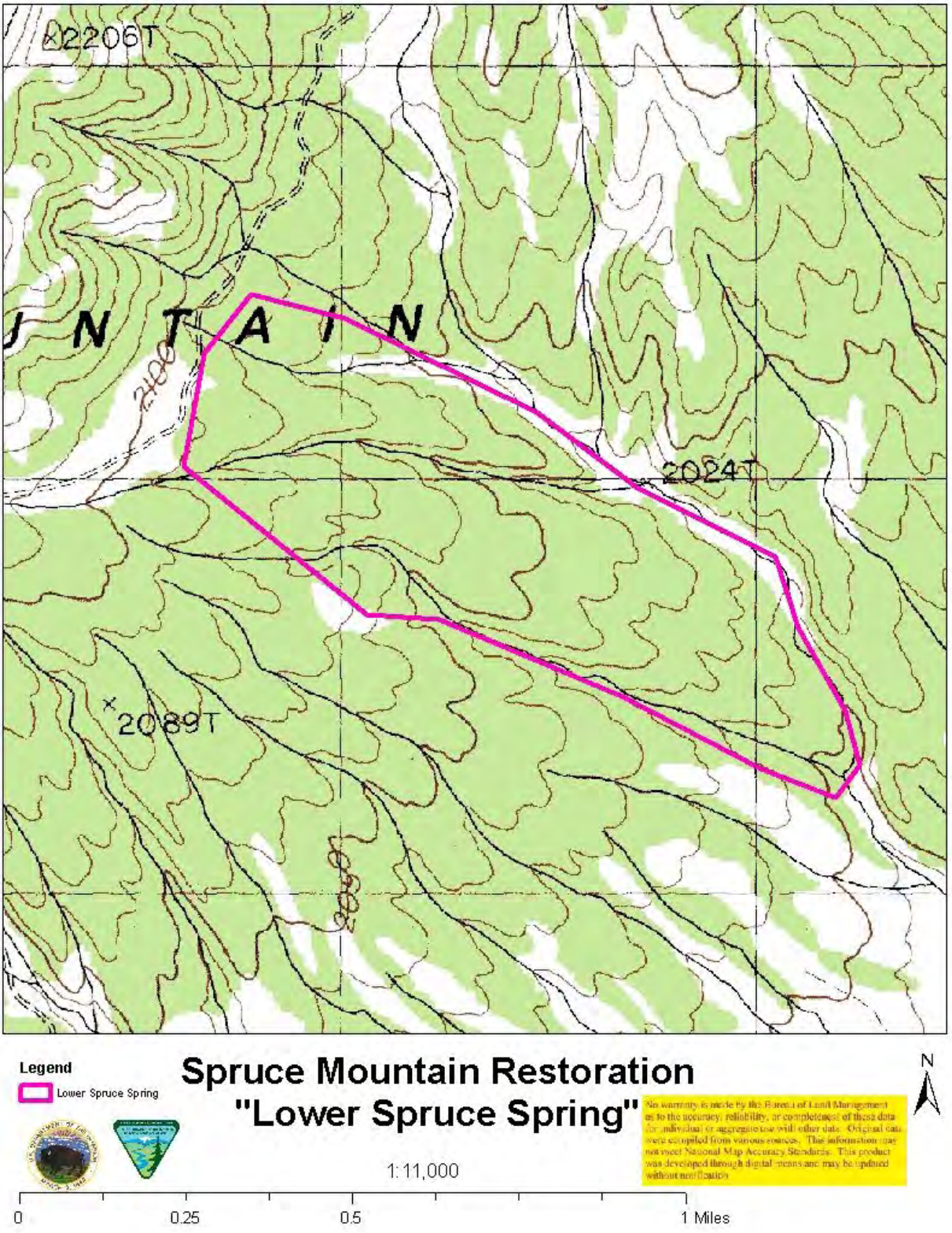

Figure A.12. Lower Spruce Spring

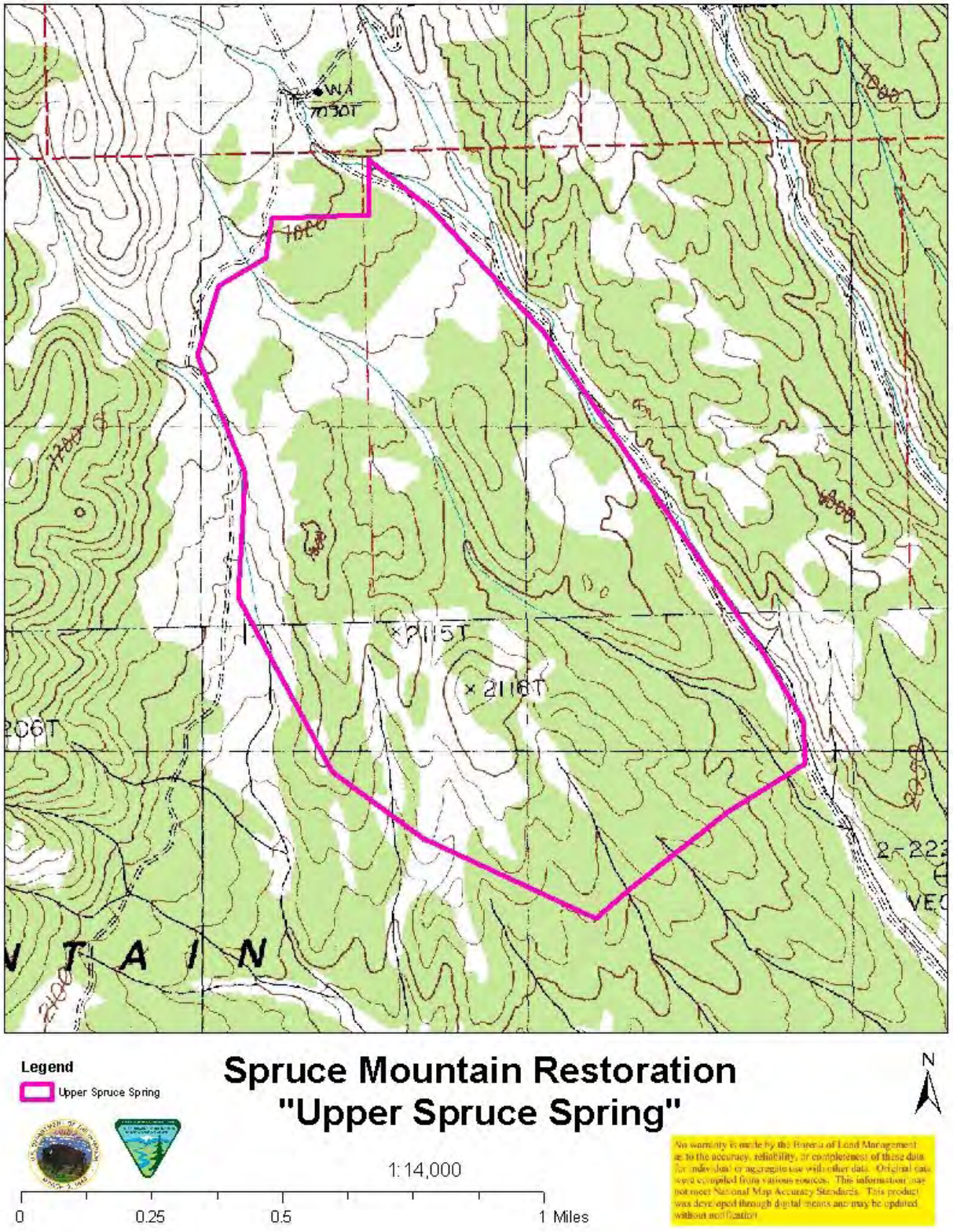

Figure A.13. Upper Spruce Spring

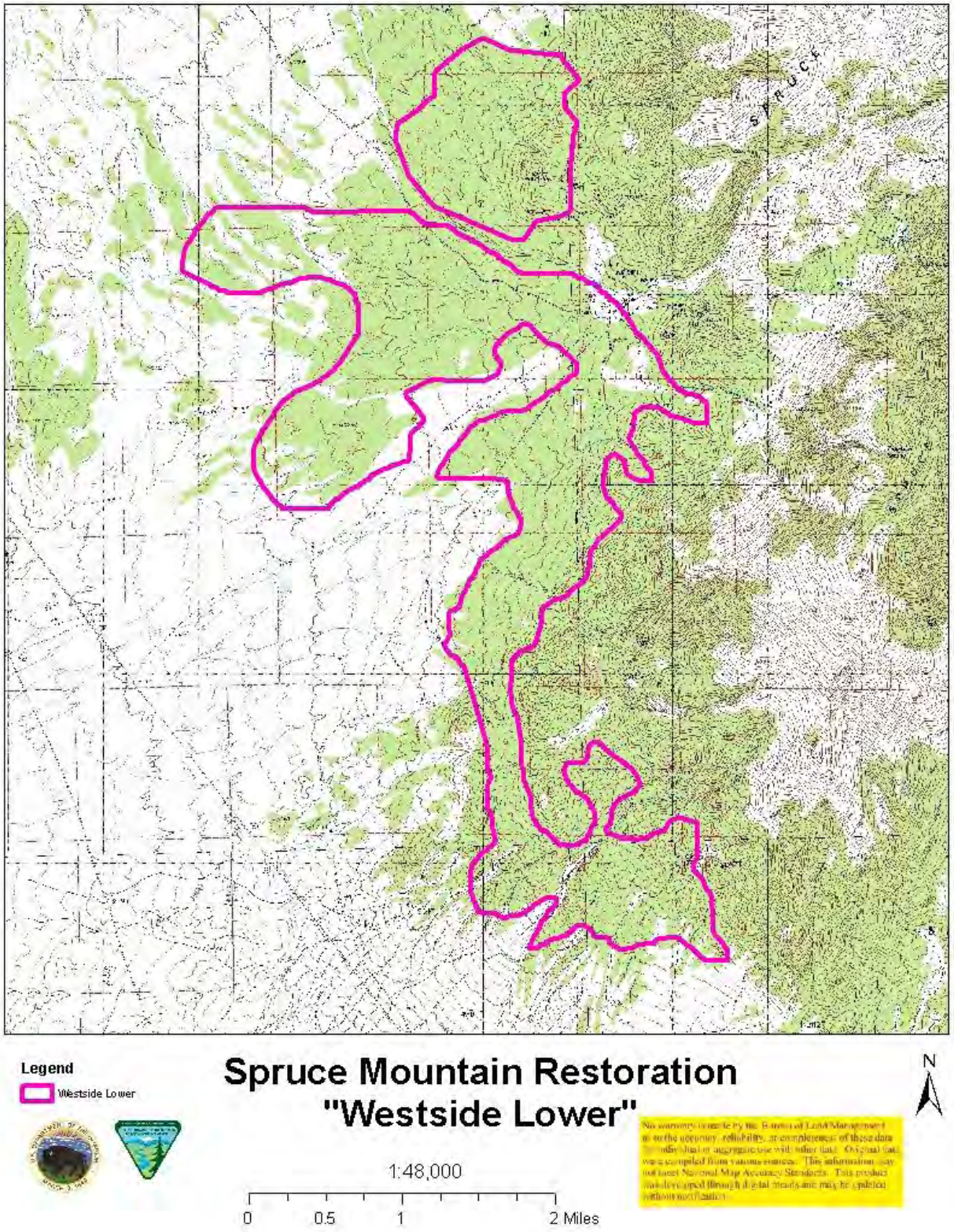

Figure A.14. Westside Lower

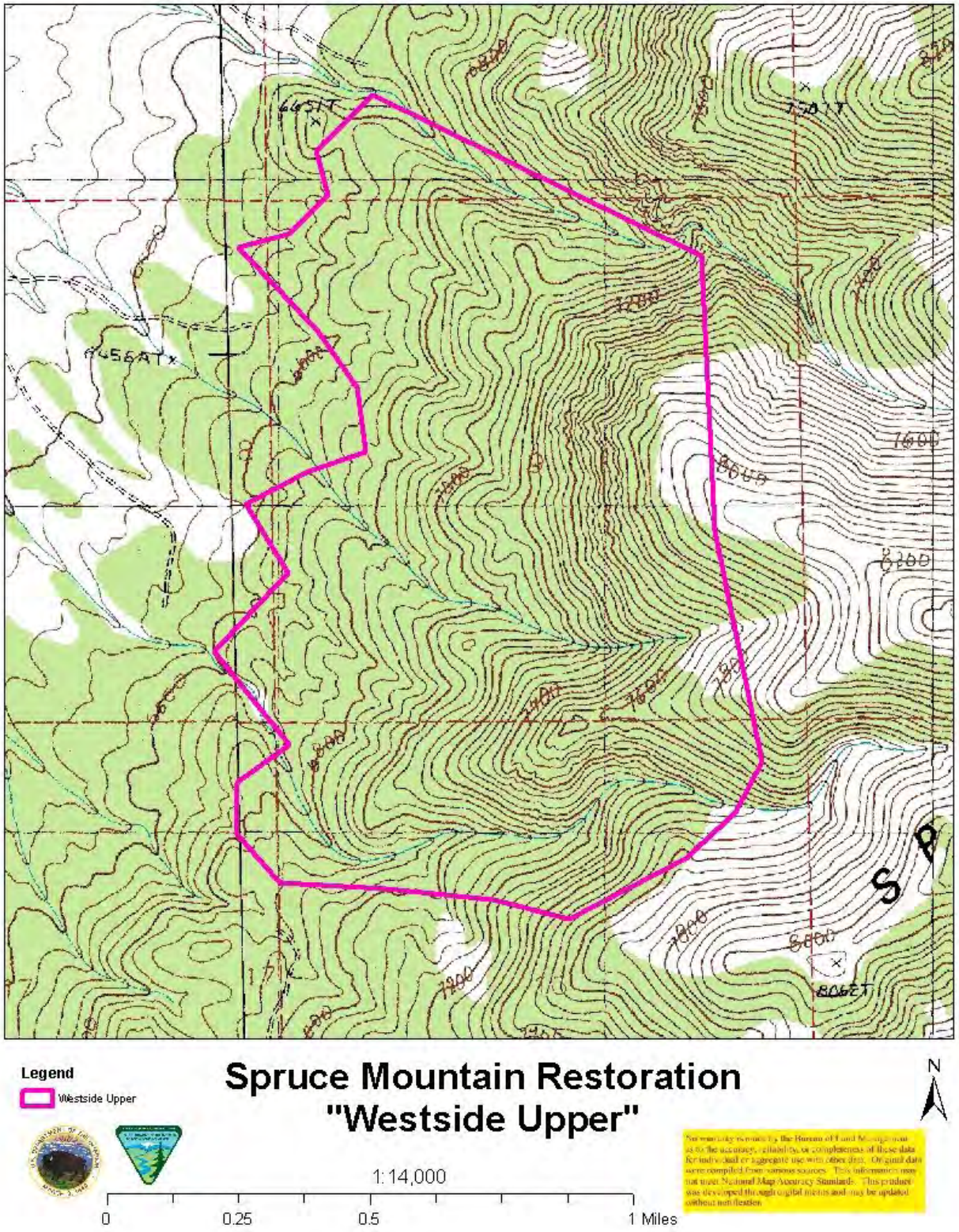

Figure A.15. Westside Upper

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Appendix B. Cumulative Effects Study Areas (CESA's)

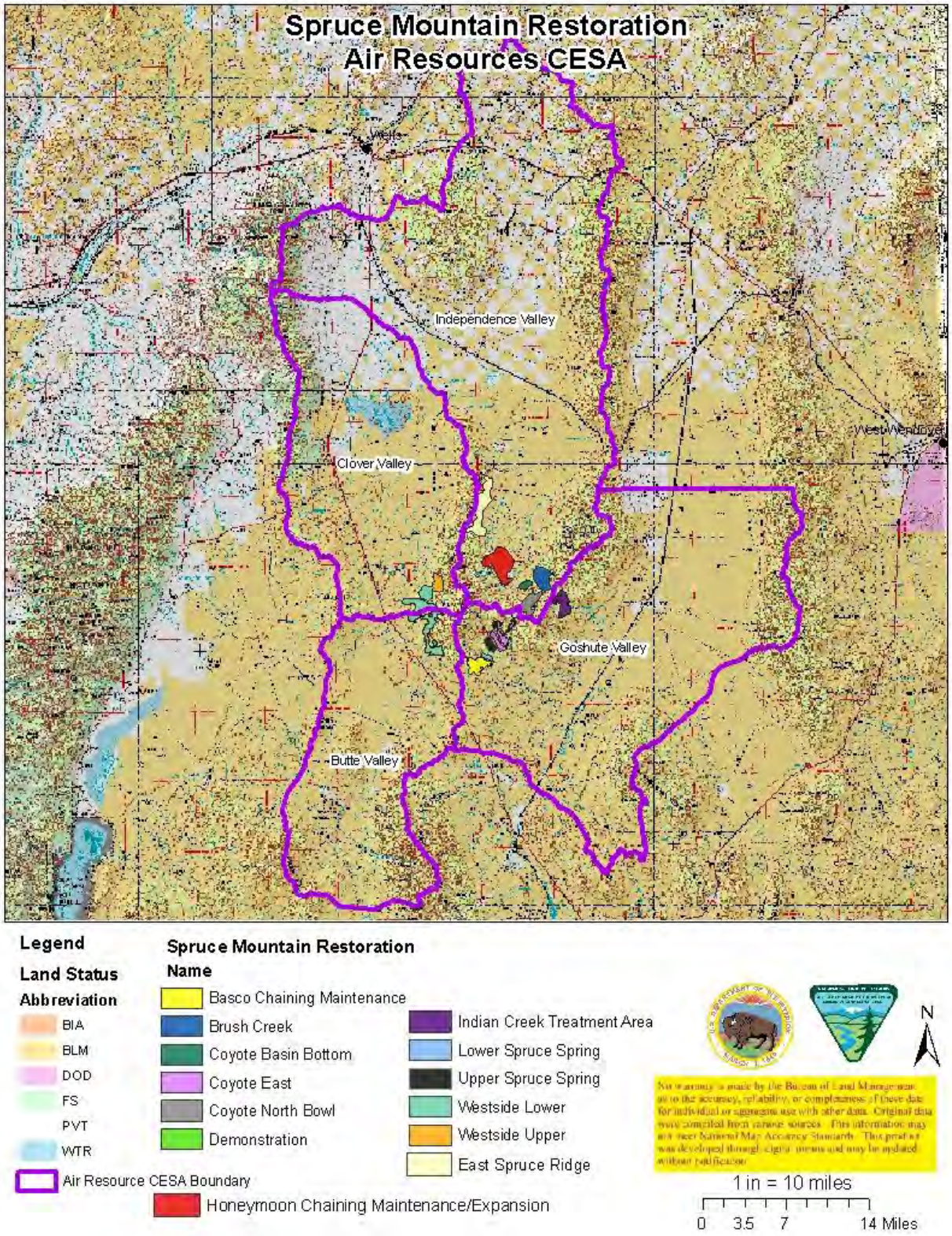

Figure B.1. Air Resources CESA

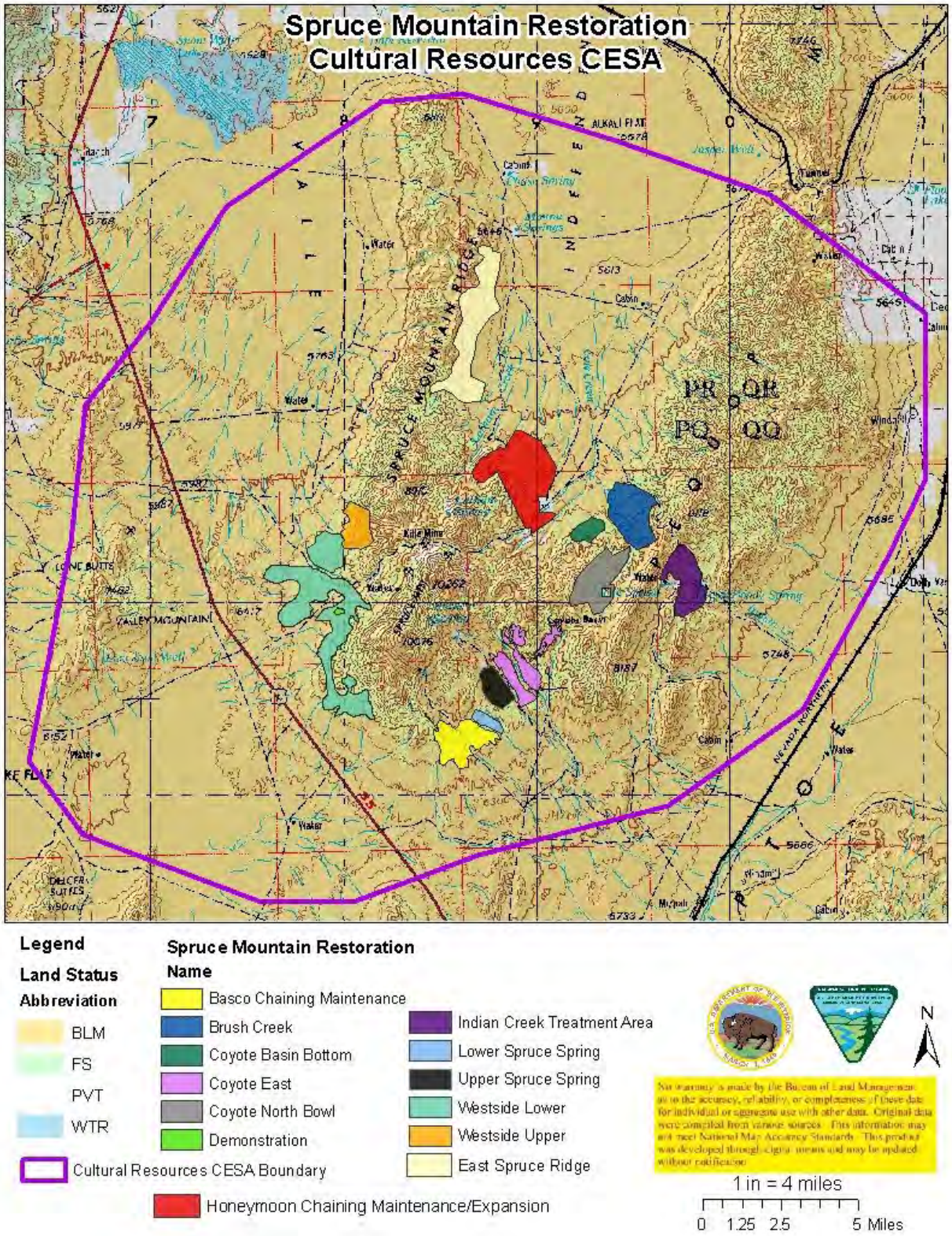

Figure B.2. Cultural Resources CESA

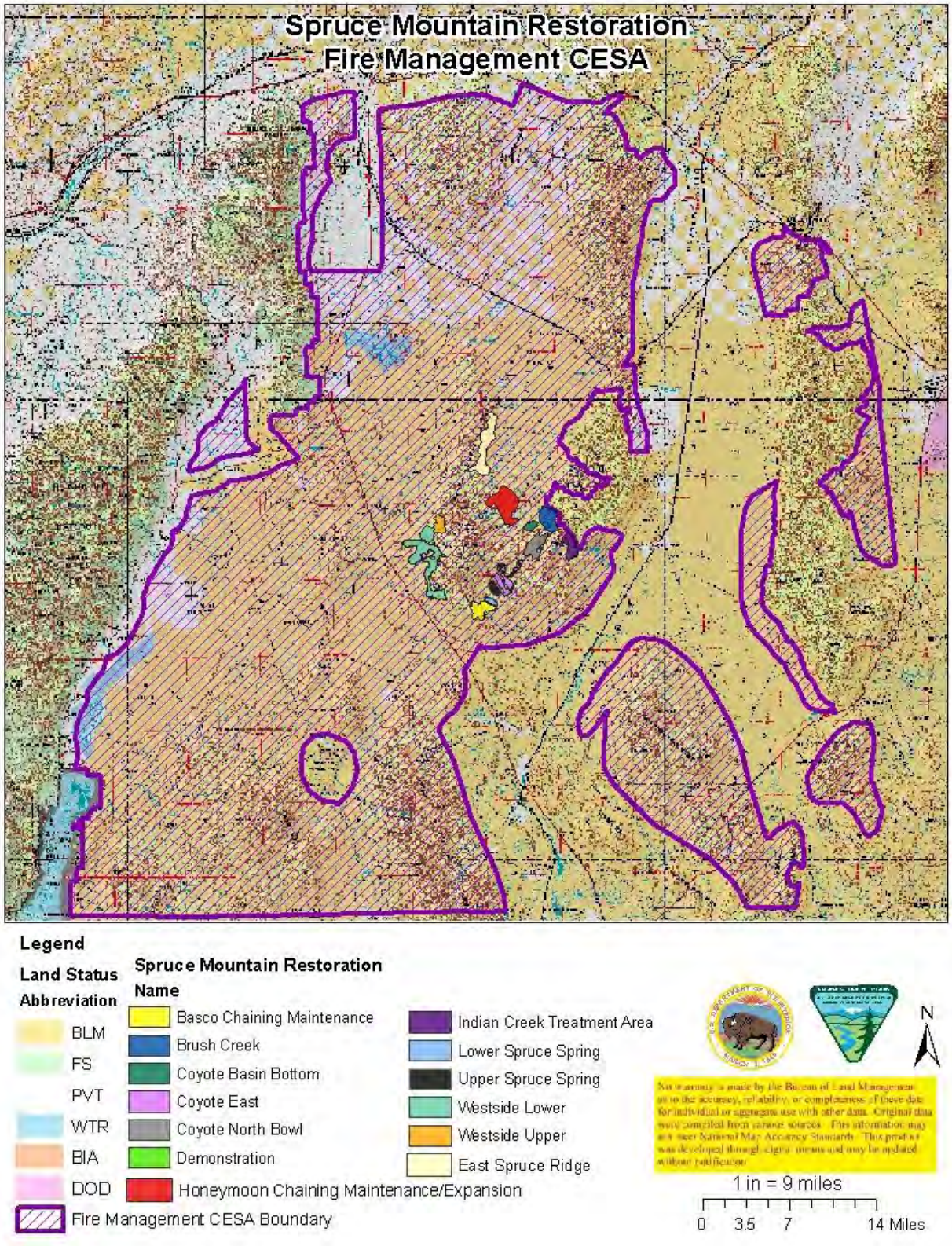

Figure B.3. Fire Management CESA

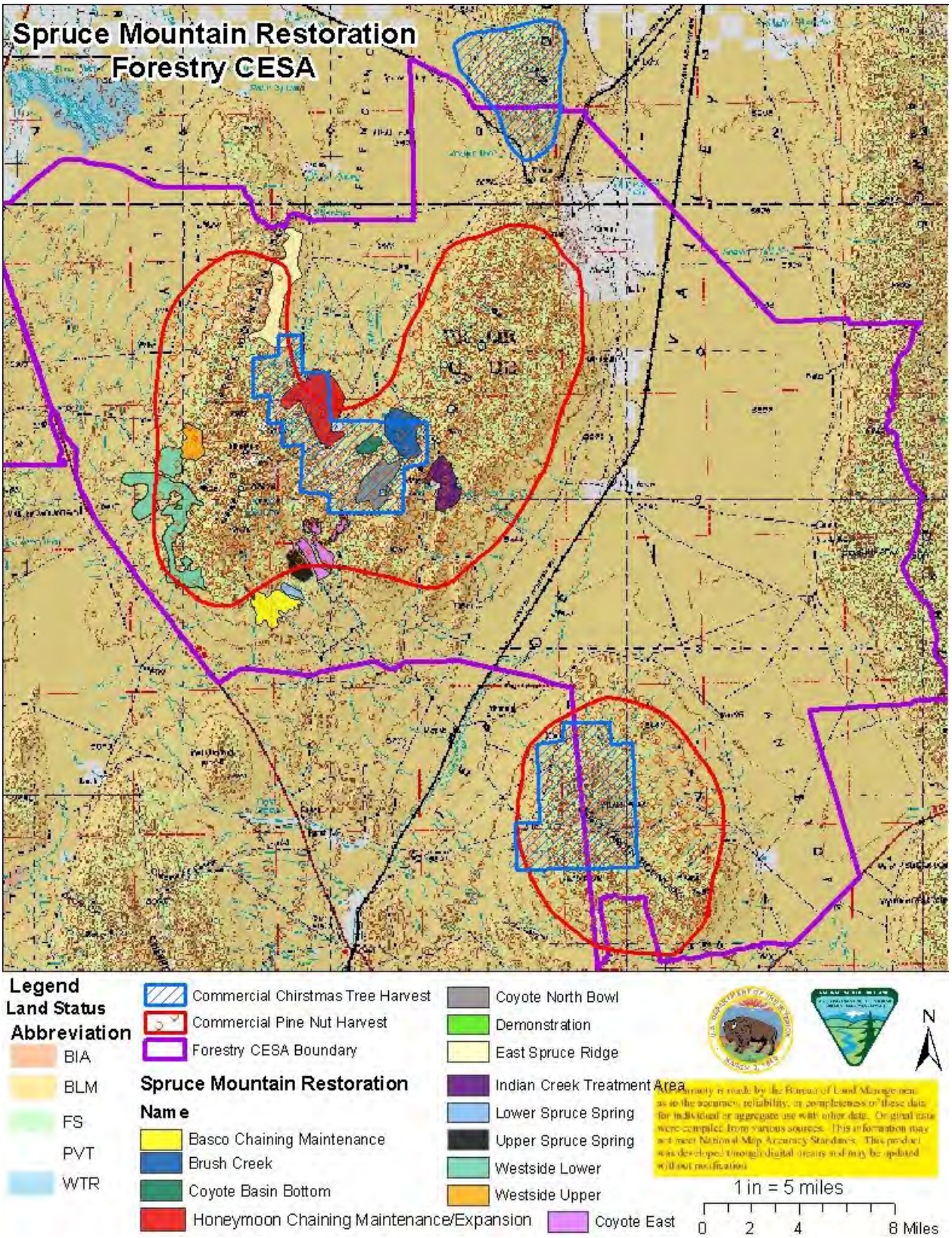

Figure B.4. Forestry CESA

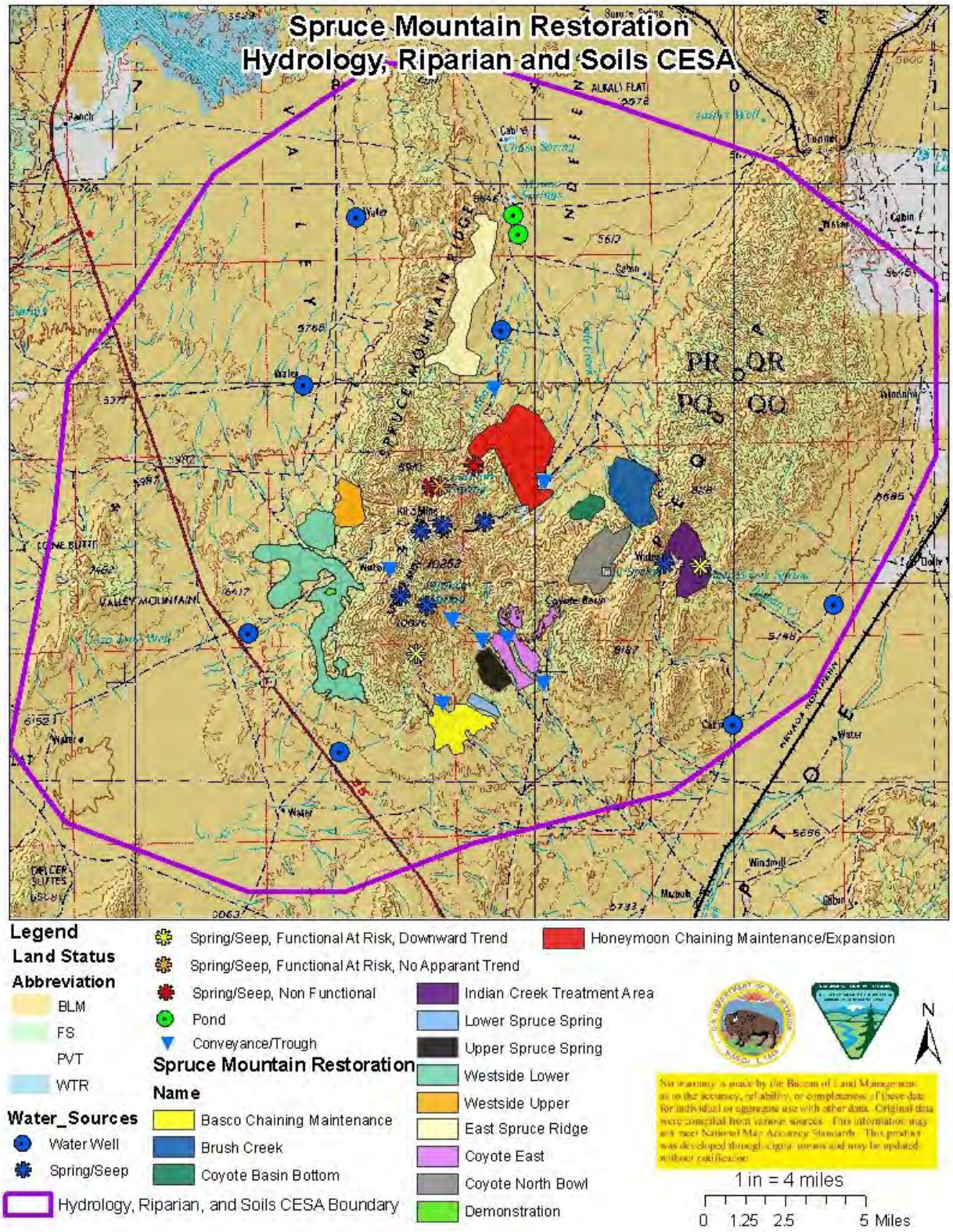

Figure B.5. Hydrology, Riparian and Soils CESA

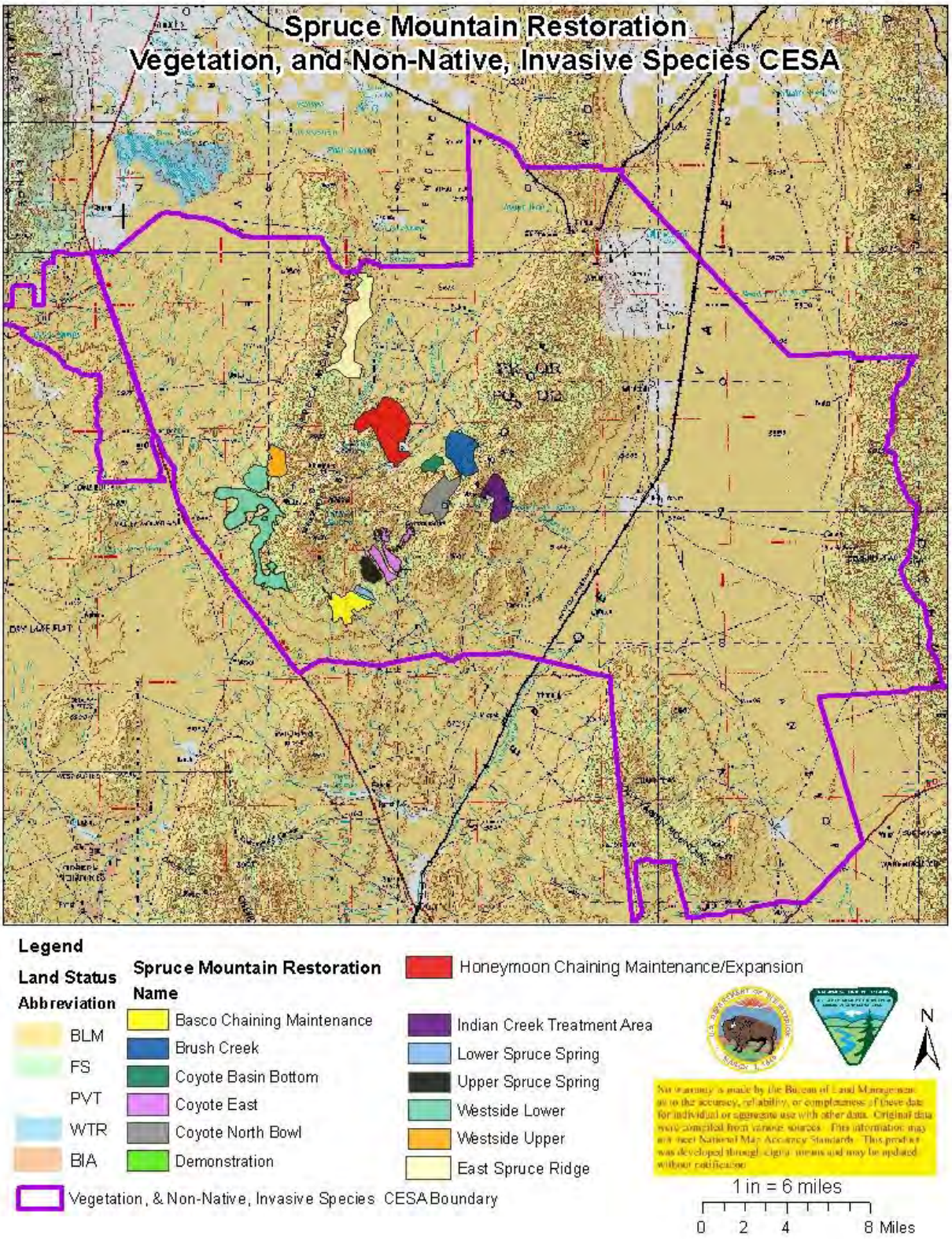

Figure B.6. Vegetation, and Non-Native, Invasive Species CESA

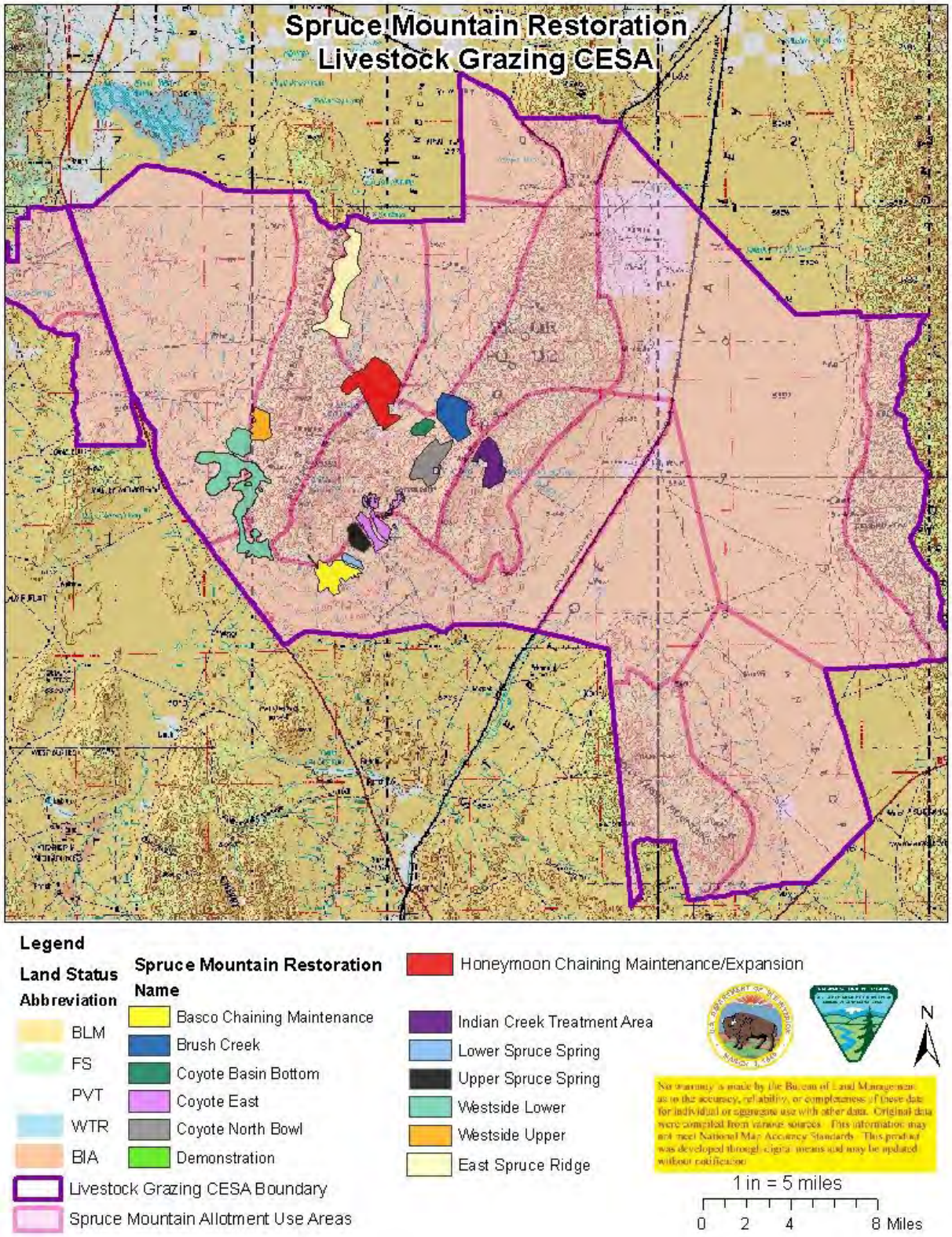

Figure B.7. Livestock Grazing Allotment

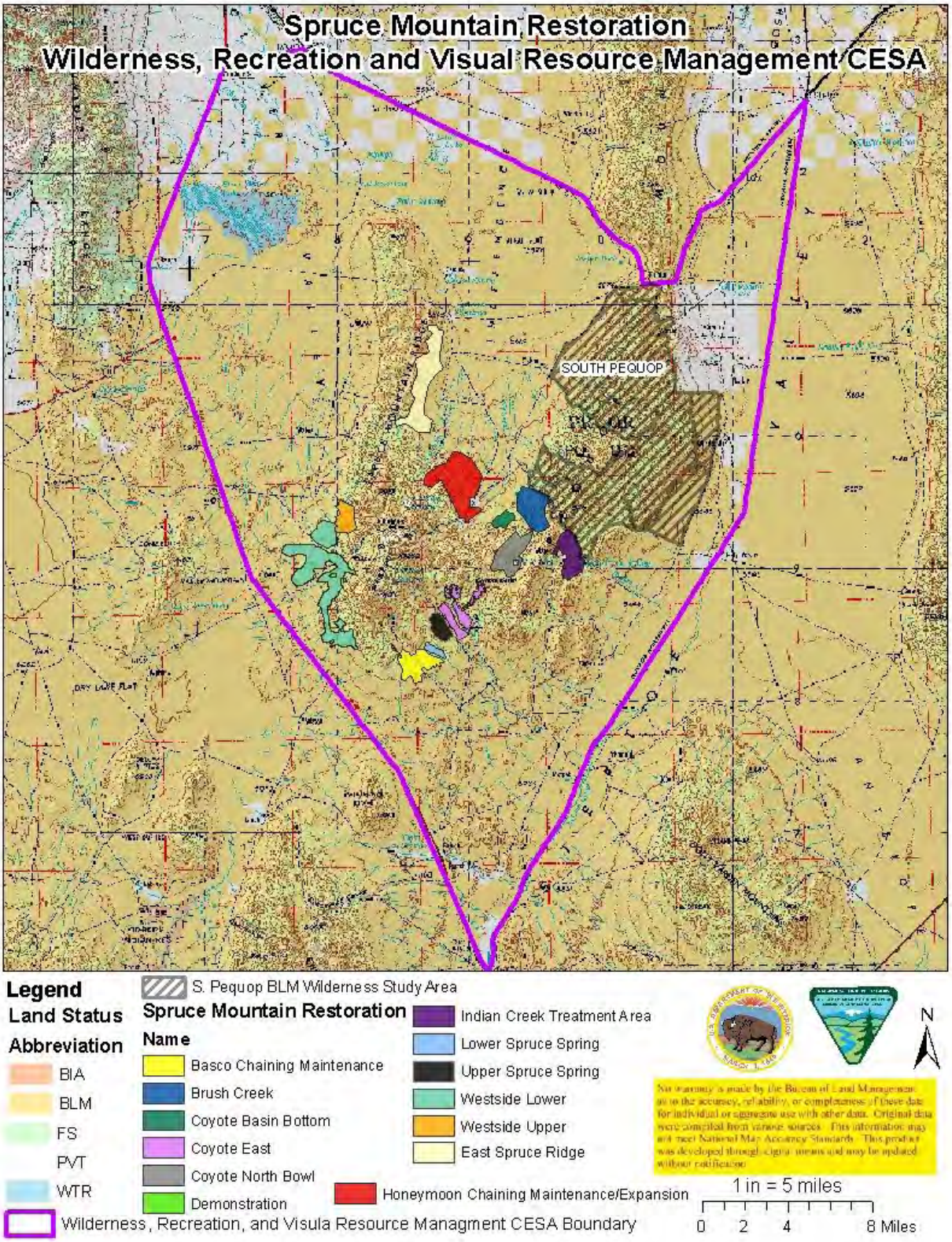

Figure B.8. Wilderness, Recreation and Visual Resource Management CESA

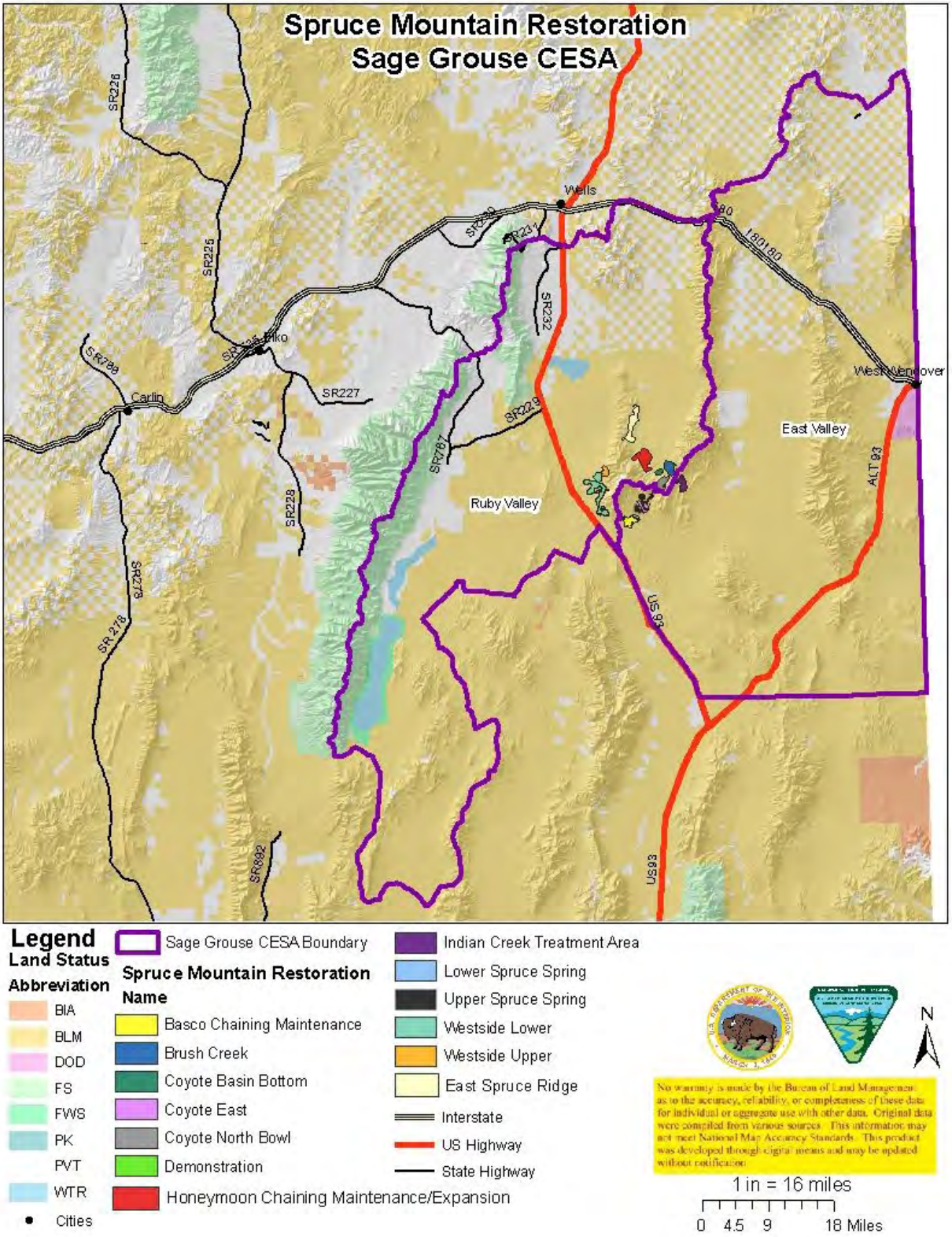

Figure B.9. Sage Grouse CESA

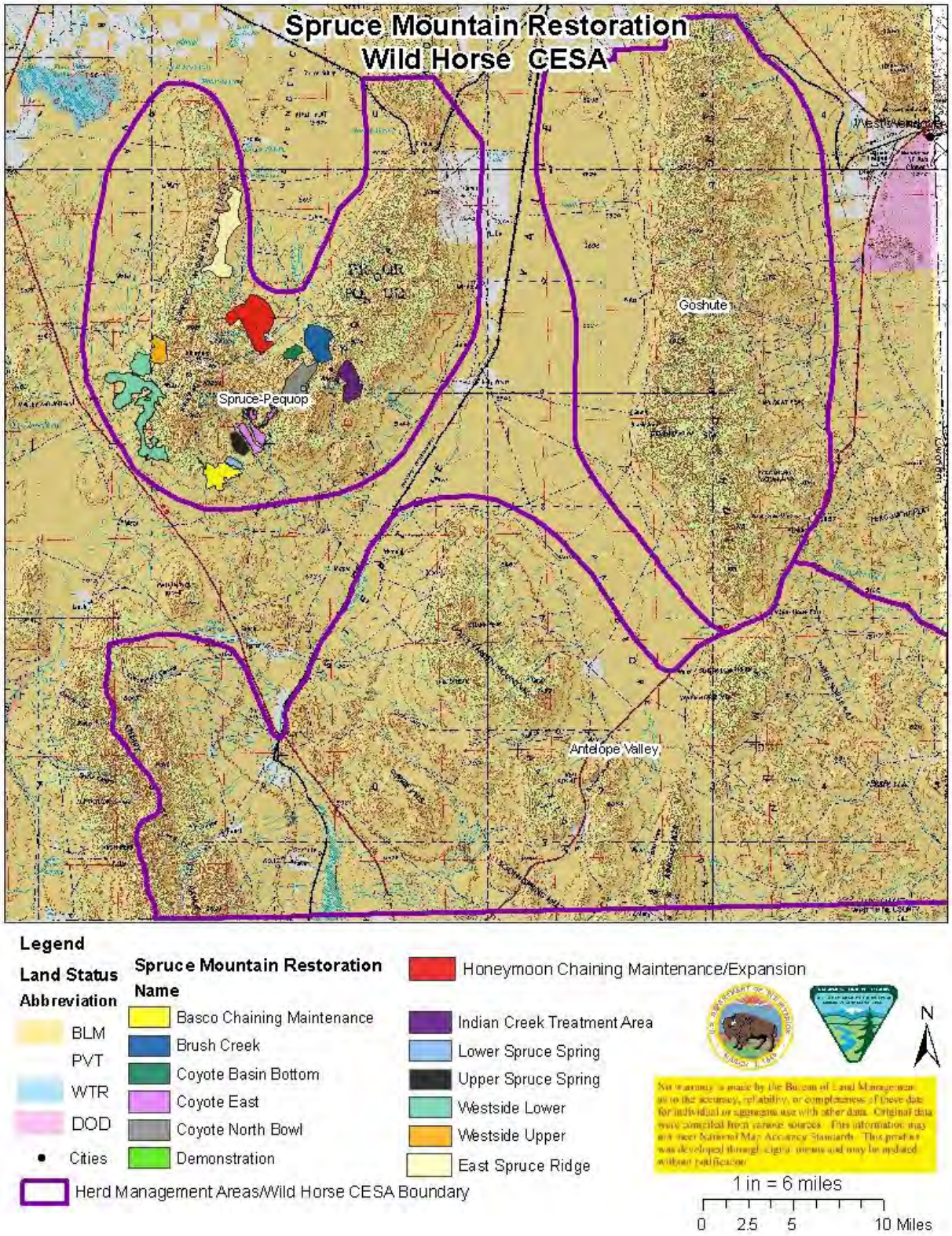

Figure B.10. Wild Horse CESA

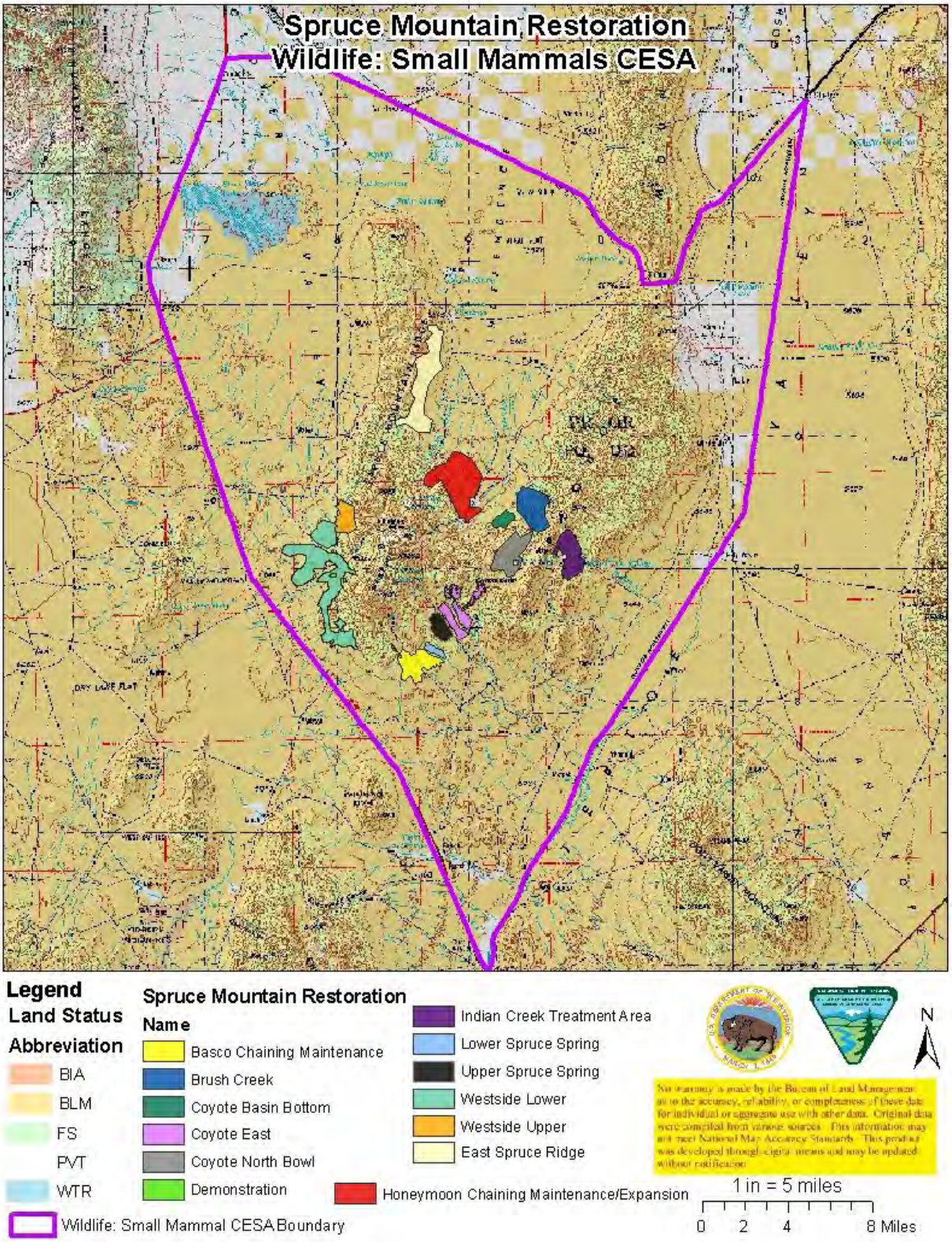

Figure B.11. Wildlife: Small Mammals CESA

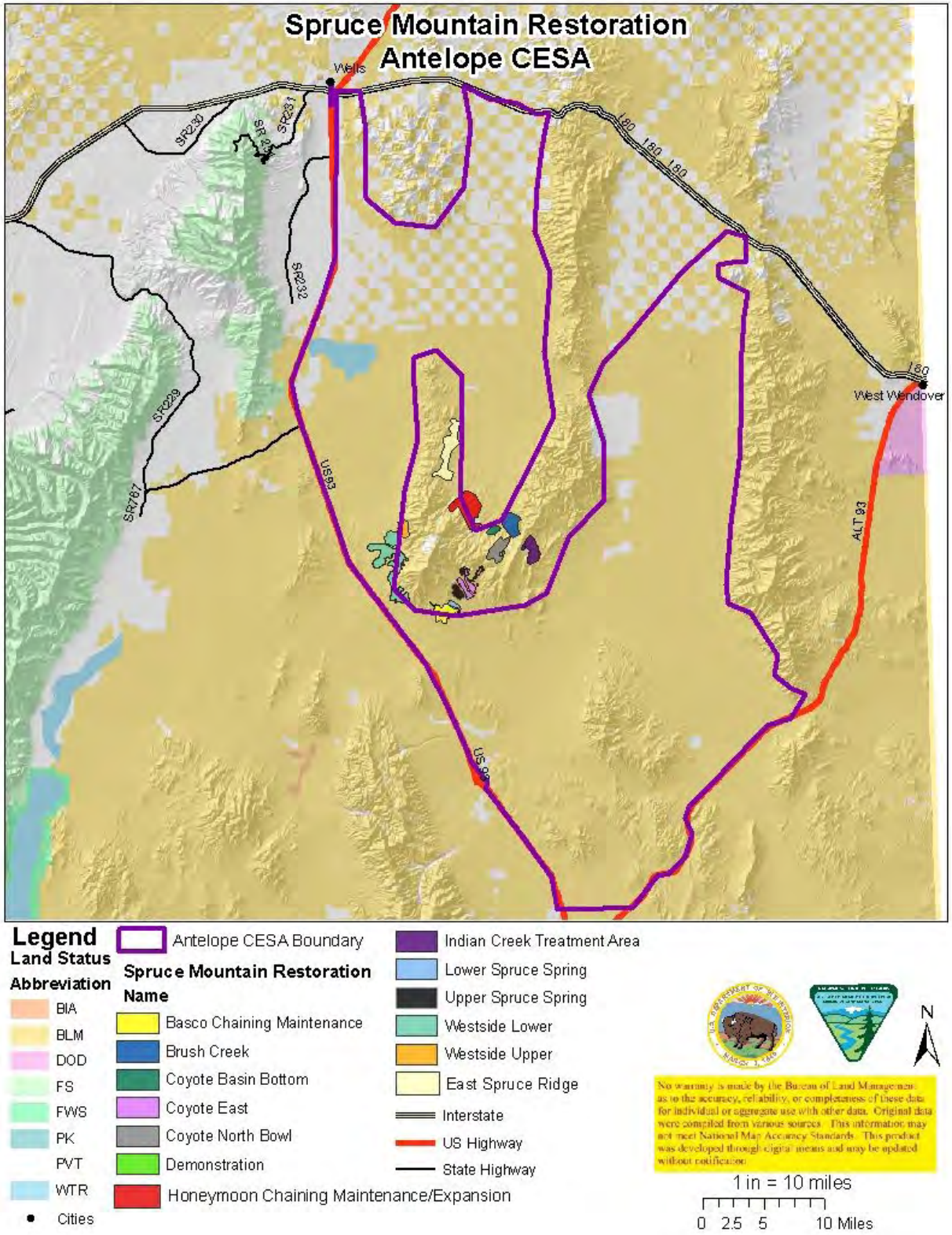

Figure B.12. Antelope CESA

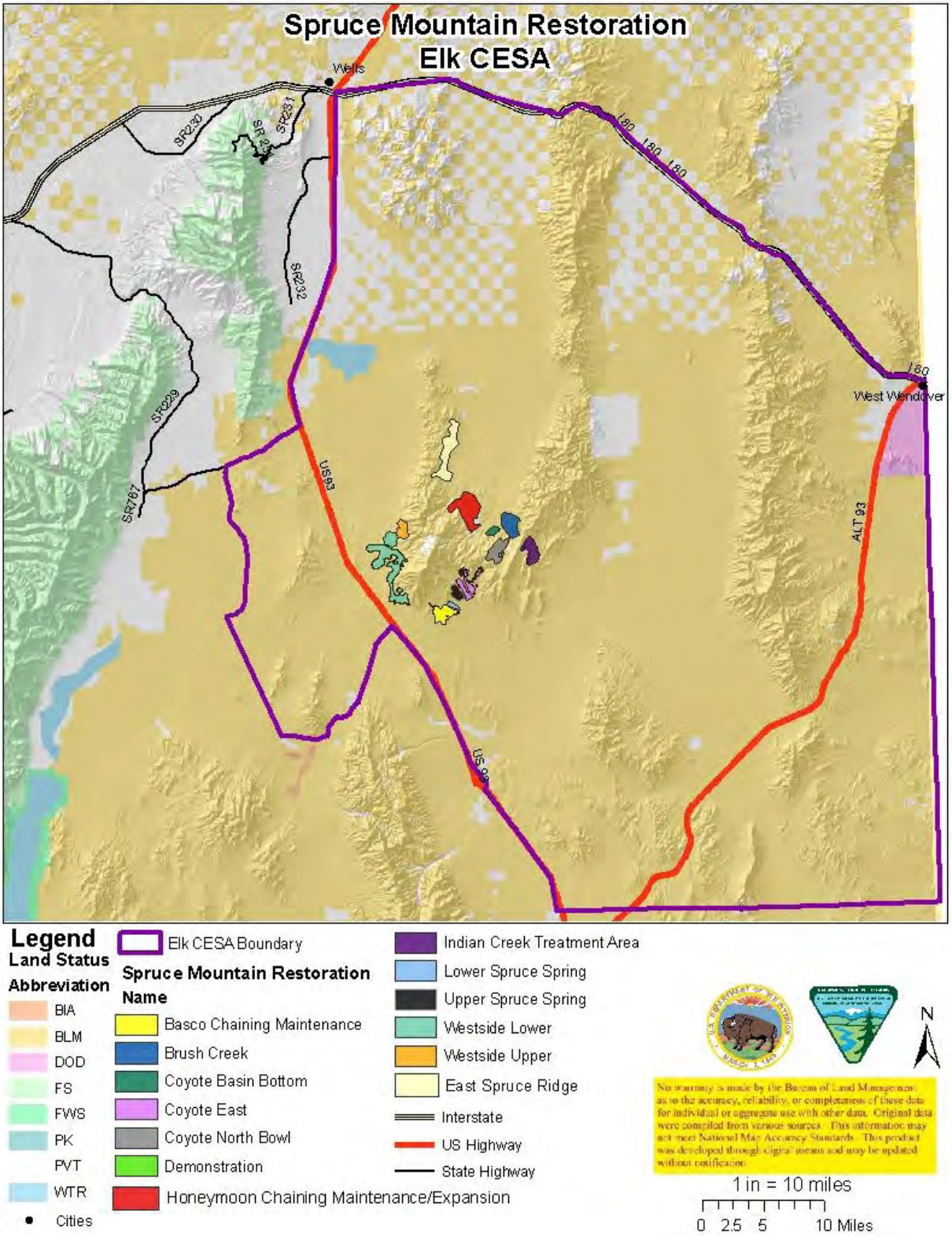

Figure B.13. Elk CESA

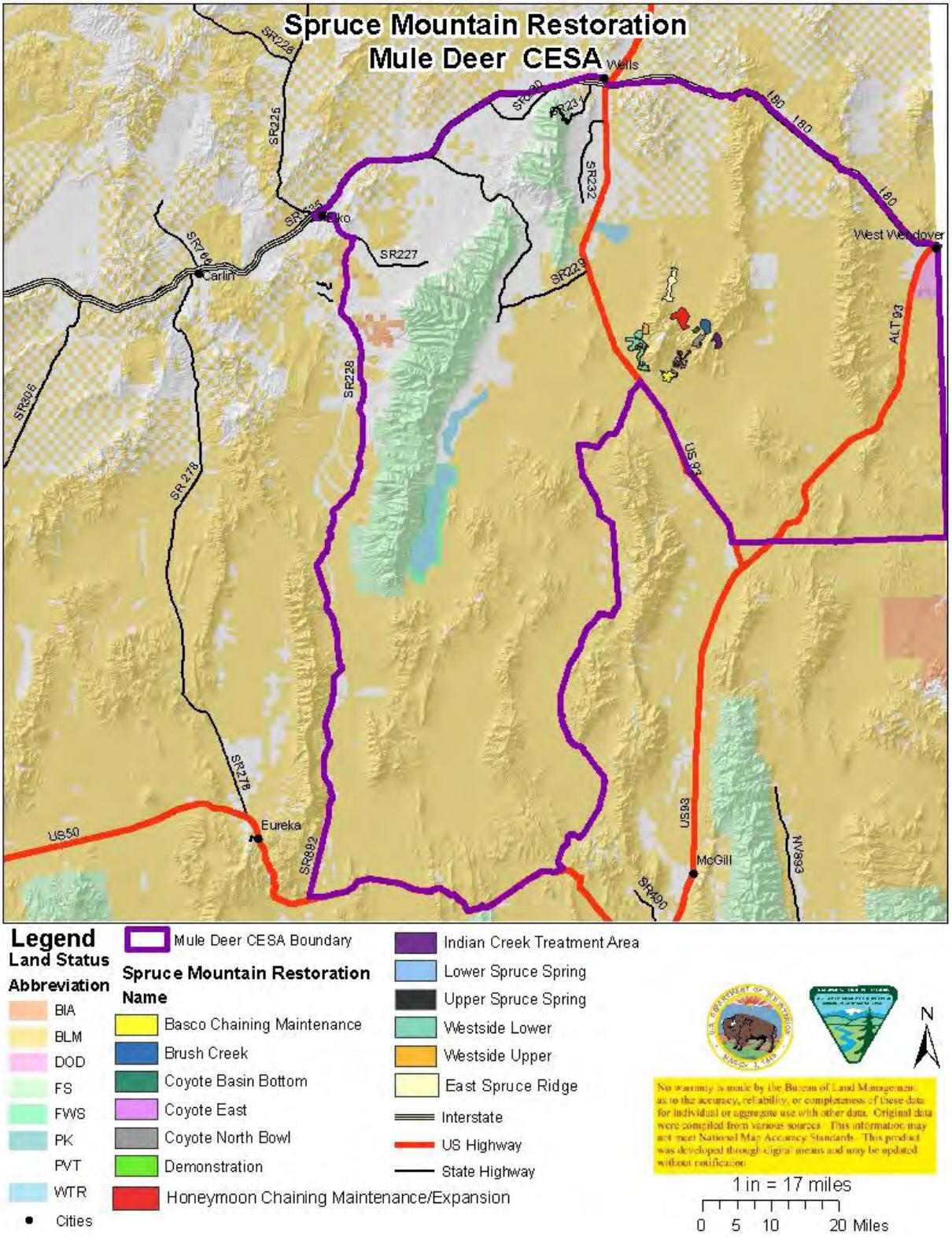

Figure B.14. Mule Deer CESA

Glossary of Terms

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