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U.S. Dept. of the Interior Bureau of Land Management
Safford Field Office

Navajo County Vegetation Management Environmental Assessment

DOI-BLM-AZ-G010-2014-0007-EA

Contents

1 Introduction 6
1.1 Background 6
1.2 Purpose and Need 6
1.3 Decision to be Made 7
1.4 Conformance with Land Use Plan 7
1.5 Relationship to Statutes, Regulations, Other Plans or Policies 8
1.6 Scoping & Issues 9
1.6.1 Issues Identified 9
2 Description of the Alternatives 9
2.1 Proposed Action 9
2.1.1 Treatment Methods 10
2.1.2 Monitoring and Treatment Evaluation 11
2.1.3 Treatment Maintenance 11
2.2 No Action Alternative 13
2.3 Alternatives Considered But Eliminated From Detailed Analysis 14
3 Affected Environment 14
3.1 Project Area Description 14
3.2 Elements/Resources of the Human Environment 14
3.3 Resources Brought Forward for Analysis 17
3.3.1 Vegetation 17
3.3.2 Socio-economics 24
3.3.3 Soils 25
3.3.4 Special Status Species 27
3.3.5 Wildlife 29
4 Environmental Consequences 31
4.1 Environmental Consequences of the Proposed Action 32
4.1.1 Vegetation 32
4.1.2 Socio-economics 32
4.1.3 Soils 32
4.1.4 Special Status Species 32
4.1.5 Wildlife 34
4.2 Environmental Consequences of the No Action Alternative 34
4.2.1 Vegetation 34

4.2.2 Socio-economics 34
4.2.3 Soils 35
4.2.4 Special Status Species 35
4.2.5 Wildlife 35
4.3 Cumulative Impacts 35
4.4 Past Actions 35
4.5 Present Actions 38
4.6 Vegetation 38
4.6.1 Proposed Action 38
4.6.2 No Action Alternative 38
4.7 Socio-economic 38
4.7.1 Proposed Action 38
4.7.2 No Action Alternative 39
4.8 Soils 39
4.8.1 Proposed Action 39
4.8.2 No Action Alternative 39
4.9 Special Status Species 39
4.9.1 Proposed Action 39
4.9.2 No Action Alternative 40
4.10 Wildlife 40
4.10.1 Proposed Action 40
4.10.2 No Action Alternative 40
5 Consultation and Coordination 40
5.1 List of Preparers and Contributors 40
5.2 Persons/Agencies Consulted 41
6 Appendix A: Project Design Features for Proposed Action 41
6.1 Best Management Practices 41
6.1.1 Access Routes (AR) 42
6.1.2 Bio-Mass Utilization (BM) 42
6.1.3 Cooperator Coordination (CC) 43
6.1.4 Cultural and Paleontological Resources (CR) 43
6.1.5 Erosion Control (EC) 44
6.1.6 Equipment Staging and Maintenance (ES) 45
6.1.7 Grazing Management (GM) 45

6.1.8 Invasive or Noxious Weeds (NW) 46
6.1.9 Rehabilitation Practices (RP) 46
6.1.10 Riparian/Wetland/Stream Courses (RW) 46
6.1.11 Wildlife Habitat (WH) 47
6.2 Conservation Measures 47
6.2.1 Wildland Fire Suppression (FS) 47
6.2.2 Fuels Treatments (FT) 48
6.2.3 Rehabilitation and Restoration (RR) 49
6.2.4 Riparian and Aquatic Habitats (RA) 50
6.2.5 Fuels Treatments (RA) 51
6.2.6 Bald Eagle (BE) 52
6.2.7 Golden Eagle (GE) 52
6.2.8 Ferruginous Hawk (FH) 52
6.2.9 Pinon Jay (PJ) 53
6.2.10 Pronghorn Antelope (PA) 53
7 Appendix B-Glossary of Terms 53
8 Appendix C-References Cited 58

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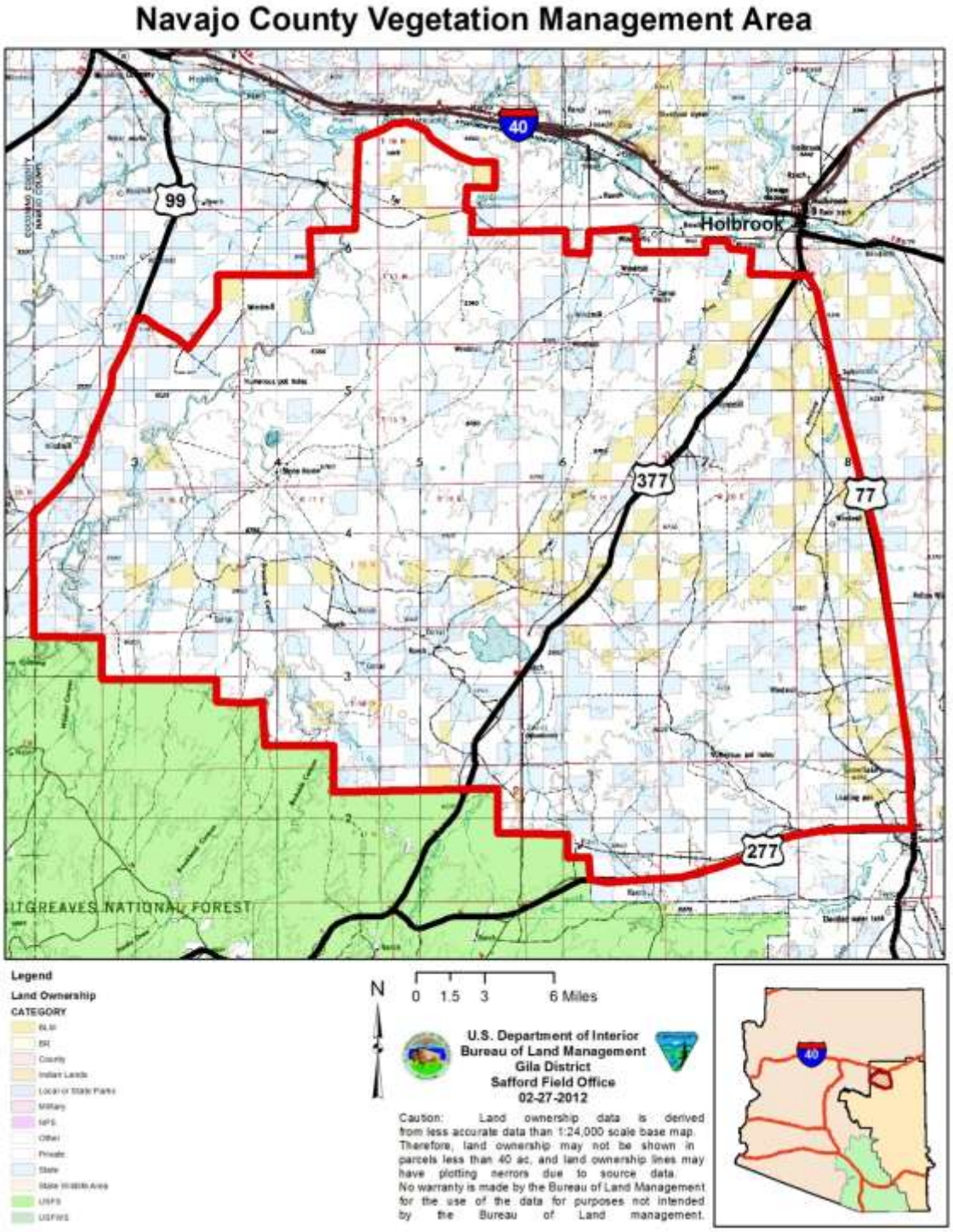
Location of Proposed Action
The proposed action will be implemented within multiple individual treatment units that are located the Navajo County Vegetation Management Area, south of Holbrook, AZ in Navajo County (see Map 1). All treatments proposed in this programmatic Environmental Assessment (EA) would occur on lands within the Safford Field Office boundary.



Map 1. Navajo County Vegetation Management Area.

1 Introduction

1.1 Background

Land ownership in the 524,530 acre Navajo County Vegetation Management Area is typified by checkerboard ownership of lands as shown above in Map 1. Bureau of Land Management (BLM) lands, Arizona State Land Department (SLD) and private lands alternate sections. Partnerships have been developed in order to manage these lands on a landscape scale. As a partner, BLM is working to facilitate vegetation management treatments on BLM managed lands, in coordination with the Natural Resource Conservation Service (NRCS), AZ State Land Department (ASLD), U.S Fish and Wildlife Service (USFWS), AZ Game and Fish Department (AZGFD), local businesses and Private land owners, among others. Vegetation treatments methods utilized to improve landscape health are derived from independent BLM assessments that involve vegetative inventory of existing fuels conditions.

A management action that has come to the forefront is the need for reduction of grassland encroaching woody species such as juniper, which is modifying historical vegetation communities across the landscape. The Navajo County Vegetation Management Environmental Assessment (EA) will analyze the potential effects of mechanical thinning treatments for reduction in density of One-seed (*Juniperus monosperma*) and Utah (*Juniperus osteosperma*) Juniper species on BLM managed land within the larger Navajo County Vegetation Management Area.

The introduction of large numbers of domestic livestock in the mid 1880's coupled with historic aggressive suppression of fire has affected the character and range of juniper and pinyon communities in the Colorado Plateau Grassland Major Land Resource Area (MLRA). Herbaceous cover was reduced until it could no longer compete with the woody species and the removal of fine fuels also reduced the site's ability to carry fires. These factors gave juniper species a distinct competitive advantage in the plant community and allowed them to greatly extend their range.

The current vegetative community does not meet BLM resource objectives for priority wildlife (pronghorn antelope), soil conditions, perennial grass cover, and juniper canopy cover. Mechanical thinning will be utilized to reduce juniper canopy cover to desired levels.

This programmatic Environmental Assessment will allow for consistent management of vegetation treatments throughout the Navajo County Vegetation Management Area.

1.2 Purpose and Need

The purpose for the proposed action is to implement an integrated vegetation management program that:

- Restores, maintains, and enhances grasslands and associated Pinyon/Juniper ecosystems.
- Utilizes vegetation treatment techniques that minimize ground disturbance.
- Provides for bio-mass utilization opportunities.

The need for the proposed action is to meet the objectives outlined in the National Fire Plan's National Cohesive Wildland Fire Management Strategy, Phoenix District Resource Management Plan (RMP), and the Arizona Statewide Land Use Plan Amendment for Fire, Fuels, and Air Quality. These objectives include restoring resilient landscapes within their natural range of variation in plant cover, composition, structure, and function. Currently 79% of the vegetation within the Navajo County Vegetation Management Area is currently not within reference conditions.

1.3 Decision to be Made

The BLM will decide whether or not to authorize the removal of juniper (One-Seed Juniper, *Juniperus monosperma*; Utah Juniper, *Juniperus osteosperma*) species on approximately 48,532 acres of BLM land within the Navajo County Vegetation Management Area.

1.4 Conformance with Land Use Plan

The proposed action in Chapter 2 is in conformance with the Phoenix District Resource Management Plan and Final Environmental Impact Statement, approved in 1991, as amended. This proposed action has been reviewed to determine if it conforms to the land use plan terms and conditions as required by 43 CFR 1610.5, BLM MS 1617.3.

Arizona Statewide Land Use Plan Amendment for Fire, Fuels, and Air Quality Management and Record of Decision (LUPA), approved in 2004. This proposed action has been reviewed to determine if it conforms to the land use plan terms and conditions as required by 43 CFR 1610.5, BLM MS 1617.3.

The proposed action is consistent with the LUPA Land Use Allocation 1-Wildland Fire Use: Areas suitable for wildland fire use for resource management benefit:

- Areas where wildland fire is desired, and there are few or no constraints for its use. Where conditions are suitable, unplanned and planned wildfire may be used to achieve desired objectives, such as improve vegetation, wildlife habitat or watershed conditions, maintain non-hazardous levels of fuels, reduce the hazardous effects of unplanned wildland fires and meet resource objectives. Where fuel loading is high but conditions are not initially suitable for wildland fire, fuel loads are reduced by mechanical, chemical or biological means to reduce hazardous fuels levels and meet resource objectives (includes WUI areas), (LUPA, pg. 4).

The proposed action is consistent with the LUPA Desired Future Conditions:

- Each vegetation community is maintained within its natural range of variation in plant composition, structure, and function, and fuels loads are maintained below levels that are considered to be hazardous, (LUPA, pg. 4)
- Plains and Great Basin Grasslands-The Desired Future Conditions are for a predominance of perennial grass cover, reduced cover of annual grasses, and for fire to naturally inhibit the invasion of woody shrubs such as rabbitbrush, snakeweed, and big sage brush, (LUPA , pg. 6).

The proposed action is consistent with the LUPA Management Actions:

- In areas suitable for fire where fuel loading is high, BLM will utilize biological, mechanical or chemical treatments, and some prescribed fire to maintain non-hazardous levels of fuels and meet resource objectives, (LUPA, pg. 9).
- For all fire management activities (wildfire suppression, appropriately managed wildfire use, prescribed fire, and mechanical, chemical, and biological vegetation treatments), Conservation Measures will be implemented as part of the Proposed Action to provide statewide consistency in reducing the effects of fire management actions on federally threatened, endangered, proposed, and candidate ("Federally protected") species, (LUPA, pg.9)

1.5 Relationship to Statutes, Regulations, Other Plans or Policies

This EA has been prepared in accordance with the requirements of NEPA and any additional Federal, State, and local statutes that may be relevant to the proposed action, such as those cited below.

National Fire Plan, National Cohesive Wildland Fire Management Strategy Guiding Principle Priorities, 2011:

- Creating Fire-Adapted Communities-Priority will be given to projects that protect values-at-risk and achieve fire management objectives identified in applicable management plans (i.e., community wildfire protection plans (CWPP), land/fire management plans, and local risk assessments, including projects which specifically:
    - Provide economic opportunities for communities, tribal members, or youth
    - Perform work through the use of a contractor or cooperator
    - Provide bio-mass potential
- Restore and Maintain Resilient Landscapes-Priority will be given to projects that move landscapes toward desired condition or projects that maintain desired conditions, including those which specifically:
    - Protect special interest species
    - Establish and restore resilient landscapes
    - Protect or restore treasured landscapes
    - Provide collaboration opportunities
    - Include joint (intra-bureau) labor and funding
    - Include contributed (non-bureau) labor and funding
    - Maintain previous investments

Central Navajo County Community Wildfire Protection Plan, 2008
Healthy Forest Restoration Act, 2003
Memorandum of Understanding on Policy Principles for Woody Bio-mass Utilization for Restoration and Fuels Treatments on Forests, Woodlands, and Rangelands, 2003
Gila District Fire Management Plan, 2013
Section 106 National Historic Preservation Act, 1966
Clean Water Act, 33 U.S.C. §1251 et seq., 1972
Navajo County Five Year Strategic Plan Fiscal Year 2013-2017

1.6 Scoping & Issues

Identification of issues for this assessment was accomplished by considering the resources that could be affected by implementation of one or more of the alternatives. Issues were identified by the Safford Field Office interdisciplinary team and interested publics. The scoping process was conducted internally beginning in 2011, while the public scoping completed in March 2013.

1.6.1 Issues Identified

- How would vegetation be affected, during and after treatment activity?
- How would grazing allotments be affected by vegetation treatments?
- How would soils be impacted by the mechanical treatments and what would the potential for increased erosion be?
- What kind of disturbance could occur to the threatened and endangered plant species Round Leaf Broom and Peebles Cactus during treatment activity?
- How would the threatened and endangered Little Colorado Spinedace habitat be impacted?
- What are the effects to wildlife, including migratory birds and sensitive species, during and after treatment activity?
- What socioeconomic impacts will the treatments have?

2 Description of the Alternatives

This EA focuses on the proposed action and no action alternatives. The no action alternative is considered and analyzed to provide a baseline for comparing the impacts of the proposed action. The alternatives considered but eliminated from further analysis are described in Section 2.3, along with the rationale for not further considering this alternative.

2.1 Proposed Action

The proposed vegetation management treatments consist of the removal of juniper (One-Seed Juniper, *Juniperus monosperma;* Utah Juniper, *Juniperus osteosperma*) species on approximately 48,532 acres of BLM land in Navajo County, identified as part of the Navajo County Vegetation Management Area. The resulting land aspect will be open grassland with few isolated large, individual trees (if present) and ambiguously shaped pockets of untreated juniper to provide cover for wildlife species. The following table shows the desired post treatment perennial grass, shrub, and juniper percent cover targets for the four target ecological sites.

Table 1. Post Treatment Objectives (Trees per Acre)

Ecological Site	Species Group	HCPC (lb/ac)	Percent cover (%)	Trees Per Acre (t/ac)
Shallow Loamy	Perennial Grass	250-395	20	
	Juniper	0-20	2	0-3
	Shrub	65-98	10	
Sandstone Upland	Perennial Grass	250-350	17	
	Juniper	25-40	5	0-3

Ecological Site	Species Group	HCPC (lb/ac)	Percent cover (%)	Trees Per Acre (t/ac)
	Shrub	25-50	3	
Loamy Upland	Perennial Grass	300-450	30	
	Juniper	5-20	1	0-3
	Shrub	35-65	5	
Sandy Loam Upland	Perennial Grass	320-580	40	
	Juniper	0-20	1	0-3
	Shrub	40-130	15	
Loamy Bottom	Perennial Grass	350-500	30	
	Juniper	0	0	0
	Shrub	50-100	25	

The proposed action will be implemented from October 1st through June 30th by BLM owned equipment and personnel, service contract, stewardship contract, permit, or co-operator agreement.

2.1.1 Treatment Methods

The types of treatment methods and techniques that will be utilized to achieve the desired resource objectives include:

2.1.1.1 Mechanical Thinning- Chainsaw

- Use of chainsaws to thin juniper
  - Trees will be cut at or near ground level.
  - Stumps will be left no higher than four inches above ground level, measured at on the uphill side of the stump.
- Use of chainsaws to lop and scatter slash
  - Felled trees will be cut or lopped into pieces and scattered so that no part of the residual slash is higher than two feet above ground level.

2.1.1.2 Mechanical Thinning-Brush Rake

- Use of heavy equipment with brush rake attachments to thin juniper.
  - Brush rake will be utilized to thin juniper, removing tree at or near ground level, without pushing rake into the ground.
  - Stumps will be left no higher than four inches above ground level, measured on the uphill side of the stump.
  - Slash will be mulched and hauled off site.

2.1.1.3 Mechanical Thinning-Mastication

- Use of heavy equipment with mastication attachments to thin juniper.
  - Trees will be masticated to a point at or near ground level
  - Stumps will be left no higher than four inches above ground level, measured on the uphill side of the stump.
- Use of heavy equipment with mastication attachments to mulch slash generated during thinning process to provide ground cover in areas of low perennial grass coverage
  - Trees will be masticated to a point at or near ground level.

- Stumps will be left no higher than four inches above ground level, measured on the uphill side of the stump.
- Remaining slash will be masticated so no part of the residual slash is higher than 4 inches above ground level.

2.1.1.4 Bio-mass Utilization

- Slash generated during the thinning process, may be utilized in the following ways:
  - Mulched or lopped and scattered to provide ground cover in areas of low perennial grass cover.
  - Piled to provide for wildlife habitat.
  - Removed via wood permit, agreement, or stewardship contract by local business or public as firewood, posts, bio-mass for co-gen plants, millwood, or any other applicable small diameter wood product.

During implementation of the proposed action, a number of Project Design Features will be utilized to reduce potential impacts to the environment. The Best Management Practices and Conservation Measures that make up the Project Design Features are listed in Chapter 5, Appendix A, sections 5.1 and 5.2.

2.1.2 Monitoring and Treatment Evaluation

Monitoring transects will be established for each treatment unit utilizing the Line Intercept Method. The monitoring transects will record juniper canopy cover and perennial grass cover. Photo points will be established at each transect.

Monitoring will be completed pre-treatment to establish current conditions for juniper and grass species within each treatment unit. As each treatment unit is identified, a pre-treatment monitoring schedule will be established.

Monitoring will also be completed one and three years' post-treatment to compare pre-treatment conditions to post treatment conditions and compare them to the desired future conditions established for each treatment unit.

A long term monitoring schedule will be established by an interdisciplinary team and implemented to periodically monitoring conditions within each treatment unit.

2.1.3 Treatment Maintenance

Long term maintenance of the treatments units will be completed via additional mechanical treatments as determined by the monitoring protocols to maintain the Desired Future Conditions per ecological site.

Picture 1. Area on private land that was treated with mechanical mastication with the slash masticated during the spring of 2011. Previous juniper density was 20+ trees per acre.

Picture 2**.** Area on state land within the proposed action area that was treated in the spring of 2010.

Picture 3. Untreated BLM parcel within the proposed action area.

Many areas of private and ASLD land adjacent to BLM land within the Navajo County Vegetation Management Area have had recent juniper thinning treatments completed. In many cases the BLM land parcels are the only areas that have not been treated to date. Pictures 1 and 2 above show treatments utilizing the same techniques as described in the proposed action on ASLD land adjacent to BLM. Picture 3 shows an area of untreated parcel of BLM land.

Future maintenance treatments may also include prescribed fire treatments once the perennial grasses have had a chance to recover to desired levels. A separate environmental analysis would be completed to analyze any future potential prescribed fire treatments. Those future prescribed fire treatments will have the potential to maintain and enhance the native grassland habitats historically found within the Navajo County Vegetation Management Area, as well as aid in re-establishing a more natural fire regime.

2.2 No Action Alternative

Under the No Action Alternative, little to no coordinated actions will be implemented to reduce juniper densities on BLM-managed lands within the Navajo County Vegetation Management Area.

Isolated vegetation management treatments may occur individually on BLM owned land within the management area, but potentially without common resource objectives, the ability to coincide with vegetation treatments on adjacent land, and each individual treatment would be subject to NEPA analysis. Additionally, no useable bio-mass would be generated, nor would permits be issued for bio-mass utilization. The BLM, however,

would continue to work with partners and permittees to monitor and evaluate wildlife habitat, vegetation changes, soil erosion and rangeland health.

2.3 Alternatives Considered But Eliminated From Detailed Analysis

The use of prescribed fire to reduce juniper canopy cover was discussed; however, this alternative would not respond to the purpose and need and could not be practically implemented effectively for the following reasons. The relatively low perennial grass cover (primary carrier of flaming front) in areas of dense juniper canopy coverage does not allow for consistent burn patterns. The prescribed fire treatments would have to create canopy or crown fire behavior (high wind, low relative humidity, high temperatures) in order to achieve reduction of the juniper canopy coverage. The fire behavior characteristics needed to achieve the desired future conditions would be difficult to control (high to extreme fire behavior characteristics), and multiple treatments would need to be implemented. Finally, fire behavior characteristics would promote high severity burning conditions with mixed to low severity conditions as a very small percentage. This would not allow for a mosaic burn pattern, which would promote habitat diversity.

No other alternatives were identified during scoping that would respond to the purpose and need and that could be practically implemented in the Navajo County Vegetation Management Area.

3 Affected Environment

The purpose of this chapter is to describe the existing environment potentially affected by the alternatives. This chapter presents the potentially affected existing environment (i.e., the physical, biological, social, and economic values and resources), as identified in Table 2 and as presented in Section 3.2 of this assessment. This chapter provides the baseline for comparison of impacts/consequences described in Chapter 4.

3.1 Project Area Description

The Navajo County Vegetation Management Area is located in Central Navajo County. It is bordered to the north by Interstate 40, on the east by Arizona State Highway 77, to the south by Arizona State Highway 277 and the Apache-Sitgreaves National Forest, and to the west by the Navajo County Line and Arizona State Highway 99.

Land ownership in the 524,530 acre Navajo County Vegetation Management Area is characterized by a checkerboard of Bureau of Land Management (BLM) lands (48,532 acres), Arizona State Land Department (ASLD) (102,647 acres) and private lands (373,351 acres) alternate sections.

3.2 Elements/Resources of the Human Environment

The BLM is required to consider many authorities when evaluating a Federal action. Those elements of the human environment that are subject to the requirements specified in statutes, regulations, or executive orders, and must be considered in all EAs, have been considered by BLM resource specialists to determine whether they would be potentially affected by the proposed action. These elements are identified in Table 2, along with the

rationale for the determination on potential effects. If any element was determined to be potentially impacted, it was carried forward for detailed analysis in this EA; if an element is not present or would not be affected, it was not carried forward for analysis. Table 2 also contains other resources/concerns that have been considered in this EA. As with the elements of the human environment, if these resources were determined to be potentially affected, they were carried forward for detailed analysis in this document.

Table 2. Elements and Resources of the Human Environment.

Resource	Determination*	Affected Environment (Rationale for Determination)
* NP = Not present in the area that will be impacted by the proposed action. NI = Present, but not affected to a degree that would mean detailed analysis is required. PI = Present with potential for impact; analyzed in detail in the EA.		
Areas of Critical Environmental Concern	NP	The proposed action would not affect this element as no ACECs are within the Navajo County Vegetation Management Area; therefore, there would be no direct, indirect or cumulative impacts to this critical element.
Air Quality	NI	There would be a small amount of dust entering the air during project implementation. Also dust would enter the air during maintenance activities. Implementation of the proposed action will occur as small treatment units on an irregular basis spread out over many years. This will not produce enough fugitive dust to cause a shift in air quality; the impacts would be temporary and isolated to the treatment units.
Cultural Resources	NI	Prior to treatment implementation, a class III cultural resource inventory will be conducted to identify any cultural or historical sites. Project design features CR-01 thru CR-11 will be utilized to prevent impacting cultural resource values located in the treatment units.
Environmental Justice	NI	The action area encompasses unpopulated public lands. The communities of Snowflake, Holbrook Heber and Winslow are on the edge of the project area and are the most likely to be impacted. Biomass production from public lands would add in a minor way to the wood products economy of the local communities Biomass production from public lands could provide products for large or small businesses and may encourage small business startups. These impacts are expected to impact minority and economic classes in the local communities equally. There is no expected discernible or disproportionate direct or indirect impacts on children or minority and low income populations as defined in Executive Order 12898 (Environment Justice) and Executive Order 13045 (Safety Risks to Children).
Farmlands (Prime or Unique)	NP	There are no prime or unique farmlands in the Navajo County Vegetation Management Area; therefore, there would be no direct, indirect, or cumulative impacts to this critical element.
Floodplains	NI	The proposed action would occur in upland areas where juniper species have increased on grassland sites. The project area is not within designated base floodplain areas. Any actions that take place within the 300 foot buffer area surrounding drainages and waterways will be completed by utilizing chainsaw thinning techniques. No ground disturbance is associated with this treatment type. Implementation of the Proposed Action would result in less runoff and sedimentation to floodplains if grasses increase on the treated area. This effect would be positive and minimal.
Invasive and Nonnative Species	NI	There is the potential for the spread of noxious weeds from equipment and support vehicles utilized during the implementation of the proposed action. Project design features NW-01 thru NW-05 (Appendix 5) would be used to mitigate potential.

Resource	Determination*	Affected Environment (Rationale for Determination)
Livestock Grazing	NI	The 17 allotments within the Navajo County Vegetation Management Area would not be impacted by the proposed action. Agency coordination with permittees would allow for growing season rest, if necessary. Existing treatments on other public and private land have already occurred and would allow for flexibility with grazing rotation.
Native American Religious Concerns	NI	The juniper communities of the west have played an integral role in the culture and livelihood of many groups of Native Americans. The species has provided shelter, fuel, medicine, hunting cover, and spiritual wellbeing for many people. Area tribes were consulted as a part of the Environmental Assessment process and had no concerns with the proposed action.
Recreation	NI	The area supports dispersed recreation activities such as hunting, hiking, and horseback riding. Treatments units and frequency of treatments on BLM land would be small isolated portions of the Navajo County Vegetation Management Area. Not all BLM lands would be treated at once; therefore impacts to recreational activities are not anticipated
Special Status Fish Species and Habitat	NI	With the use of a 300 foot buffer and project design features outlined in Appendix 5, the potential for off-site sediment movement would be reduced and the likelihood of sediment generated from the proposed action would be eliminated. Little Colorado River Sucker, Little Colorado Spinedace, Roundtail Chub, and their habitats, would not be impacted by the proposed action or alternatives.
Special Status Plant Species	NI	The proposed project area was adjusted to be outside of the known range of Round-leaf Broom and Peebles Navajo Cactus, therefore these species would not be impacted.
Special Status Wildlife Species	NI	Western burrowing owl are not anticipated to be in areas proposed for treatment, due to the presence of juniper and the absence of prairie dog tunnels, therefore no impacts to Western burrowing owls would be anticipated. Wintering bald eagles arrive within the proposed project area in October and leave mid-March. To avoid potential disturbance to bald eagle no mechanical thinning with chainsaws within 0.5 mile of known nest trees and no mechanical thinning by brush rake, mastication, or bio-mass utilization within 0.25 miles of known nest sites from October through March in T15N, R18E, Sections 26 and 30.
Special Status Wildlife Species	NP	Surveys for Gunnison prairie dog in 2006 (BLM) and 2011 (AZGFD) have not found them within the project area. The range for the 10j population of California condor is north of Interstate 40, outside of the project area.
Special Status Wildlife Species	PI	The proposed action has the potential to impact Special Status Species: Golden Eagle, Pinyon Jay, Ferruginous Hawk, or their habitats.
Socioeconomic Values	PI	The action area encompasses unpopulated public lands. The communities of Snowflake, Holbrook Heber and Winslow are on the edge of the project area and are the most likely to be impacted. These communities have traditionally been, and to a large extent still are dependent on wood products industry for their economy. In addition a majority of the homes in the communities use local wood sources as the only or primary heat. Biomass products from public lands will add to, and stabilize the wood products industries in minor ways and provide an additional source of fire wood for the communities.
Soils	PI	The proposed action has the potential of long term positive impacts for soils and erosion. The removal of juniper trees would promote more herbaceous cover, therefore increasing soil stability.

Resource	Determination*	Affected Environment (Rationale for Determination)
Vegetation	PI	The proposed action has the potential of short term minor impacts to grasses due to equipment, staging areas, access routes, and off road travel during implementation of the proposed action. Project design features AR-01 through AR-05 and RP-01 through RP-07 will be implemented to reduce impacts to vegetation resources. Long term, the proposed action would have a beneficial impact to vegetation communities by returning to reference conditions.
Visual Resource Management	NI	The location of the Proposed Action is in a Class IV Visual Resource Management Area. The objective of Class IV Visual Resource Management Areas is to provide for management activities that require major modification of the existing character of the landscape. The level of change to the characteristic landscape can be high. These management activities may dominate the view and be the major focus of viewer attention. Every attempt should be made, however, to minimize the impact of these activities through careful location, minimal disturbance, and repeating the basic elements. This critical element would not be affected by the proposed treatment due to the nature of the treatment prescriptions. Although the proposed treatments are a modification to the landscape, the treatments are designed to restore the landscape to a more natural condition.
Wastes (hazardous or solid)	NP	There are no hazardous or solid wastes within the Navajo County Vegetation Management Area and no direct, indirect, or cumulative impacts on this critical element would occur.
Water Quality (Surface, Ground, Drinking)	NI	Any decrease in the amount of bare ground resulting from an increase in ground cover such as, perennial grass and forb species would improve soil productivity and quality. Infiltration would increase; surface runoff and sediment yield would decrease. The Little Colorado River which drains this watershed is impaired in selected reaches for exceeding water quality standards (copper, silver, E-coli, and suspended sediment concentration). A decrease in sediment yield within the project area may improve water quality downstream.
Wetlands/Riparian Zones	NI	In accordance with Executive Order 11990, a 300-foot buffer area surrounding all wetland and riparian areas within the project area would be identified where mechanical treatments would not take place.
Wild and Scenic Rivers	NP	There are no wild and scenic rivers within the Navajo County Vegetation Management Area; therefore, no direct, indirect, or cumulative impacts on this critical element would occur.
Wilderness	NP	The project area is not located within designated wilderness; therefore, no direct, indirect, or cumulative impacts on this critical element would occur.
Wilderness Characteristics	NP	The area analyzed within the Navajo County Vegetation Management Area does not meet the size criteria for wilderness characteristics. Due to dis-continuous land parcels, roads, fences, infrastructure and not meeting the size criteria, no direct, indirect, or cumulative impacts would occur.
Wildlife	PI	Antelope, a priority wildlife species, would be affected by the proposed action or alternatives.

3.3 Resources Brought Forward for Analysis

3.3.1 Vegetation

Vegetation conditions in the Navajo County Vegetation Management Area are represented at a landscape level by Fire Regime Condition Class ratings, which show

departure from reference vegetative conditions and at a site specific level by Ecological Site Descriptions that provide reference vegetative conditions.

3.3.1.1 Fire Regime Condition Class

A natural fire regime is a general classification of the role fire would play across a landscape in the absence of modern human mechanical intervention, but including the influence of aboriginal burning. The five natural (historical) fire regimes are classified based on average number of years between fires (fire frequency) combined with the severity (amount of replacement) of the fire on the dominant over-story vegetation.

Fire Regimes Groups and Fire Regime Condition Classes for the Navajo County Vegetation Management Area are shown below. Fire Regime Groups are defined as:

- Fire Regime Group III: 35-200 year fire return interval with mixed to low severity fires, (generally stand replacing fire, can include low severity fire).
- Fire Regime Group IV: 35- 200 year fire return interval with high severity, stand replacement fires.
- Fire Regime Group V: 200 + year fire return interval with high severity, standing replacement fires, (predominately stand replacement fire but any severity type can be included in this frequency range).

The Fire Regime Condition Classification System measures the extent to which vegetation departs from reference conditions (or how the current vegetation differs from a particular reference condition). Departures from reference condition could be the result of changes to key ecosystem components such as vegetation characteristics, fuel composition, fire frequency, fire severity and pattern, as well as other associated disturbances. Associated disturbances can include insects and disease mortality, human activity impacts (grazing, urban expansion, infrastructure corridors), or fire suppression practices. Fire Regimes are organized into three Condition Classes.

Fire Regime Condition Classes are defined as:

- Condition Class 1: Represents vegetation communities with low departure from reference conditions. Represents ecosystems with low degree of departure and that are still within an estimated historical range of variation as determined by modeling for the ecosystems reference conditions. Fire regimes are within a historical range, and the risk of losing key ecosystem components is low. ***Vegetation attributes (species composition and structure) are intact and functioning within a historical range.*** Where appropriate, these areas can be maintained within the historical fire regime by treatments such as fire for resource benefit or prescribed fire.
- Condition Class 2: Represents ecosystems with moderate degree of departure from reference conditions. Fire regimes have been moderately altered from their historical range. The risk of losing key ecosystem components is moderate. Fire frequencies have departed from historical frequencies by one or more return intervals (either increased or decreased). This results in moderate changes to one or more of the following: fire size, intensity and severity, and landscape patterns. ***Vegetation attributes have been moderately altered from their historical range.***

Where appropriate, these areas may need moderate levels of restoration treatments, such as prescribed fire, mechanical, chemical, or fire for resource benefit treatments.

- Condition Class 3: Represents ecosystems with high degree of departure from reference conditions. Fire regimes have been significantly altered from their historical range. The risk of losing key ecosystem components is high. Fire frequencies have departed from historical frequencies by multiple return intervals. This results in dramatic changes to one or more of the following: fire size, intensity, severity, and landscape patterns. ***Vegetation attributes have been significantly altered from their historical range.*** Where appropriate, these areas may need high levels of restoration treatments, such as mechanical or chemical treatments, before fire can be used to restore the historical fire regime.

Table 3. Fire Regime Condition Class

Landscape Level: Fire Regime Condition Classes					
	Condition Class 1	Condition Class 2	Condition Class 3	Urban	Total Not Within Reference Conditions
Navajo Co. Veg. Management Area (524,530 Acres)	20%	65%	11%	5%	76%
BLM Lands (48,532 Acres)	15%	71%	11%	2%	82%
Source: Data obtained from the Landfire dataset in 2012.					

Table 3 describes the current condition of the project area, and the BLM lands proposed to be treated. 76% of the vegetation within the Navajo County Vegetation Management Area is classified as either Condition Class 2 or 3 indicating they are currently not within reference conditions. 82% of the BLM land's vegetation is currently not within reference conditions.

3.3.1.2 Ecological Sites

Ecological sites on BLM land within the Navajo County Vegetation Management Area include: Shallow Loamy, Sandstone Upland, Sandy Loam Upland and limited areas of Loamy Upland and Loamy Bottom occurring mostly in drainages. Table 4 describes the ecological sites' distribution on the 48,532 BLM acres within the Navajo County Vegetation Management Area.

Table 4. Ecological Sites

Site Specific Level: Ecological Sites			
Ecological Site Description	NRCS ID	BLM Acres	Percent
Sandstone Upland 10-14" p.z.	R035XA115AZ	26,584	55%
Shallow Loamy 10-14" p.z.	R035XA119AZ	8,839	18%
Loamy Upland 10-14" p.z.	R035XA113AZ	6,552	13%

Sandy Loam Upland 10-14" p.z.	R035XA117AZ	4,886	10%
Loamy Wash 6-10" p.z.	R035XB211AZ	1,118	2%
Loamy Bottom 6-10" p.z.	R035XA112AZ	554	1%

A further description of the ecological sites' reference state and reference plant community (Historic Climax Plant Community) follows below. The historical climax represents the natural potential plan communities found on relict or relatively undisturbed sites. The plant communities are naturally variable throughout an ecological site, and composition will vary due to annual conditions, location, aspect, and assumed variability of soils. A discussion of the Loamy Wash and Loamy Bottom sites were not included, since a design feature of the proposed action would avoid drainages and washes and consequently avoid these two sites (NRCS, Ecological Site Descriptions).

3.3.1.3 Sandstone Upland 10-14"PZ

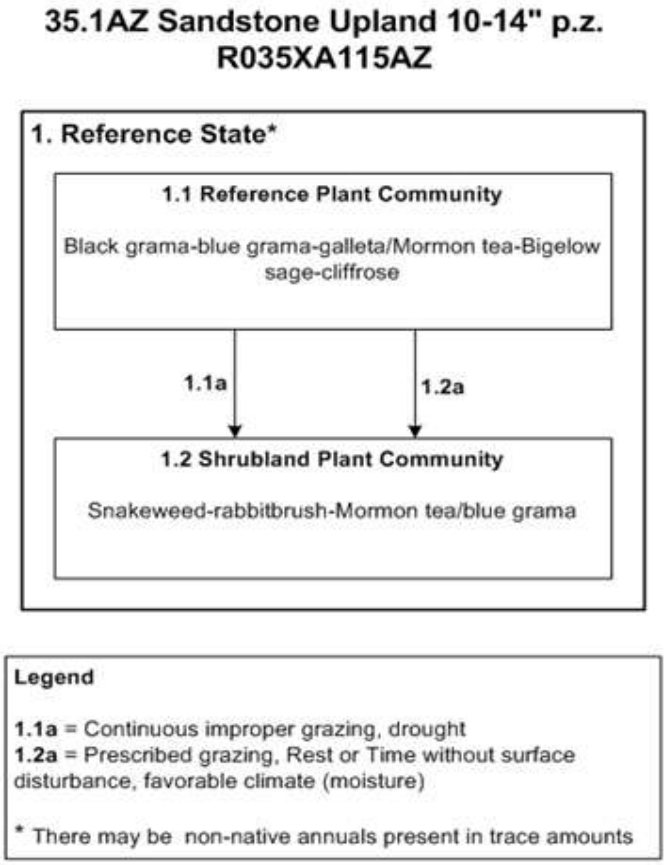


Figure 1. State and Transition Diagram for Sandstone Upland ESD.

The reference state is characterized as native mid and short grassland with scattered shrubs and trees. Warm season grasses such as black grama, blue grama and galleta dominate herbaceous cover. A mix of large and low growing shrubs along with scattered trees is the dominant woody species. The potential plant community provides a variety of food and cover plants for wildlife. When the vegetative complex of this site

retrogresses, unpalatable shrubby species increase and the site becomes less valuable as a foraging area for some wildlife species. Areas where outcrops occur are important cover area for various wildlife species such as cottontail, wrens and reptiles. These outcrops are also important hunting perches for raptors.

Currently, these sites on BLM land within the Navajo County Vegetation Management Area outside of the reference state. One-seed Juniper is identified as a species which both characterize degraded states and have the potential to become a dominant or co-dominant species on the ecological site if their future establishment and growth is not actively controlled by management interventions (NRCS Site ID R035XA115AZ, 2007).

3.3.1.4 Shallow Loamy 10-14" PZ

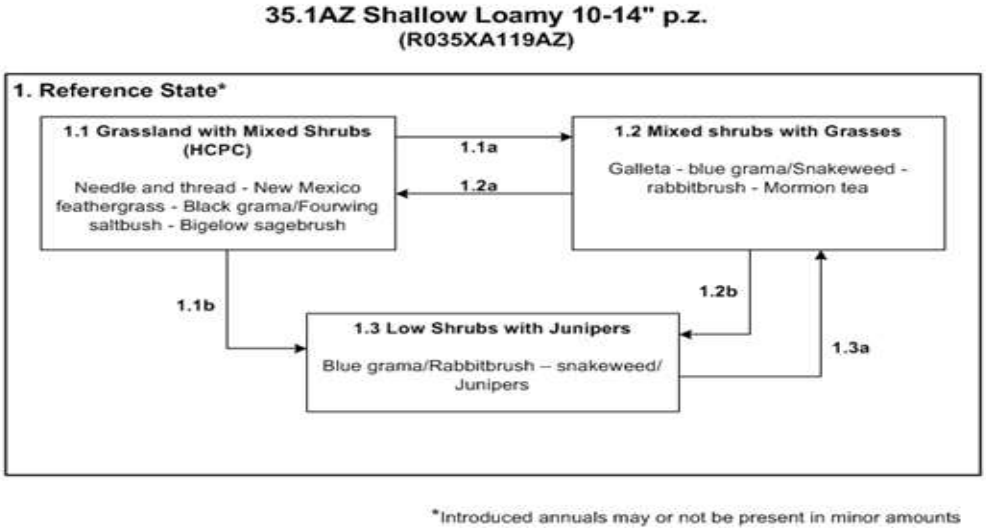


Figure 2. State and Transition Diagram for Shallow Loamy ESD.

The reference state is characterized as made up primarily of mid and short grasses (a mix of cool and warm season), shrubs and a relatively small percentage of forbs and scattered junipers. Dominant grasses include galleta, blue grama, black grama, New Mexico feather grass, and dropseeds. Common shrubs include snakeweed, rabbitbrush, Mormon tea and fourwing saltbrush with occasional succulents. The potential plant community provides a variety of food and cover plants for wildlife. Mechanical treatment such as ripping or pitting will improve the vegetation more rapidly. This site follows perennial and intermittent streams and forms an important mosaic of migration routes for many species of birds. Many bird species are dependent upon the nesting areas provided by the vegetative species on the site. A large variety of birds, reptiles, and mammals are indigenous to this site and many other species are benefitted by the edge it forms with other sites. When the vegetation complex retrogresses then unpalatable shrub species increase and the site becomes less usable as a foraging area for some species. Shrubs that provide both food and cover should be maintained. Wildlife factors of food, cover, topography are good but water is scarce in natural springs and potholes.

Currently, these sites on BLM land within the Navajo County Vegetation Management Area are within Reference State 1.3. One-seed juniper is native to the site, but has the potential to increase and dominate after unmanaged grazing and/or fire exclusion (NRCS Site ID R035XA119AZ, 2007).

3.3.1.5 Loamy Upland 10-14" PZ

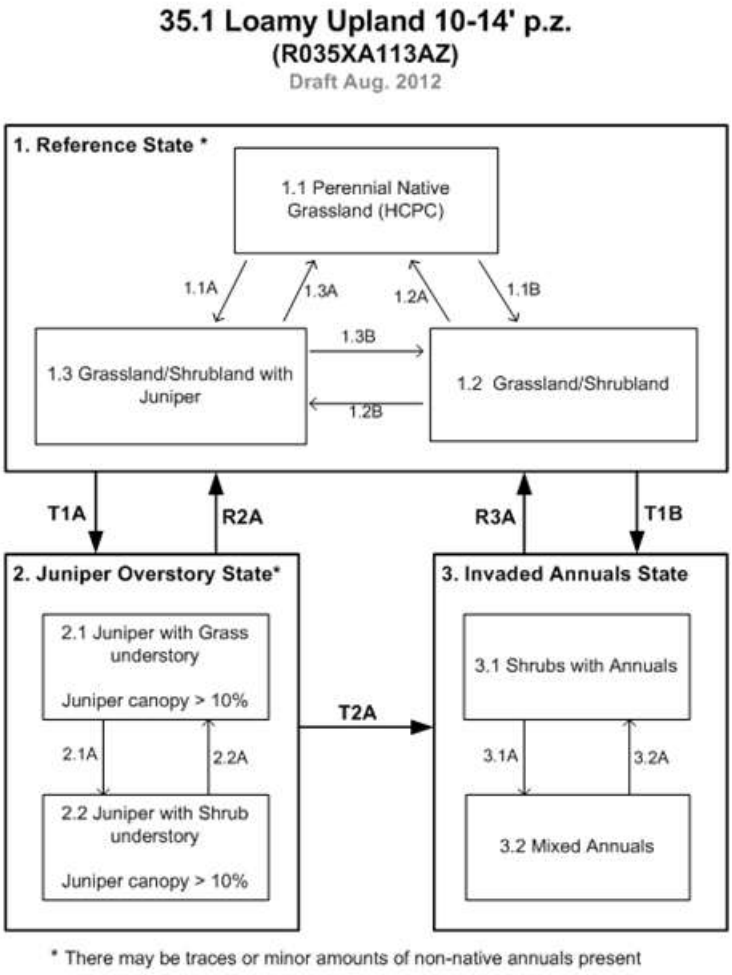


Figure 3. State and Transition diagram for Loamy Upland ESD.

The reference state plant community is composed of warm season mid grasses and short grasses with a mix of cool season grasses and half-shrubs. Black grama, blue grama, squirreltail, indian ricegrass, galletta and sideoats grama are the dominant grasses. Winterfat and fourwing saltbush make up the dominant shrubs. The current state is typified by State 2; characterized by a dominance of juniper and other woody species. Juniper has increased due to lack of fire and/or unmanaged grazing and available seed source for juniper. Juniper removal through woody species control/prescribed burning, herbaceous species reseeding, and grazing management are potential restoration pathways (2A in the image above) back to the reference state. The potential plant community produced by this site provides food for those species of wildlife that utilize

grass as a major portion of their diet. When vegetative retrogression occurs, unpalatable shrubby species increase and some wildlife species may benefit.

Currently, these sites on BLM within the Navajo County Vegetation Management Area are within State 2. One-seed juniper is native to the site, but has the potential to increase and dominate after unmanaged grazing and/or fire exclusion (NRCS Site ID R035XA113AZ, 2012).

3.3.1.6 Sandy Loam Upland 10-14" PZ

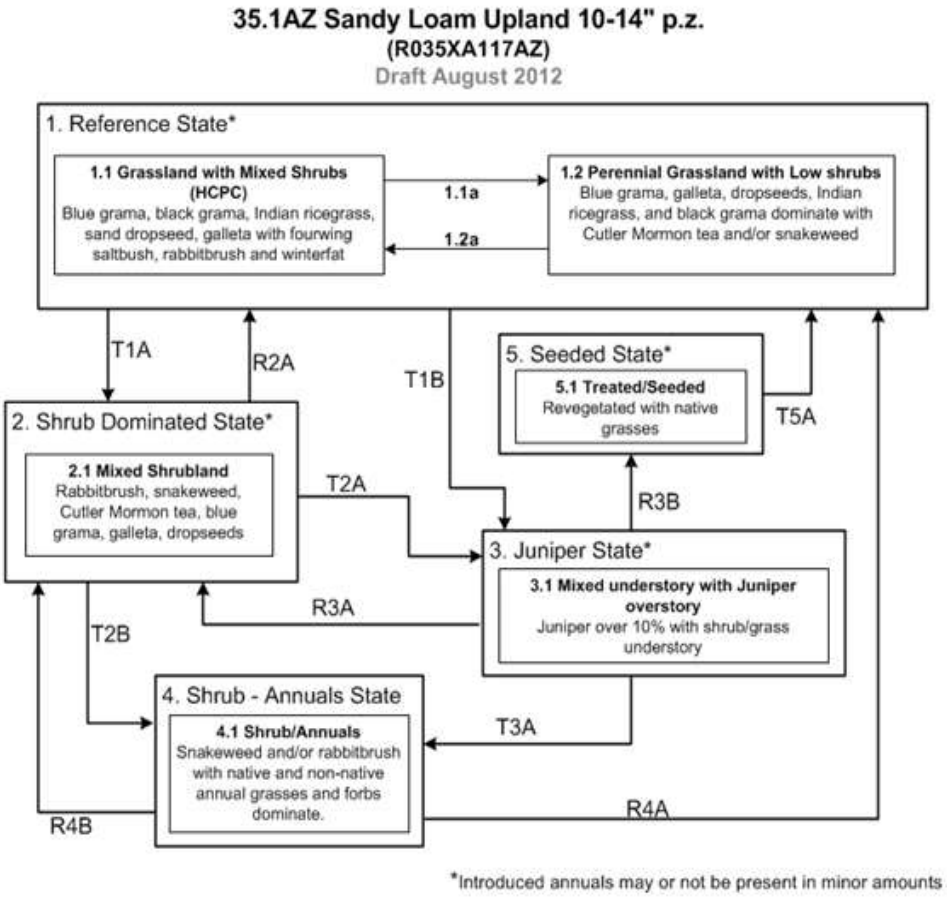


Figure 4. State and Transition Diagram for Sandy Loam Upland ESD.

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The reference state is composed primarily of warm season mid-grasses and short grasses with a small percentage of cool season grasses and half-shrubs. Dominant grasses include blue grama, black grama, sand dropseed and galleta. Fourwing saltbush and Greene's rabbitbrush are the dominant shrubs. The sites are currently typified by State 3; an overstory of junipers with half shrubs and succulents. Juniper has increased greater than 10% with an understory of shrubs with grasses. A lack of fire and/or unmanaged grazing, and above normal winter precipitation has resulted in an increase of juniper and cool season annual forbs. As juniper canopies increase, bare ground and runoff rates increase. The potential plant community produced by this site provides food for those species of

wildlife that utilize grass as a major portion of their diet. When vegetative retrogression occurs, shrubby species increase and some wildlife species may benefit.

Currently, these sites on BLM land within the Navajo County Vegetation Management Area are in the State 3, two steps removed from the reference state. One restoration pathway (R3A) is by reducing tree canopy through mechanical methods or burning. Another (R3B) is by woody species control, prescribed fire, range reseeding, or more favorable climate conditions (NRCS ID R035XA117AZ, 2008).

3.3.2 Socio-economics

The communities in or near the Vegetation Management Area include Heber, Snowflake, Holbrook and Winslow. 2010 Census data for each community was reviewed to determine unemployment and income status. With the exception of Heber which was not available, a comparison of these economic indicators is provided in Table 5. The economic indicators compare fairly well with the state average. The exception is Holbrook with double the unemployment average for the state and three percent more individuals under the poverty level. Overall the communities appear to be doing well but, there is evidence that there are pockets or segments of the communities that are not as well off.

Table 5. Comparison of Selected Economic Indicators.

Comparison of Selected Economic Indicators from the 2010 Census				
	Arizona	**Winslow**	**Snowflake**	**Holbrook**
Median Household Income	$50,752	$50,526	$53,384	$50,610
Unemployment	5.5%	4.2%	2.0%	10.0%
Persons Below Poverty Level	16.2%	17.0%	14.4%	19.2%

Even though the economy of the communities has become more diversified with time, the communities still have a large dependence on wood products. Navajo County is committed to providing business and employment opportunities while supporting responsible use of natural resources and encouraging the development of alternative energy sources (Navajo County Five Year Strategic Plan Fiscal Year 2013-2017).

Historically, juniper woodlands were an important source of fuelwood, fenceposts, and building materials. Current demand for these products is increasing.

One of the largest employers in the area is the Snowflake Power Plant. The Snowflake power plant was constructed next to the Snowflake paper mill which supplied a portion of the fuel for the plant. The paper mill is now closed leaving the power plant short of readily available biomass materials in close proximity to the plant.

Current figures for the amount of wood harvested from pinyon-juniper woodlands in Arizona and New Mexico are lacking. However research shows that in 1986

approximately 227,000 m^3 of pinyon and juniper fuelwood were harvested in New Mexico and up to 20,000 cords of wood were harvested annually on the Gila National Forest until 1985. Fuel wood demand in Arizona is likely similar to New Mexico. The Gila National Forest supplies many more communities than the four considered in this EA, but provides an indication of rural community fire wood demand. Most communities in Arizona and New Mexico depend on fuelwood as the primary source for heating and cooking (Gori and Bate 2007).

There are currently no designated areas for harvesting wood products from the BLM owned lands in the Navajo County.

3.3.3 Soils

The Navajo County Vegetation Management Area occurs in the Major Land Resource Area (MLRA) of 35-1AZ Colorado Plateau Grassland, 10" to 14" precipitation zone. Elevation ranges from 4,000 to 6,000 feet with a topography of rolling hills with jutting buttes. The aspect consists of a mixture of open grassland and densely invaded juniper grasslands.

Most juniper woodlands in the Southwest have a high soil erosion potential, which means that erosion rates are more sensitive to changes in herbaceous and woody vegetative cover. Areas with reduced or very little herbaceous cover can erode more easily than areas with normal herbaceous cover, with lower intensity precipitation events. Erosion is generally minimal on sites with high herbaceous cover (Gori and Bate 2007).

Researchers estimated an average historical soil loss of 1.9 mm (0.07 in.) per year from a hillslope in pinyon-juniper woodland in northern Arizona over the last 400 years. However, erosion was highly episodic, tending to occur after lengthy drought periods that reduced herbaceous cover, followed by extended periods of above-average precipitation. This type of erosion normally occurs when infiltration capacity is exceeded during large, early summer thunderstorms (Gori and Bate, 2007).

Several studies have measured present-day erosion rates in pinyon-juniper woodlands, highlighting the importance of herbaceous cover in minimizing precipitation runoff and soil loss. On sites with high woody canopy cover or reduced intercanopy vegetation and litter cover, soil losses from intercanopy spaces range from 4 to 4.7 mm/year. Given soil depths that average 1 to 12 dm (4 to 47 in.), these erosion rates are clearly not sustainable, and annual soil losses that are more than a few millimeters may result in nutrient loss and a reduction in site productivity. Research suggests a threshold ground cover of a minimum of 15-20% in intercanopy spaces in juniper woodlands, below which high-magnitude sediment yields would result. (Gori and Bate, 2007).

Accumulated changes in soil properties from erosion may lead to a threshold that, when crossed, limits herbaceous cover re-establishment and prevents the ecosystem from recovering without intervening land management actions (Gori and Bate, 2007).

Table 6 describes the soil communities found within the project area and their respective erosion potential. Ten communities make up 87% of the BLM land in the project area. A majority possess moderate soil potential.

Table 6. Soil Communities

Soils Communities within Navajo Co. Vegetation Management Area			
Soil Community	Erosion Potential (K Factor, Whole Soil)	Acres	Percent
Leanto-Bisoodi complex, 1 to 12 percent slopes	Moderate	10,660	22.0%
Epikom channery sandy loam, 1 to 12 percent slopes	Low	8,804	18.1%
Purgatory fine sandy loam, 1 to 8 percent slopes	Very High	5,630	11.6%
Mellenthin-Rock outcrop complex, 1 to 20 percent slopes	Low	5,004	10.3%
Rock outcrop-Arches complex, 2 to 30 percent slopes	No Data	2,836	5.8%
Pensom-Chedeski complex, 1 to 5 percent slopes	Moderate	2,764	5.7%
Bisoodi fine sandy loam, 1 to 8 percent slopes	Moderate	2,695	5.6%
Rock outcrop-Needle complex, 1 to 10 percent slopes	No Data	1,644	3.4%
Kech fine sandy loam, 1 to 12 percent slopes	Moderate	1,416	2.9%
Leanto-Bisoodi-Rock outcrop complex, 1 to 20 percent slopes	Low	1,066	2.2%
		42,517 BLM Acres	87.6% Project Area
Source: NRCS Order 3 Soil Survey, Unit AZ633			

The remaining 12% of the project area is made up of twenty soil communities. Three-quarters of those soils have low to moderate potential for erosion.

3.3.4 Special Status Species

BLM special status species and critical habitat which may be affected by the proposed project are listed in Table 7.

Table 7. BLM Special Status Species and Critical Habitat.

Special Status Species within 3 Miles of the Project Area				
NAME	COMMON NAME	FWS	BLM	STATE
Aquila chrysaetos	Golden Eagle	BGA		
Buteo regalis	Ferruginous Hawk	SC	S	WSC
Gymnorhinus cyanocephalus	Pinon Jay		S	

BGA: Bald and Golden Eagle Protection Act S: Sensitive
WSC: Wildlife Species of Concern

3.3.4.1 Golden Eagle

Golden Eagles (*Aquila chrysaetos*) range, in North America, from Alaska through western North America down to mid-Mexico and are also found less often in Eastern Canada and the Eastern United States. Habitat usually consists of open areas including deserts, mountains, and plateaus, and they usually avoid heavily forested areas. In Arizona, as in much of the lower part of its range, the Golden Eagle remains in its territory all year round, while northern populations will migrate south when food is scarce in winter (AZGF 2002).

The Golden eagle is protected under the Bald and Golden Eagle Protection Act (16 U.S.C. 668-668c), enacted in 1940, which prohibits anyone, without a permit issued by the Secretary of the Interior, from "taking" bald eagles, including their parts, nests, or eggs. The Act defines "take" as "pursue, shoot, shoot at, poison, wound, kill, capture, trap, collect, molest or disturb." For purposes of these guidelines, "disturb" means: “to agitate or bother a bald or golden eagle to a degree that causes, or is likely to cause, based on the best scientific information available, 1) injury to an eagle, 2) a decrease in its productivity, by substantially interfering with normal breeding, feeding, or sheltering behavior, or 3) nest abandonment, by substantially interfering with normal breeding, feeding, or sheltering behavior." In addition to immediate impacts, this definition also covers impacts that result from human-induced alterations initiated around a previously used nest site during a time when eagles are not present, if, upon the eagle's return, such alterations agitate or bother an eagle to a degree that interferes with or interrupts normal breeding, feeding, or sheltering habits, and causes injury, death or nest abandonment.

The Golden Eagle’s territory size in several areas of the western U.S. ranges from 22-60 square miles. They nest on rock ledges, cliffs, in large trees or man-made structures that resemble these. The pair may have several alternate nests and they may use the same nests in consecutive years or shift to alternate nest used in different years (AZGF 2002).

The Golden Eagle is most susceptible to disturbance during the nesting period (February through April). Given the general lack of large trees within the project area golden eagles

are most likely to be nesting along cliffs, below project related activities which may reduce visual and noise disturbance. Project implementation should remain a minimum of one mile from canyon rims in areas with known nests during the nesting season. If a large stick nest is identified in the project area, efforts should be made to not disturb it, as a result of any BLM permitted action, especially during the nesting period.

The Arizona Game and Fish Department conducted aerial surveys, based on potential nest site suitability, within the project area in 2012 and found two potential nests in Chevelon Canyon (AZGFD 2012). All other known nest sites are outside of the project area.

3.3.4.2 Ferruginous Hawk

Ferruginous hawk (*Buteo regalis*) breeds in low density in northern Arizona on the Colorado Plateau from April to September, and can be seen in most of Arizona with open environs, particularly in agricultural fields and native grasslands (Glinski 1998). It perches in trees, on poles, and on the ground. Nest substrates range from cliffs, trees, utility structures, and farm buildings to haystacks and even ground level. When in nesting in trees, preference is for lone or edge trees in open areas rather than wooded areas. Within the Colorado Plateau nests are generally on cliffs, pinnacles, or high mounds (92%), with 4% of nests on the ground, and 3% of nests in trees, with none documented within pinyon/juniper habitat (Rammaka and Woyewodzic 1993). Nests are usually quite large and bulky made up of coarse sticks, and frequently contain cow dung. In Arizona, courtship has been observed as early as the first week of March. From 2 to 5 (usually 3 to 4) eggs are laid and incubation begins in late April or early May. Incubation period is estimated between 32-33 days (Palmer 1988). Young typically first leave the nest at 38-50 days; males (smaller in size) leave as much as 10 days before females (Bechard et al, 1995). Ferruginous hawks generally are erratic breeders and for unknown reasons, shift nesting territories. The species appears to be especially sensitive to human disturbance during the breeding season, especially during incubation (Hall et al, 1988).

Ferruginous hawks prey includes rabbits (*Lepus* sp.), ground squirrels (*Spermophilus* sp.), pocket gophers (*Thomomys* sp.), prairie dogs (*Cynomys* sp.) and rabbits can be important prey items (Glinski 1998). Populations and the reproduction of this hawk can fluctuate with the availability of prey. In winter Ferruginous hawks typically aggregate where ground squirrels and especially prairie dogs are numerous. Other prey items include birds, locusts or Jerusalem crickets (when swarming), and snakes (Brown and Amandon 1968).

In Arizona, ferruginous hawks occupy the open scrublands and woodlands, grasslands, and Semi-desert Grassland in the northern and southeastern parts of the state (Glinski 1998) and hunt in open areas with perch sites (Hall et al 1988). It generally avoids high elevations, forest interiors, and narrow canyons. In general, the Ferruginous hawk breeds in open areas with little topographic relief (Hall et al 1988).

3.3.4.3 Pinyon Jay

Range of the Pinyon Jay (*Gymnorhinus cyanocephalus*) is associated with the distribution of pinyon-juniper woodlands of the Southwest and Intermountain regions of the United

States. In Arizona, Pinyon Jays are permanent residents of pinyon-juniper woodlands and lower ponderosa pine forests in the northern and central part of Arizona. Pinyon Jays are non-migratory but may move hundreds of miles outside normal range during fall and winter when pine seed crops are poor (Balda and Bateman 1971, Phillips et al 1964, Westcott 1964).

Pinyon Jays initiate egg-laying as early as late February. Large flocks (up to 250 individuals) nest communally in traditional breeding areas. Courtship begins in November and pairs form in January-February. Highly synchronous flock nest building begins late February to mid-March. Females incubate, but both parents feed nestlings. Young attain independence at 16 weeks. Pairs will re-nest up to five times in a breeding season if earlier nesting attempts fail (Marzluff and Balda 1992). Most birds breed at age two and have an average lifespan of five years (Marzluff and Balda 1992).

Pinyon pine seeds provide the primary source of reproductive energy for nesting Pinyon Jays (Balda and Bateman 1971, Marzluff and Balda 1992). In years following poor pinyon production, breeding is delayed until April or May when other foods, primarily insects, become common (Ligon 1971). Pinyon Jays will also feed on ponderosa pine seed, fruits, eggs, nestlings, lizards. They feed on the ground, in foliage and hawk for insects (Balda and Bateman 1971).

The Pinyon Jay is a gregarious and highly socialized species. Large, highly integrated flocks are maintained year-round and use well-defined home ranges during most years. During poor seed crop years, individuals and flocks have been observed in southern Arizona as well as at treeline in northern Arizona harvesting limber pine seed (Phillips and others 1964, Westcott 1964, Balda and Bateman 1971).

Food availability seems to be the most important factor determining colony breeding site selection (Gabaldon 1979). Open cup nests (usually one nest/tree) are placed in ponderosa pine, pinyon pine, Gambel's oak, juniper, and occasionally blue spruce trees. Nests are typically 1-8 m (3-26 ft) high and tend to be south-facing (Gabaldon 1979, Marzluff and Balda 1992). Gabaldon (1979) found nest trees were taller and had higher foliage density than surrounding trees. Gabaldon (1979) also found jays avoided trees with abundant pine cones, perhaps because these might attract predators. Many nests were located along roads and Gabaldon (1979) found these nests to have higher reproductive success. Balda and Bateman (1971) studied a well-defined flock of about 250 birds which maintained a 21 km^2 (8 mi^2) home range which included ponderosa pine forest, pinyon-juniper woodland, and grassland. This flock used a nesting area of about 95 ha (230 ac) (Balda and Bateman 1971).

3.3.5 Wildlife

3.3.5.1 Antelope

The Navajo County Vegetation Management Area encompasses portions of Arizona Game and Fish Department, Game Management Units (GMU's) 3A, 4A, and 4B.

In GMU 3A pronghorn are distributed throughout undeveloped areas within Unit 3A. Pronghorn occupy Great Basin grasslands, plains grasslands, and open areas of Great Basin Conifer Woodlands within the unit. Seasonal variation in distribution is influenced primarily by rainfall patterns and livestock grazing which produce variations in the quality and quantity of available forage. There is no distinction between winter and summer ranges (AZGFD 2009).

Pronghorn habitat in Unit 3A is comprised of private, State Trust, Bureau of Land Management (BLM), and U.S. Forest Service lands, with the majority of pronghorn habitat in the unit located on private land. The east half of the unit (that portion of the unit which lies east of State Route 77) is about 75% private land and the western half of the unit (west of State Route 77) is about 60% private land. In 1996, the Research Branch evaluated pronghorn habitat quality throughout the unit. The evaluation indicated the majority (50%) of pronghorn habitat in the unit was moderate quality, followed by 20% evaluated as low quality and 15% unsuitable (AZGFD 2009).

In GMU 4A pronghorn distribution and population densities remain constant throughout the year. The primary use area includes everything north of the forest boundary. On Forest Service land, pronghorn distribution remains adjacent to the forest boundary from Chevelon Canyon to East Clear Creek. Pronghorn generally range about 2 to 4 miles south of the forest boundary. Pronghorn sightings rarely occur further south on the Forest in the ponderosa pine habitat. The majority of the pronghorn habitat in GMU 4A is comprised of private and leased Arizona State Trust Lands (AZGFD 2009).

In GMU 4B the antelope population is bisected by Interstate I-40 in the northern portion of the unit. Most pronghorn in this population reside south of the interstate and north of the Sitgreaves National Forest boundary. A few animals use habitat within the forest boundary and north of I-40. Starting in 1977 survey efforts observed 164 pronghorn in 4B. In 2007, 146 pronghorn were observed. Pronghorn survey observations have ranged as high as 335 in 1999 and as low as 81 in 1991. No reintroductions or population augmentations have been implemented in 4B to date (AZGFD 2009).

The largest contiguous area of suitable pronghorn habitat in Unit 4B is located between Dry Lake and Chevelon Canyon to the west, north to the Little Colorado River. Unit 4B pronghorn population estimates show a slightly declining population over the last 10 years. In 2005, 4B fawn recruitment was the highest it had been in 10 years. In 2006, fawn recruitment leveled off at 23:100 equaling the 5-year average. In 2007, fawn recruitment was again above the 5-year average at 28:100. Consecutive years of increased recruitment could result in a stable or increasing population in 4B. Continued monitoring and improvement of range conditions throughout the unit will help this population to continue to grow (AZGFD 2009).

Antelope management issues identified in the Arizona Statewide Pronghorn Operational Plan 2006, common to all three GMU's include:

- Habitat loss, fragmentation, or degradation
- Tree-shrub encroachment

- Plant diversity and forage conditions
- Water availability
- Numerous fences

Antelope management objectives identified in the Arizona Statewide Pronghorn Operational Plan 2006, include:

- Coordinate with land management agencies and private landowners to insure key pronghorn habitat is identified and enhanced through pinyon-juniper removal, development of additional wildlife waters and other applicable management activities.
- Maintain and enhance large contiguous blocks of pronghorn habitat by promoting pinyon-juniper treatments in and around existing pronghorn habitat to reduce cover for predators and increase forage production for pronghorn.
- Maintain pronghorn habitat and travel corridors through cooperation with land management agencies and private or other landowners.
- Increase water availability and distribution
- Evaluate and modify livestock fences to pronghorn specifications.
- Greater use of controlled burning to restore grassland habitat and increase plant species diversity.
- Continued and increased removal of encroaching juniper or pinyon-juniper woodland types through chaining, fuel wood cuts and prescribed burning.
- Encourage predator management by private landowners and sportsmen.
- Encourage non-governmental organizations, such as The Arizona Antelope Foundation and The Nature Conservancy, to participate in grassland conservation and management.

4 Environmental Consequences

This section includes a discussion of the environmental consequences (including a description of direct and indirect impacts, and cumulative effects, if any). Impacts are defined as modifications to the existing condition of the environment and/or probable future condition that would be brought about by implementation of one of the alternatives.

Impacts can be direct or indirect; direct impacts are those effects that are caused by the action or alternative and occur at the same time and place, while indirect effects are those effects that are caused by or would result from an alternative and are later in time but that are still reasonably certain to occur. Cumulative effects are generally assessed using the environmental impacts of past, present, or reasonably foreseeable future actions within the project areas.

The impact analyses in the following sections were based on knowledge of the resources and the site, review of existing literature information provided by experts and other agencies, and professional judgment.

4.1 Environmental Consequences of the Proposed Action

4.1.1 Vegetation

The proposed action would have a positive impact to the perennial grass cover in the treatment units. Studies suggest that juniper reduction treatments have positive effects on total understory plant cover. One study supports understory plant cover increases between 4 and 16 fold higher within two years post treatment (Ross, Castle, Barger, 2012).

The proposed action would greatly reduce the number of juniper trees found in each treatment unit. Although the proposed action would reduce the juniper overstory, the reduction would bring the number of junipers to within historic reference conditions. Since the reduction of juniper would bring the species within reference conditions the change in canopy cover of juniper will be a positive impact.

4.1.2 Socio-economics

The proposed action would have a positive although small impact to the society and economy of the local communities. The proposed action would provide a mechanism of providing wood products for use by individuals and businesses in the local communities. This would assist in continuing a societal connection to forest and wood products. The proposed action would assist in bolstering and stabilizing existing wood product businesses. It may also provide a mechanism encouraging business startups. The Bureau under this programmatic EA would also be able to use available wood resources to proactively support local wood product industries. Local communities have established that there is a demand for the following types of wood products:

- Firewood (generally for home heating)
- Millwood (local artists and woodworkers)
- Fence posts (local ranching community)
- Slash (used as fuel for co-generation power plants in the local area)

4.1.3 Soils

The amount of ground cover (herbaceous) and soil erosion potential are key factors in determining the erosion potential for soils (Davenport, et. al, 2013). The proposed action would impact soils by treating encroaching juniper trees. Decreased cover of juniper increases the amount of herbaceous cover, which in turn promotes the potential for soil stability. The proposed action would have a positive impact on soil conditions due to the increase of herbaceous plant cover post-treatment (Huffman, 2013) (Albert, et. al. 2004).

4.1.4 Special Status Species

4.1.4.1 Golden Eagle

Potential impacts to Golden Eagle due to implementation of the proposed action may include localized and temporary disturbance to individuals foraging within the project area during treatments. Golden Eagle Conservation Measures (see Appendix A, sec.

5.2.7) will minimize or eliminate nest disturbance and result in levels of disturbance not reaching the level of take.

Reduction of juniper cover would result in a general increase in prey availability/ vulnerability which would benefit golden eagle.

4.1.4.2 Ferruginous Hawk

Potential impacts to Ferruginous Hawk due to implementation of the proposed action may include temporary disturbance to foraging individuals or disturbance of undocumented nest sites. Reduction of juniper cover would result in a general increase in prey availability/ vulnerability which would benefit the ferruginous hawk.

4.1.4.3 Pinyon Jay

Potential impacts to Pinyon Jay due to implementation of the proposed action may include disturbance during nesting period and loss of potential nest sites in juniper trees. Since only juniper trees would be removed, food resources for the pinyon jay are expected to remain essentially unchanged. Pinyon nuts, which may make up a considerable portion of the pinyon jay's diet, would remain.

Within the project area the only significant habitat (163 square miles) which may be used by the pinyon jay is pinyon-juniper habitat (there are 0.02 square miles of ponderosa pine habitat within the project area). Within the project area, pinyon-juniper habitat on BLM lands (a total of 14.3 square miles) is at the edge of this habitat. In considering the potential effects to pinyon jay nesting habitat, a 15-mile buffer around the project area was considered. Within this buffer only 1% of potential nesting habitat is on BLM lands, with 15% of potential nest habitat being within the project area, see Table 8. The remaining 85% is primarily on US Forest Service Lands, with lesser amounts on private and, state, and BLM. Additionally, not all juniper trees would be cleared from the BLM lands within project area, but would be reduced to levels closer to ecological site descriptions. Therefore, the reduction of juniper trees on BLM lands is not anticipated to reduce nesting habitat to a level which would noticeably affect the pinyon jay population.

Table 8. Pinyon Jay Habitat

Pinyon Jay Nest Habitat	BLM Land (Square miles)	Project Area (Square miles)	15 Mile-buffer Project Area (Square miles)
Pinyon-Juniper	14.3	163	754
Ponderosa Pine	0	.02	324
Total	14.3	163.02	1,078

To reduce potential impacts to pinyon jay nests and recruitment of juveniles, juniper removal would not occur from February 21 through June, or surveys for nesting colonies would be completed during the month of February and areas of nest colonies would not be treated from February through June.

4.1.5 Wildlife

4.1.5.1 Antelope

Potential impacts to Antelope may include temporary disturbance during implementation of the proposed action. Antelope avoid areas of juniper encroachment; therefore the majority of activities would not occur in areas occupied by antelope.

Removal of juniper, in areas contiguous with existing antelope habitat would increase antelope movement and likely result in an increase in the antelope population over time.

4.2 Environmental Consequences of the No Action Alternative

4.2.1 Vegetation

Under the no action alternative juniper will continue to expand its range and cover further reducing herbaceous cover and diversity. Pinyon-juniper woodlands in the southwest have increased in density and extent over the last 100 years. Pinyon and juniper have invaded grasslands and former pinyon-juniper savannas through a wide range of elevations. In existing savannas and woodlands, trees have replaced formerly more abundant perennial grasses, leaving large areas of bare soil in intercanopy spaces that are susceptible to soil erosion. Increased overstory canopy cover in pinyon-juniper woodlands has led to a reduction in understory plant cover (shrubs, forbs, and grasses) and productivity. It also led to declines in plant species richness and diversity. These decreases have been greatest on sites with shallow soils (16-24 in.) and on southern aspects (Gori and Bate, 2007).

4.2.2 Socio-economics

Under the no action alternative, requests for wood products on public lands would continue to be handled on a case by case basis without the overarching guidance or analysis provided by the programmatic EA. Coordination and planning across ownership boundaries would be more difficult, impacting the effectiveness of businesses to use wood products. The Bureau would not have the guidance to proactively support and encourage local use of the wood resources. It would be less likely that wood products from public land would contribute to the bolstering or stabilization of the wood products industry, particularly the small wood industries.

Socio-economic values would be impacted by the no action alternative in the following ways:

- The Bureau would have a lessened ability to conduct thinning treatments, grant wood use permits and to promote bio-mass utilization of slash generated from thinning treatments.
- The Bureau would have a lessened ability to support local community firewood, fence post, millwood, or bio-mass markets.
- Bio-mass opportunities would likely be granted only on a small scale that may not meet local demand.

4.2.3 Soils

The amount of ground cover (herbaceous) and soil erosion potential are key factors in determining the erosion potential for soils (Davenport, et. al, 2013). The no action alternative would impact soils by not treating encroaching juniper trees. Increased cover of juniper reduces the amount of herbaceous cover in the intercanopy spaces, which in turn promotes the potential for soil erosion.

4.2.4 Special Status Species

4.2.4.1 Golden Eagle

Current conditions would continue into the foreseeable future. Juniper would likely continue to increase over time, gradually reducing open foraging areas available to golden eagle.

4.2.4.2 Ferruginous Hawk

Current conditions for the ferruginous hawk are anticipated to continue into the foreseeable future.

4.2.4.3 Pinyon Jay

Pinyon jay habitat would likely continue to gradually increase over time as juniper continue to encroach grassland habitats, assuming a continued lack of fire events which could remove juniper from the area.

4.2.5 Wildlife

4.2.5.1 Antelope

Antelope habitat would continue to shrink with shrub/juniper encroachment and corridors for intermixing between herds would be reduced over time. The loss of herbaceous cover will reduce the quality of fawning cover.

4.3 Cumulative Impacts

The Council on Environmental Quality (CEQ) regulations that implement NEPA defines a cumulative impact as: "The impact on the environment which results from the incremental impact of the action when added to other past, present, or reasonably foreseeable future actions." Cumulative impacts can result from individually minor but collectively significant actions taking place over a period of time (40 CFR 1508.7).

Life of the proposed action and its alternative is twenty years; this time frame is considered to be most appropriate for considering the incremental effect of actions in the foreseeable future. Many of the past and present actions are expected to persist through this time frame, though the relative intensity of these actions could vary.

4.4 Past Actions

Historically the small communities in the White Mountain and surrounding areas derived a majority of the economy from wood products. Small lumber mills existed in most if not all of the communities. They logged and milled trees close to the communities and provided products sold throughout the state. These small lumber mills faded out in the late 1970s until only a few large mills remained. Many mill workers in the action area

found employment at the Snowflake paper mill which recently shut down. In the last 10 years the Snowflake cogeneration power plant fueled by biomass was constructed next to the paper mill and used paper by-products as one of the sources of fuel. This power plant is now one of the largest employers in the action area. The cogeneration plant has had difficulty competing in the power market, making continued operation and employment tenuous.

In southern Arizona, fuelwood from evergreen woodlands (including pinyon-juniper woodlands) was the major source of fuel for mining operations until the late 19th century and for domestic heating and cooking until the mid-1900's. Although fuelwood was replaced by coal in the early 1900s as an energy source for mining, woodcutting for domestic heating and cooking continued. Census data shows that even as late as 1940, 44% of the homes in Arizona still depended on fuelwood for heating and cooking. In the action area there are probably few or no homes that still rely on wood for cooking, although the percentage of homes that rely on wood as their only or primary source of heat is probably still around 40 percent. Traditionally this fire wood has been gathered locally by home owners or small business operators.

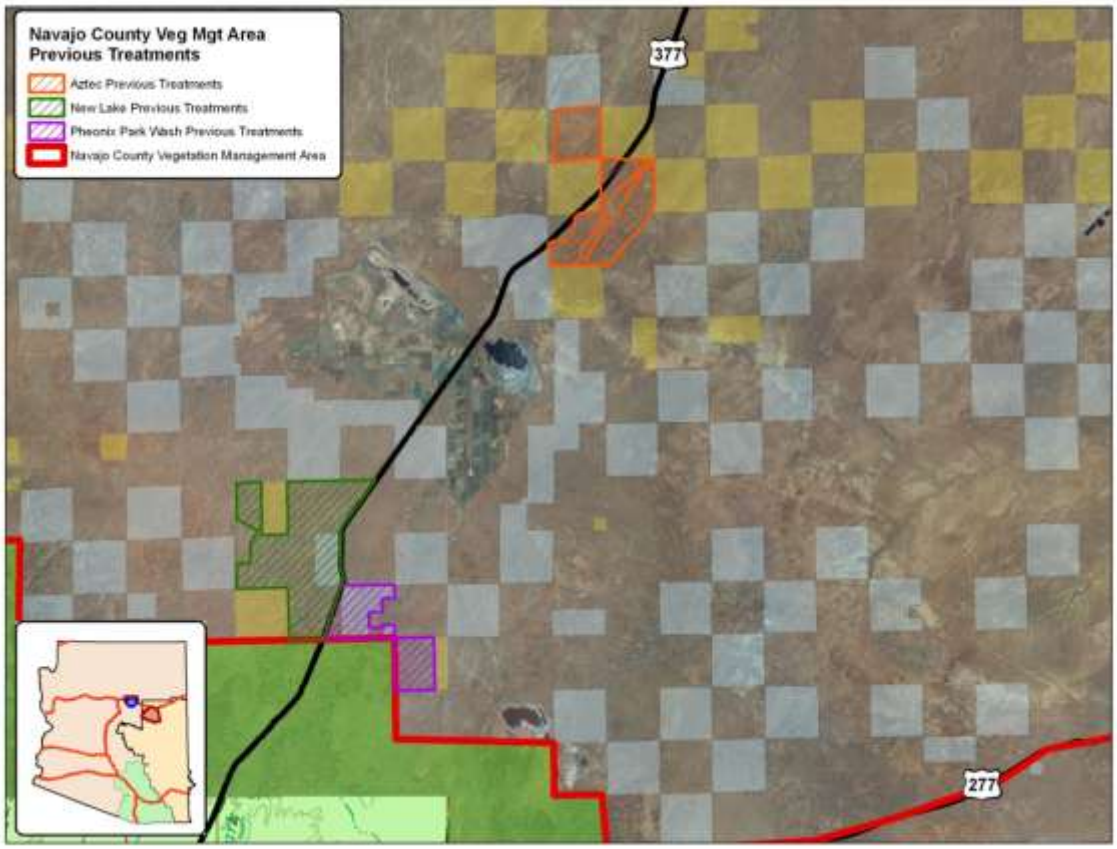
The disruption of historical fire regimes that followed the introduction of livestock and the 1890's drought has been documented in historical accounts and fire-history reconstructions in pinyon-juniper savannas, open woodlands, and in shrub woodlands at higher elevations. These reconstructions show the virtual cessation of surface and mixed-severity fires in pinyon-juniper systems between 1890 and 1905. The alteration of fire regimes may be greater for grass open woodlands, although fire-history information for the latter types are lacking in the Southwest (Gori and Bate, 2007).

In the early 1900s, fire suppression policies were instituted by the federal government and involved the construction of fire line, fire roads, and later coordinated efforts by ground and aerial fire suppression resources. Fire exclusion was very successful initially, but the accumulation of fuels, increased tree densities, and development of ladder fuels that could bring surface fires into the crowns and canopies of the woodlands made fire suppression more difficult. As the number and size of fires has increased over the last century, particularly in the last 30 years, land management agencies have increased the emphasis on the use of prescribed fire treatments, with varying levels of success due to complex social and climatic factors. Large stand-replacing fires that have burned with surprisingly high-intensity in pinyon-juniper systems in recent years (Ex. the South Canyon Fire in 1994, the Cerro Grande fire in 2000, the Rodeo-Chediski fire in 2002, and the Aspen fire in 2003) have underscored the need for pro-active fire and fuels management strategies to reduce wildfire risk as well as to restore fire-adapted ecosystems. Restoration treatments should be based on an understanding of local stand history and the historical range of variability in disturbance regimes (Gori and Bate, 2007).

Juniper thinning treatments that have been completed adjacent to BLM land within the past five years:

- Aztec Juniper Thinning-1,832 acres-completed in 2011

- New Lake Juniper Thinning-2,830 acres-completed in 2012
- Phoenix Park Wash Juniper Thinning-1,123 acres-completed in 2012



Map 2. Previous juniper treatments in Navajo County adjacent to BLM lands.

Other past actions and historical land use in the area include dispersed recreational activities such as camping, hunting, horseback riding, OHV use, hiking, shooting, and biking.

Other activities include range management treatments (juniper thinning, range improvements), bio-mass (thinning slash) collection (co-gen power plant fuel), animal farming, and cattle grazing.

Utility corridors (power lines, gas pipelines, wind farms), transportation routes (highway), and other infrastructure developments (communication sites, cell towers) are dispersed throughout the area.

4.5 Present Actions

Private land owners are working local businesses, State, and Federal agencies to implement juniper thinning treatments similar in scope, magnitude and nature as the proposed action. Some of these treatments are occurring on land adjacent to BLM.

Dispersed recreational activities such as camping, hunting, horseback riding, OHV use, hiking, shooting, and biking are occurring in the area.

Utility corridors (power lines, gas pipelines, wind farms), transportation routes (highway), and other infrastructure developments (communication sites, cell towers) are dispersed throughout the area. Utilization and maintenance of these infrastructure developments, transportation routes and utility corridors is ongoing.

4.6 Vegetation

4.6.1 Proposed Action

The proposed action would work in coordination with other similar vegetation treatments in the Navajo County Vegetation Management Area, this coordination will allow for landscape scale restoration of the ecological sites. This approach would benefit perennial grasses across the large area.

4.6.2 No Action Alternative

The no action alternative does not support coordination with adjacent land owners and would not provide the perennial grasses an opportunity to increase on BLM managed lands. This would leave areas of decreased grass cover and increased erosion potential.

4.7 Socio-economic

4.7.1 Proposed Action

The proposed action would make available wood products in close proximity to the Snowflake power plant and may help stabilize it and improve its viability. It would make available additional areas for fire wood gathering. The proposed action would help the communities reconnect with their wood products heritage by, supporting small business (fire wood, fence posts, small diameter mill work, biomass material gathering) and could generate additional small businesses.

The Natural Resource Conservation Service considers the vegetation treatments done under their contracts on private lands to be successful in reaching their goals and will likely continue to pursue private land treatment through local contracts in the action area.

Dwarfing the efforts of the Bureau and the NRCS, the Forests in Arizona have issued the Four Forest Restoration Initiative (4FRI) thinning contract. The contract calls for a new lumber mill, possibly making improvements to existing mills, a power plant, and the placement of a number of pellet mills in the forest near thinning areas. Of these known operations the new lumber mill will be built in Winslow. The contractor has said that they will hire and use local resources in their operations. Over the lifetime of the contract, approximately 300,000 acres will be treated on forest land in Arizona, 932 acres

of thinning was approved this year for the Apache-Sitgreaves National Forests. Specifically how much thinning will be done on forest lands, adjacent to the action area is unknown, but would likely have a large impact on the economy of the action area at least for the next 10-20 years.

4.7.2 No Action Alternative

The no action alternative would make wood products located on BLM lands unavailable to the local bio-mass plant and local communities. The No Action Alternative would not make available additional areas for fire wood gathering. The No Action Alternative would not help the communities reconnect with their wood products heritage because of the lessened support to small business (fire wood, fence posts, small diameter mill work, biomass material gathering), and would not generate additional small businesses.

4.8 Soils

4.8.1 Proposed Action

The proposed action would work in coordination with similar juniper thinning treatments on adjacent land ownerships increasing the amount of acreage that is treated. This would lead to larger areas of herbaceous plant recovery post treatment. With herbaceous plant cover increasing across the landscape soil erosion potential would be decreased at the landscape scale.

4.8.2 No Action Alternative

The no-action alternative would not work in coordination with similar juniper thinning treatments on adjacent land ownerships. The BLM lands scattered throughout the landscape would be areas of untreated juniper, which would result in areas of increased soil erosion potential due to reduce herbaceous plant cover.

4.9 Special Status Species

4.9.1 Proposed Action

The Dry Lake Wind Farm has a projected mortality estimate of 1.13 Eagles per year. The proposed action would avoid direct impacts to golden eagle while indirectly increasing prey availability/vulnerability which would result in increased nest success and recruitment. The proposed project may help offset impacts from the Dry Lake Wind Farm to golden eagle in the area.

Pinyon jay habitat would be reduced on private, state, and Forest Service Lands within a 15-mile area of the project area. Out of the 1,078 square miles of potential nesting habitat in the area, 1% of habitat would be reduced on BLM lands, up to 15% may be reduced on private and state lands over the next 10+ years and the Apache Sitgreaves Forest estimates that, as part of the Four Forest Restoration Initiative, an additional 1% of pinyon jay habitat may be converted to restore historic forest conditions.

4.9.2 No Action Alternative

Projected golden eagle mortalities (1.13 per year) from the Dry Lake Wind Farm would continue. Prey availability/vulnerability conditions would remain approximately the same which, in years with low prey numbers, may reduce nest success.

Pinyon jay nesting habitat would gradually continue to increase on BLM lands within the project area as juniper encroach into grassland habitats. Reduction of juniper on private and state lands are expected to continue and could reduce pinyon jay nesting habitat by up to 15% on private and state lands over the next 10+ years and the Apache Sitgreaves Forest estimates that, as part of the Four Forest Restoration Initiative, an additional 1% of pinyon jay habitat may be converted to restore historic forest conditions.

4.10 Wildlife

4.10.1 Proposed Action

Antelope within the Dry Lake area appear to have reduced movement due to State Highways 377 and 77 and the associated fencing along them. The herd currently uses an area of approximately 44 square miles. The proposed action could make an additional 7 square miles of BLM lands more likely to be used by pronghorn antelope. Additionally, juniper reductions on private and state lands could add another 15 square miles of potentially useable antelope habitat.

4.10.2 No Action Alternative

Reduced movement of antelope would likely continue due to associated fencing along state highways in the area. The area would continue to not meet desired resource conditions for the habitat of antelope.

5 Consultation and Coordination

5.1 List of Preparers and Contributors

The following table lists the BLM Interdisciplinary Team (ID) members who participated in preparing this environmental assessment.

Table 9. List of Preparers and Contributors

Name	Title	Responsible for the Following Program
Dan McGrew	Archaeologist	Cultural Resources Native American Religious Concerns,
Tim Goodman	Wildlife Biologist	Environmental Justice, Socioeconomic Values, BLM Sensitive Plants
Jeff Conn	Natural Resource Specialist	Wildlife, Special Status Species,
Heidi Blasius	Fisheries Biologist	Fisheries

Sharisse Fisher	Geographic Information Specialist	NEPA Maps, Eplanning, GIS
Roberta Lopez	Realty Specialist	Realty
Bill Wells Chris Morris	Hydrologist Hydrologist	Water Quality and Quantity, Floodplains, Air Quality, Wetlands/Riparian Zones,
Dave Arthun Gwen Dominguez Amy Humphrey	Range Management Specialist Range Management Specialist Range Management Specialist	Farmlands (Prime or Unique), Invasive, Non-native Species, Invasive, Non-native Species, Livestock Grazing, Range, Vegetation, Noxious Weeds
R. J. Estes	Range Management Specialist	Wastes (hazardous or solid), Livestock Grazing, Range, Vegetation
Ron Peru	Realty Specialist	Visual Resource Management
Joe David	Assistant Field Office Manager	NEPA Coordinator
Dan Quintana	Fuels Program Manager	EA Preparer, Hazardous Fuels Reduction, Vegetation Treatments, Prescribed Fire
Scott Cooke	Safford Field Office Manager	Resource Management
Mark Pater	Fire Ecologist	Range Management, Fire Ecology

5.2 Persons/Agencies Consulted

The following persons or agencies were consulted during the preparation of this environmental assessment.

- Cow Canyon, New Lake Allotment Leasee
- Aztec Allotment Leasee
- Phoenix Park Wash Leasee
- Aztec Land and Cattle Co. L.L.C.
- Wilma Renken, NRCS-Holbrook, District Conservationist
- Mike Larsen, NRCS-Holbrook, District Conservationist
- Greta Anderson, Deputy Director, Western Watershed Project
- Brad Worsley, President/CEO, Novo Power
- David Newlin, Little Colorado River Plateau RC&D, Watershed Project Director
- Heath Hildebrand, Vice President, Snowflake Power
- Rachel Williams, Regional Landowner Relations Specialist, Region 1, Arizona Game and Fish Department
- Chester Krandell
- Kay Turley

6 Appendix A: Project Design Features for Proposed Action

During implementation of the proposed action Best Management Practices and Conservation Measures will be used to reduce impacts to the resources.

6.1 Best Management Practices

The following Best Management Practices will be utilized during implementation of the proposed action to minimize potential impacts.

6.1.1 Access Routes (AR)

The following treatment unit access best management practices will be applied to all treatments identified in the proposed action.

- **AR-01** Access to treatments identified in the proposed action will require temporary off-road vehicle traffic. Off road vehicle traffic will be limited to authorized personnel and equipment only and as little as necessary to complete treatment.
- **AR-02** Many of the treatments units or portions of the treatment units are not located immediately adjacent to roads; off-road travel not within the foot print of the treatment unit may also be required. Access routes will be discussed with Resource staff and approved by the unit manager prior to implementation of the treatment.
- **AR-03** No new permanent roads will be constructed or created during project implementation.
- **AR-04** All access routes to treatments that develop two tracks will be signed during project implementation and rehabbed with appropriate rehabilitation techniques (i.e. hydro-mulch, water bars, etc.), if determined necessary, following completion of the treatment.
- **AR-05** Equipment staging areas may be utilized adjacent to roads for equipment maintenance and equipment/vehicle staging. All staging areas will be rehabbed at the completion of the treatment as needed.
- **AR-06** Access across private land will be coordinated with land owner prior to implementation of treatments
- **AR-07** Access across AZ State Trust Land will be coordinated with the AZ State Land Department.
- **AR-08** Except at crossings, temporary access routes shall be located sufficiently far from streams or other water bodies to minimize sediment discharges.
- **AR-09** Leadout ditches, waterbars, will not be constructed in such a manner as to divert run-off into stream courses.

6.1.2 Bio-Mass Utilization (BM)

The following bio-mass utilization practices may be implemented during treatment activities:

- **BM-01** Where appropriate and allowed by resource management plans, useable bio-mass generated during thinning treatments will be made available for use by the public, groups, organizations, or companies.
- **BM-02** Wood permits-Permits can be issued to the general public, companies, non-profit groups, etc. for bio-mass generated during thinning treatments. Maps of the area available for wood collection will issued with wood permits.
- **BM-03** Stewardship-Stewardship contracts may be utilized for vegetation treatments that have the potential to produce large quantities of useable bio-mass.
- **BM-04** Bio-mass generated by the proposed action may be utilized for erosion control material during treatment implementation or rehabilitation.
- **BM-05** Bio-mass utilization will be implemented during or immediately following mechanical treatments and prior to any rehab treatments that may be needed.

- **BM-06** Use of rubber tired equipment or vehicles to collect bio-mass throughout the treatment units

6.1.3 Cooperator Coordination (CC)

The following cooperator best management practices will be applied to all treatments identified in the proposed action.

- **CC-01** Access to treatment units through private land will need to be coordinated with the land owner prior to treatment implementation.
- **CC-02** BLM GDO Fire Management and SFO Resource Management personnel will monitor any activities completed by BLM partners on BLM land during treatment implementation.
- **CC-03** The BLM will coordinate with Federal, State, County, and Private land cooperators and permittees during planning and implementation of proposed treatments.
- **CC-04** Coordination with the affected livestock permittees within the allotments being treated would be conducted prior to any treatment occurring.

6.1.4 Cultural and Paleontological Resources (CR)

The following Cultural Resource Best Management Practices will occur on all treatments identified in the proposed action:

- **CR-01** All ground disturbing activities will follow the Section 106 (National Historic Preservation Act) NHPA guidelines that state that all ground disturbing activities will be surveyed at Class III levels prior to treatment implementation. All cultural resource sites located on the survey will be avoided as well as avoidance of all previously recorded sites. These sites will be flagged and identified as no entry buffer areas by the Safford Field Office (SFO) archaeologist prior to treatment implementation.
- **CR-02** All field personnel will be briefed on the location and avoidance tactics to be utilized during ground disturbing activities.
- **CR-03** All non-ground disturbing activities will be coordinated with the SFO archeologist prior to treatment implementation.
- **CR-04** A Class I record search will be completed for all treatments prior to project implementation.
- **CR-05** Class III surveys, following Section 106 guidelines, will be completed for all treatments that involve ground disturbing activities.

The following Cultural Resource Mitigation Stipulations will apply in case new sites are unearthed during project implementation (all treatment types):

- **CR-06** Any archaeological or historical artifacts or remains, or vertebrate fossils discovered during operations shall be left intact and undisturbed; all work in the area shall stop immediately; and the Safford BLM Archaeologist shall be notified. Commencement of operations shall be allowed upon clearance by the Assistant Field Manager.
- **CR-07** An additional cultural and paleontological resource survey may be required in the event the project location is changed or additional surface

disturbing operations are added to the project after the initial survey. Any such survey would have to be completed prior to commencement of operations.

- **CR-08** If in connection with operations under this authorization, any human remains, funerary objects, sacred objects or objects of cultural patrimony as defined in the Native American Graves Protection and Repatriation Act (L. 101-601; Stat. 3048; 25 U. S. C. 3001) are discovered, the Burn Boss, Project Manager, or Crew Supervisor shall stop operations in the immediate area of the discovery, protect the remains and objects, and immediately notify the SFO Archaeologist and the Field Office Manager (or authorized officer) of the discovery. The Crew Supervisor, Contractor, or Contracting Officer's Representative (COR) shall continue to protect the immediate area of the discovery until notified by the SFO Archaeologist and the Field Office Manager (or authorized officer) that operations may resume.
- **CR-09** Section 106 of the National Historic Preservation Act 1966 requires government agencies to take into account the effect of an undertaking on all federal lands. Since the proposed project involves an undertaking that may require ground disturbing activities, for example; handline construction, mechanical grubbing, off-road vehicle and equipment use, the project area will be surveyed (Class I & Class III) for cultural resources prior to implementation of the fireline and infrastructure preparation work.
- **CR-10** Upon completion of the Class III cultural resource survey, the SFO Archaeologist will supervise the implementation phase, which includes protection and preservation of the cultural resource sites discovered on the survey. This task will be accomplished by the installation of flagged buffer areas that will serve as avoidance areas during all phases of project implementation. The Fuels Program Manager shall review the prescribed cultural resource protection treatments with the SFO archaeologist and ensure that a copy of the cultural resource report summary is placed in the project folder.
- **CR-11** All Identified cultural sites will be avoided during ground disturbing activities such as off road vehicle travel. The SFO archaeologist will be consulted during access route and staging area placement and will have the opportunity to visit the proposed areas with the Project Manager prior to Implementation.

6.1.5 Erosion Control (EC)

The following erosion control best management practices will be applied to all treatments identified in the proposed action:

- **EC-01**Areas within treatment units that have little to no ground cover of native grasses will have thinned juniper trees completely masticated into mulch, with mulch being left onsite to provide ground cover.
- **EC-02** Areas of chainsaw thinning within the 300 foot buffer areas surrounding riparian areas, streams, or drainages will have slash generated during the thinning process lop and scattered to provide ground cover. Slash will be lopped and scattered so that no parts of the tree trunk or limbs are left higher than 2 foot above ground level. Severed limbs and trunks will be scattered evenly and not piled.

- **EC-03** Stumps will be flush cut with no stump higher than 12" above ground level, measured on the uphill side of the stump.
- **EC-04** Use heavy equipment on dry or frozen ground to minimize soil rutting.

6.1.6 Equipment Staging and Maintenance (ES)

The following road maintenance best management practices will be applied to all treatments identified in the proposed action:

- **ES-01** Equipment will be well maintained and void of any high volume fluid leaks.
- **ES-02** Fueling, equipment maintenance, equipment staging, and overnight parking will be taken care of in treatment staging areas or other designated equipment storage areas.
- **ES-03** Fuel transport and field storage will only occur in DOT approved safety fuel containers or transfer tanks during treatment implementation.
- **ES-04** Cleanup-Spills of hydraulic fluid, oil, antifreeze, etc. fewer than 10 gallons in size will be scooped up, bagged, and disposed of properly.
- **ES-05** During servicing or refueling of equipment, pollutants from equipment are not allowed to enter any waterway, riparian area or stream course. Select service and refueling areas well away from wet areas and surface water.

6.1.7 Grazing Management (GM)

The following grazing best management practices will be utilized during implementation of the proposed action:

- **GM-01** Livestock grazing will be deferred for two growing seasons (July through September) following the mechanical treatment.
- **GM-02** Dormant season livestock grazing (October through June) will be done through approval of the grazing management portion of the CRM plan on a yearly basis dependent on precipitation and forage production.
- **GM-03** The proposed action does not include an increase in the available AUM's in individual grazing allotments post treatment.
- **GM-04** Coordination with the affected livestock permittees within the allotments being treated would be conducted prior to any treatment occurring.
- **GM-05** Any livestock grazing closure for the purpose of the vegetation treatment would be done through the grazing decision or agreement process and would occur prior to the treatment.
- **GM-06** Livestock grazing would not be authorized within the treatment areas during implementation of the selected alternative.
- **GM-07** After the deferment period, a deferred rotational grazing system will be implemented on the remainder of the pastures to allow herbaceous cover to re-grow, regain vigor, produce seed, and establish new plants when climatic conditions are favorable.
- **GM-08** Monitoring data will be collected within key areas and will be used to guide the grazing management of the allotment

6.1.8 Invasive or Noxious Weeds (NW)

The following noxious weed best management practices will be applied to all treatments identified in the proposed action:

- **NW-01** All equipment utilized from out of the local area will be pressure washed prior to arriving on site for treatment implementation
- **NW-02** All BLM equipment will be cleaned prior to being moved from one area to the next.
- **NW-03** All contract equipment and support vehicles will be pressure washed prior to arrive for treatment implementation.
- **NW-04** Design vegetation treatments to retain native vegetation in and around project activity areas.
- **NW-05** Locate treatment staging areas for refueling, equipment maintenance, materials and operating supplies in weed-free areas.

6.1.9 Rehabilitation Practices (RP)

Rehabilitation practices will include as needed:

- **RP-01** Access routes, staging areas, and areas with increased erosion potential due to treatment implementation will be rehabilitated following treatment implementation as needed.
- **RP-02** Hydro-mulching with certified weed free straw based mulch with plant based soil tackifier, seedless versions of hydro-mulch.
- **RP-03** Straw waddles, water bars, or silt fences.
- **RP-04** Utilization of slash (mulch, limbs, braches, etc.) generated during thinning treatments as erosion control material.
- **RP-05** Rehab needs will be evaluated upon completion of thinning treatments.
- **RP-06** Rehab treatments will be implemented prior to the next monsoon season following treatment.
- **RP-07** Rehab of access routes and equipment staging areas may include harrowing techniques to break up soils.

6.1.10 Riparian/Wetland/Stream Courses (RW)

Riparian, Wetland, and Loamy Bottom Ecological Site best management practices include:

- **RW-01** Areas of Loamy Bottom ecological site will not be treated.
- **RW-02** Wash areas will be left for wildlife travel corridors and habitat.
- **RW-03** A 300-foot buffer will be delineated around washes and perennial water-bodies to designate where no surface disturbance will occur. This will prevent any sediment movement offsite into washes or water-bodies within or adjacent to the proposed project area.
- **RW-04** Slash may be placed in minor drainages to aid in rebuilding of deeply incised gullies and headcuts, although no burning of slash in drainages or depressions is allowed.
- **RW-05** Piling of slash for burning should occur as far as possible from the stream channel.

- **RW-06** Ensure that sediment from disturbed areas does not directly enter the stream system through combinations of seeding, waterbars, wattles, or spreading slash.
- **RW-07** Locations of protected stream courses and filter strips will be shown on the treatment area maps. Riparian areas and meadows to be protected are also shown on treatment area maps.
- **RW-08** Around and within ephemeral drainages, no road construction should be allowed in or immediately adjacent to ephemeral streams. Designated channels to be treated with slash are generally located in the headwaters of ephemeral drainages. Do not cut trees where the root system is important in maintaining the integrity of the bank.

6.1.11 Wildlife Habitat (WH)

The following wildlife best management practices will be utilized during implementation of the proposed action:

- **WH-01** Areas or groups of untreated juniper with uneven ambiguous borders in each ecological site will also remain for wildlife habitat.
- **WH-02** Survey for species of concern when a project may impact sensitive or protected species (e.g. federally and state listed species) and/or habitat.
- **WH-03** Limit the size and intensity of disturbances within critical habitats or areas where protect/sensitive species are present that could be affected by disturbance. Limit activities that may result in long-term and/or cumulative impacts to sensitive species habitats (e.g. breeding, nesting, fawning, etc.)
- **WH-04** Maintain appropriate vegetative/riparian buffers between treatment areas and water bodies to protect water quality.

6.2 Conservation Measures

The following Conservation Measures will be implemented during fire suppression operations, including adaptively managed fires, unless firefighter or public safety, or the protection of property, improvements, or natural resources, render them infeasible during a particular operation. Each Conservation measure has been given an alphanumerical designation for organizational purposes (e.g., FS-1). Necessary modifications of the Conservation Measures or impacts to Federally protected species and habitat during fire suppression operations will be documented by the Resource Advisor, and coordinated with the United States Fish and Wildlife Service (USFWS).

6.2.1 Wildland Fire Suppression (FS)

- **FS-01** Protect known locations of habitat occupied by Federally listed species. Best Management Practices and Minimum Impact Suppression Tactics (M.I.S.T) will be followed in all areas with known Federally protected species or habitat.
- **FS-02** Resource Advisors will be designated to coordinate natural resource concerns, including Federally protected species. They will also serve as a field contact representative (FCR) responsible for coordination with the USFWS. Duties will include identifying protective measures endorsed by the Field Office

Manager, and delivering these measures to the Incident Commander; surveying prospective campsites, aircraft landing and fueling sites; and performing other duties necessary to ensure adverse effects to Federally protected species and their habitats are minimized. On-the-ground monitors will be designated and used when fire suppression activities occur within identified occupied or suitable habitat for Federally protected species.

- **FS-03** All personnel on the fire (firefighters and support personnel) will be briefed and educated by Resource Advisors or designated supervisors about listed species and the importance of minimizing impacts to individuals and their habitats. All personnel will be informed of the conservation measures designed to minimize or eliminate take of the species present. This information is best identified in the incident objectives.
- **FS-04** permanent road construction will not be permitted during fire suppression activities in habitat occupied by Federally protected species. Construction of temporary roads is approved only if necessary for safety or the protection of property or resources, including Federally protected species habitat. Temporary road construction should be coordinated with the USFWS, through the Resource Advisor.
- **FS-05** Crew camps, equipment staging areas, and aircraft landing and fueling areas should be located outside of listed species habitats, and preferably in locations that are disturbed. If camps must be located in listed species habitat, the Resource Advisor will be consulted to ensure habitat damage and other effects to listed species are minimized and documented. The Resource Advisor should also consider the potential for indirect effects to listed species or their habitat from the siting of camps and staging areas (e.g., if an area is within the water flow pattern, there may be indirect effects to aquatic habitat or species located off-site).
- **FS-06** All fire management protocols to protect Federally protected species will be coordinated with local fire suppression agencies that conduct fire suppression on BLM-administered lands to ensure that the agency knows how to minimize impacts to Federally protected species in the area.
- **FS-07** The effectiveness of fire suppression activities and Conservation Measures for Federally protected species should be evaluated after a fire, when practical, and the results shared with the USFWS and Arizona Game and Fish Department (AGFD). Revise future fire suppression plans and tactical applications as needed and as practical.

6.2.2 Fuels Treatments (FT)

The following Conservation measures are mandatory when implementing prescribed fires and the proposed vegetation treatments (mechanical, chemical, biological).

- **FT-01** Biologists will be involved in the development of prescribed burn plans and vegetation treatment plans to minimize effects to Federally protected species and their habitats within, adjacent to, and downstream from proposed project sites. Biologists will consider the protection of seasonal and spatial needs of Federally protected species (*e.g.*, avoiding or protecting important use areas or

structures and maintaining adequate patches of key habitat components) during project planning and implementation.

- **FT-02** Best Management Practices (BMP's) and M.I.S.T. will be followed in all areas with known Federally protected species or habitats.
- **FT-03** Pre-project surveys and clearances (biological evaluations/assessments) for Federally protected species will be required for each project site before implementation. All applicable Conservation Measures will be applied to areas with unsurveyed suitable habitat for Federally protected species, until a survey has been conducted by qualified personnel to clear the area for the treatment activity.
- **FT-04** Use of motorized vehicles during prescribed burns or other fuels treatment activities in suitable or occupied habitat will be restricted, to the extent feasible, to existing roads, trails, washes, and temporary fuelbreaks or site-access routes. If off-road travel is deemed necessary, any cross-country travel paths will be surveyed prior to use and will be closed and rehabilitated after the prescribed burn or fuels treatment project is completed.
- **FT-05** As part of the mandatory fire briefing held prior to prescribed burning, all personnel (firefighters and support personnel) will be briefed and educated by Resource Advisors or designated supervisors about listed species and the importance of minimizing impacts to individuals and their habitats. All personnel will be informed of the Conservation Measures designed to minimize or eliminate take of the species present.

6.2.3 Rehabilitation and Restoration (RR)

- **RR-01** When rehabilitating important areas for Federally listed species that have been damaged by fire or other fuels treatments, the biologist will give careful consideration to minimizing short-term and long-term impacts. Someone who is familiar with fire impacts and the needs of the affected species will contribute to rehabilitation plan development. Appropriate timing of rehabilitation and spatial needs of Federally listed species will be addressed in rehabilitation plans.
- **RR-02** Seed from regionally native or sterile non-native species of grasses and herbaceous vegetation will be used in areas where reseeding is necessary following ground disturbance to stabilize soils and prevent erosion by both wind and water.
- **RR-03** Sediment traps or other erosion control methods will be used to reduce or eliminate influx of ash and sediment into aquatic systems.
- **RR-04** Use of motorized vehicles during rehabilitation or restoration activities in suitable or occupied habitat will be restricted, to the extent feasible, to existing roads, trails, or washes, and to temporary access roads or fuelbreaks created to enable the fire suppression, prescribed burn, or fuels treatment activities to occur. If off-road travel is deemed necessary, any cross-country travel paths will be surveyed prior to use and will be closed and rehabilitated after rehabilitation or restoration activities are completed.
- **RR-05** All temporary roads, vehicle tracks, skid trails, and off-road vehicle (ORV) trails resulting from fire suppression and the proposed fire management

activities will be rehabilitated (water bars, etc.), and will be closed or made impassible for future use.

- **RR-06** Burned area emergency rehabilitation (BAER) activities and long-term restoration activities should be monitored, and the results provided to the USFWS and AGFD. Section 7 Consultation for BAER activities will be conducted independently, if necessary.

The following Conservation Measures will be implemented during fire suppression operations in riparian, wetland, or aquatic habitats, unless firefighter or public safety, or the protection of property, improvements, or natural resources, render them infeasible during a particular operation. Necessary modifications of the Conservation Measures or impacts to Federally protected species and habitat during fire suppression operations will be documented by the Resource Advisor, and coordinated with the USFWS.

6.2.4 Riparian and Aquatic Habitats (RA)

Wildland Fire Suppression (including adaptively managed wildfires) and Rehabilitation

- **RA-01** During wildfire suppression, apply M.I.S.T. within riparian habitats occupied by Federally protected species or designated areas that drain into Federally protected fish habitat. Fire suppression actions in riparian habitats should be prioritized to minimize damage to stands of native vegetation from wildfire or suppression operations. To the extent possible, retain large, downed woody materials and snags that are not a hazard to firefighters.
- **RA-02** Fire suppression and rehabilitation in riparian corridors with Federally protected fish or wildlife species will be coordinated with the Resource Advisor or qualified biologist approved by BLM.
- **RA-03** Site-specific Fire Management Plans that include project areas with Federally protected aquatic or riparian-obligate species will specify fire management objectives and wildland fire suppression guidance, taking into account the special concerns related to these species.
- **RA-04** In riparian habitats occupied by Federally protected species, use natural barriers or openings in riparian vegetation as the easiest, safest method to manage a riparian wildfire. Where possible and practical, use wet firebreaks in developing or sandy overflow channels rather than constructing firelines by hand or with heavy equipment.
- **RA-05** Crossings of perennial streams in suitable or occupied T&E habitat will not be permitted, unless an established road already exists or where dry, intermittent sections occur.
- **RA-06** Avoid the use of fire retardants or chemical foams in riparian habitats or within 300 feet of aquatic habitats, particularly sites occupied by Federally protected species. Apply operational guidelines as Stated in the *Interagency Standards for Fire and Fire Aviation Operations 2003 (or updates)*, "Environmental Guidelines for Delivery of Retardant or Foam Near Waterways," Chapter 8 (pp. 8-13 through 8-15).

- **RA-07** Priority for placement of fire camps, fire staging areas, and aircraft landing or refueling sites will be outside riparian habitats or river/stream corridors occupied by Federally protected species.
- **RA-08** When using water from sources supporting Federally protected species, care must be taken to ensure adverse impacts to these species are minimized or prevented. Consider replacing water when appropriate. Unused water from fire abatement activities will not be dumped in sites occupied by Federally protected aquatic species to avoid introducing non-native species, diseases, or parasites.
- **RA-09** Use of containment systems for portable pumps to avoid fuel spills in riparian or aquatic systems will be required.
- **RA-10** (Recommended) Develop and implement restoration plans for affected riparian or aquatic habitats, including long-term monitoring, to document changes in conditions in the riparian zone and watershed that maintain flood regimes and reduce fire susceptibility. Monitor stream water quality and riparian ecosystem health to determine effects of wildfire and fire management activities. Coordinate efforts and results with the USFWS and AGFD.

The following Conservation Measures are mandatory when implementing wildland fire use, prescribed fires, and the proposed vegetation treatments (mechanical, chemical, and biological) within riparian, wetland, or aquatic habitats.

6.2.5 Fuels Treatments (RA)

- **RA-11** All Conservation Measures for wildland fire suppression (**RA-1 to RA-10**) also apply to fuels treatment activities (prescribed fire; mechanical, chemical, and biological treatments) in riparian, wetland, and aquatic habitats with suitable habitat for TEP species.
- **RA-12** Fire management treatments within or adjacent to riparian and aquatic habitats will be designed to provide long-term benefits to aquatic and riparian resources with TEP species by reducing threats associated with dewatering and surface disturbance, or by improving the condition of the watershed and enhancing watershed function.
- **RA-13** For priority fire/fuels management areas (*e.g.*, WUIs) with Federally protected species or designated critical habitat downstream, BLM biologists and other resource specialists, as appropriate, in coordination with USFWS and AGFD, will determine:

    - The number of acres and the number of projects or phases of projects to occur within one watershed per year.

    - An appropriately-sized buffer adjacent to perennial streams in order to minimize soil and ash from entering the stream.

    - Where livestock grazing occurs in areas that have been burned, specialists will determine when grazing can be resumed. Such

deferments from grazing will only occur when necessary to protect streams from increased ash or sediment flow into streams.

The following Conservation Measures for known locations and unsurveyed habitat of all Federally protected plant species within the planning area will be implemented during fire suppression to the extent possible, and are mandatory for prescribed fire and vegetation treatment activities.

6.2.6 Bald Eagle (BE)

- **BE-01** No human activity within ½ mile of known bald eagle nest sites between December 1 and June 30.
- **BE-02** No tree cutting within ¼ mile of known nest trees.
- **BE-03** No human activity within ¼ mile of known bald eagle winter roost areas between October 15 and April 15.
- **BE-04** No tree cutting within the area immediately around winter roost sites as determined by BLM biologists.
- **BE-05** Provide reasonable protective measures so fire prescription or fuels treatment will not consume dominant, large trees as identified by the Resource Advisor or qualified biologist approved by BLM within ½ mile of known nests and roosts of bald eagles Pretreatment efforts should provide reasonable protection of identified nesting and roosting trees.

6.2.7 Golden Eagle (GE)

- **GE-01** No project activity within 1 mile of potential or known golden eagle nest sites from February through April, unless surveys indicate no active nests. This area includes:
  T15N, R18E, a portion of Section 6
  T16N, 16E, Section 28
  T16N, 17E, a portion of Section 6
  T17, R17E, Section 28
- **GE-02** No mechanical thinning with chainsaws within 0.5 mile of known nest sites from May through January.
- **GE-03** No mechanical thinning by brush rake, mastication, or bio-mass utilization within 0.25 miles of known nest trees from May through January.

6.2.8 Ferruginous Hawk (FH)

- **FH-01** No juniper removal will be done within 0.5 miles of an occupied nest during the months of April through August.
- **FH-02** If a large stick nest (may be on ground, ledge, or tree) is discovered during juniper treatments, work will stop in that area and a BLM biologist will be contacted to survey if the nest is occupied or not, or nest will be assumed to be occupied and project activity excluded within 0.25 miles of the nest location from September through March. Nest locations and avoidance areas will be coordinated with BLM staff within 48 hours of their discovery.

6.2.9 Pinon Jay (PJ)

- **PJ-01** To ensure that pinyon jay nests and recruitment are not disrupted, juniper removal will not occur between February 21 and July 1, or surveys for nesting colonies will be completed during the month of February and areas of nest colonies will not be treated from February through May.

6.2.10 Pronghorn Antelope (PA)

- **PA-01** During the months of May through July, vehicles will not cross large open areas but will follow the perimeter of standing juniper to avoid disturbing antelope fawns.

7 Appendix B-Glossary of Terms

Available Fuel

1. That portion of the total fuel (vegetation) that would actually burn under various environmental conditions.
2. Fuel available for use in a motor vehicle, aircraft, or other motorized equipment.

Best Management Practices

1. A suite of techniques that guide, or may be applied to management actions, to aid in achieving desired outcomes. The term, "standard operating procedures" (SOP) is sometimes used instead of best management practices (BMP's).

Bio-mass, Woody Bio-mass

1. Woody Biomass is defined as the by-product of management, restoration, and hazardous fuel reduction treatments, including trees and woody plants (i.e., limbs, tops, needles, leaves, and other woody parts, grown in a forest, woodland, or rangeland environment). This document may use the word "biomass" and phrase "woody biomass" interchangeably. The reader should realize woody biomass is being discussed specifically in both instances.

Bio-mass, Woody Bio-mass Utilization

1. Woody Biomass Utilization (WBU) is defined as the harvest, sale, offer, trade, and/or use of woody biomass. This utilization results in the production of a full range of wood products, including timber, engineered lumber, paper and pulp, furniture, and value-added commodities, as well as bioenergy and/or biobased products such as plastics, ethanol, and diesel.

Broadcast Burning

1. Prescribed burning activity where fire is applied generally to most or all of an area within well-defined boundaries for reduction of fuel hazard, as a resource management treatment, or both.

Burning Conditions

1. The state of the combined factors of the environment that affect fire behavior in a specified fuel type.

Brush Management

1. Manipulation of stands of brush by manual, mechanical, chemical, or biological means or by prescribed burning for the purpose of achieving land management objectives. Vegetation management is often used instead of brush management.

Canopy

1. The stratum containing the crowns of the tallest vegetation present (living or dead), usually above 20 feet.

Community Wildfire Protection Plan (CWPP)

1. A CWPP is a plan that communities create, in collaboration with emergency management and land management agencies, allowing them to be proactive in managing their wildfire risk.

Condition Class

1. Depiction of the degree of departure from historical fire regimes, possibly resulting in alternations of key ecosystem components. These classes categorize and describe vegetation composition and structure conditions that currently exist inside the Fire Regime Groups. Based on the coarse-scale national data, they serve as generalized wildfire rankings. The risk of loss of key ecosystem components from wildfires increases from Condition Class 1 (lowest risk) to Condition Class 3 (highest risk).

Desired Future Condition (DFC)

1. Land or resource conditions that are expected to result if goals and objectives are fully achieved
2. A type of land-use plan decision expressed as a goal or objective

Ecological Site Description

1. Description of soils, uses, and potential of a kind of land with specific physical characteristics to produce distinctive kinds and amounts of vegetation.

Evaluation

1. An examination and judgment concerning the worth, quality, significance, amount, degree, or condition of something.
2. The systematic process for determining the effectiveness of on-the-ground management actions and assessing progress toward meeting management objectives.

Exotic Species

1. Includes species introduced into an area that may have adapted to the area and compete with resident (indigenous) species.

Fire Behavior

1. The manner in which a fire reacts to the influences of fuel, weather, and topography.

Fire Frequency

1. A general term referring to the recurrence of fire in a given area over time.

Fire Regime

1. Description of the patterns of fire occurrences, frequency, size, severity, and sometimes vegetation and fire effects as well, in a given area or ecosystem. A fire regime is a generalization based on fire histories at individual sites. Fire regimes can often be described as cycles because some parts of the histories usually get repeated, and the repetitions can be counted and measured, such as fire return interval.

Fire Regime Condition Class

1. A qualitative measure classified into three classes describing the relative degree of departure from historical fire regimes, possibly resulting in alterations of key ecosystem components such as species composition, structural stage, stand age, canopy closure, and fuel loadings.

Fire Regime Groups

1. A classification of fire regimes into a discrete number of categories based on frequency and severity. The national, coarse-scale classification of fire regime groups commonly used includes five groups:
    - I - frequent (0-35 years), low severity;
    - II - frequent (0-35 years), stand replacement severity;
    - III - 35-100+ years, mixed severity;
    - IV - 35-100+ years, stand replacement severity;
    - V - 200+ years, stand replacement severity.

Flame Length

1. The distance between the flame tip and the midpoint of the flame depth at the base of the flame (generally the ground surface), an indicator of fire intensity.

Fuel Characteristics

1. Factors that make up fuels such as compactness, loading, horizontal continuity, vertical arrangement, chemical content, size and shape, and moisture content.

Fuel Continuity

1. The degree or extent of continuous or uninterrupted distribution of fuel particles in a fuel bed thus affecting a fire's ability to sustain combustion and spread. This applies to aerial fuels as well as surface fuels.

Habitat Fragmentation

1. The process of dividing habitats into smaller and smaller units until their utility as habitat is lost.

Integrated Vegetation Management

1. To unite the various programs within the BLM toward achieving a common goal of protecting, maintaining, and restoring ecologically diverse and properly functioning native plant communities on public land.

Interdisciplinary Process

1. The act of drawing from two or more academic disciplines and integrating their insights to work together in pursuit of a common goal.

Land Use Plan

1. A set of decisions that establishes management direction for land within an administrative area, as prescribed under the planning provisions of FLPMA.
2. An assimilation of land-use-plan-level decisions developed through the planning process outlined in 43 CFR 1600, regardless of the scale at which the decisions were developed.
3. The term includes both resource management plans (RMPs) and management framework plans (MFPs).

Light (Fine) Fuels

1. Fast-drying fuels, generally with a comparatively high surface area-to-volume ratio, which are less than 1/4-inch in diameter and have a timelag of 1 hour or less. These fuels readily ignite and are rapidly consumed by fire when dry.

Lopping

1. After felling, cutting branches, tops, and unwanted boles into lengths such that resultant logging debris will lie close to the ground

Lop and Scatter

1. Use of chain saws to buck or cut felled tree and shrub limbs and braches into small easily scattered pieces. Cut material is then scattered evenly around site where tree or shrub originally stood.
2. Lopping logging debris and spreading it more or less evenly over the ground.

Mastication

1. Mulching, chopping, shredding, chipping, or grinding of vegetation utilizing vertical or horizontal style cutting heads.

Mastication Equipment

1. Rubber tired, rubber tracked, or steel tracked heavy equipment equipped with mastication attachments utilized for vegetation thinning treatments.

Monitoring

1. The regular collection of data over time to evaluate whether objectives or land health standards are being achieved.
2. The regular collection of data over time to evaluate the effectiveness of management actions.

Noxious Weed

1. A plant species designated by federal or state law as generally possessing one or more of the following characteristics: aggressive and difficult to manage; parasitic; a carrier or host of serious insects of disease; or non-native, new, or not common to the United States.

Prescribed Fire (Burn)

1. Any fire ignited by management actions to meet specific objectives. A written, approved prescribed fire plan must exist, and national Environmental Protection Act (NEPA) requirements (where applicable) must be met, prior to ignition.

Objective

1. A description of a desired condition; quantified and measured, and where possible, with established time frames for achievement.
2. Specific, achievable, measurable, time-limited results to be achieved through land management practices, either through a description of a desired condition or the degree of desired change in an attribute.

Project Objectives

1. The specific results expected from completing a project.

Parameter

1. A variable which can be measured quantitatively; sometimes, an arbitrary constant; associated with populations. One of the unknown values that determine a model.

Rangeland

1. Land on which the native vegetation, climax or natural potential consists predominantly of grasses, grass-like plants, forbs, or shrubs. The term includes re-vegetated naturally or artificially to provide a non-crop plant cover that is managed like native vegetation. Rangeland may consist of natural grasslands, savannahs, shrublands, most deserts, tundra, alpine communities, coastal marshes and wet meadows.

Slash

1. Debris resulting from such natural events as wind, fire, or snow breakage; or such human activities as road construction, logging, pruning, thinning, or brush cutting. It includes logs, chunks, bark, branches, stumps, and broken understory trees or brush.

Slash Disposal

1. Treatment of slash to reduce fire hazard or for other purposes. (Preferred to Brush Disposal).

Small Diameter Wood Product Utilization

1. Small-Diameter Utilization (SDU) refers to a more specific size class of woody biomass that includes small-diameter trees that do not meet minimum specifications for sawlogs, but are large enough to be used as posts, poles, tree stakes, small pulplogs, or other similar forest products.

8 Appendix C-References Cited

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