
United States Department of the Interior
Bureau of Land Management
Safford Field Office
Safford, AZ



Environmental Assessment
DOI-BLM-AZ-G010-2014-0014

Oak Creek Allotment Herbicide Treatment

**UNITED STATES DEPARTMENT OF THE INTERIOR
BUREAU OF LAND MANAGEMENT
SAFFORD FIELD OFFICE
GRAHAM COUNTY, ARIZONA**



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1 Introduction

1.1 Identifying Information

Title: Oak Creek Allotment Herbicide Treatment

EA Number: DOI-BLM-AZ-G010-2014-0014

Type of Project: Vegetation management

Name and Location of Preparing Office:

Bureau of Land Management (BLM) Safford Field Office
Safford, Arizona

General Location: Approximately 15 miles south of San Simon, Cochise County, Arizona.
Township 16 South, Range 30 East, sections 12, 13, 14, 23;
Township 16 South, Range 31 East, sections 7 and 18, of the Gila and Salt
River Base Meridian.

1.2 Introduction

This Environmental Assessment (EA) has been prepared to disclose and analyze the environmental consequences of the Oak Creek Allotment Herbicide Treatment project as proposed by the BLM Safford Field Office.

The EA is a site-specific analysis of potential impacts that could result with the implementation of a proposed action or alternatives to the proposed action. The EA assists the BLM in project planning and ensuring compliance with the National Environmental Policy Act (NEPA), and in making a determination as to whether any “significant” impacts could result from the analyzed actions (“significance” is defined by NEPA and is found in regulation 40 CFR 1508.27). An EA provides evidence for determining whether to prepare an Environmental Impact Statement (EIS) or a statement of Finding of No Significant Impact (FONSI). If the decision maker determines that this project has “significant” impacts following the analysis in the EA, then an EIS would be prepared for the project. If not, a Decision Record (DR) may be signed for the EA, approving the selected alternative, whether the proposed action or another alternative. A DR, including a FONSI statement, documents the reasons why implementation of the selected alternative would not result in “significant” environmental impacts (effects).

1.3 Background

The valleys of southeastern Arizona were dominated by grasslands until the late 19th century. Shrubs and low growing trees have always been present in Arizona’s grasslands, but historically were largely limited to drainages or to rocky shallow soil areas (Bahre, 1991). Historical overgrazing by livestock of Arizona’s grasslands, climate change, and

drought has led to invasion of woody shrubs causing a large increase in density and establishment into sites where they did not previously occur. Vast areas of the landscape function below their potential in terms of habitat provision and watershed stability because of past resource use and extraction. These sites have been altered to a degree that prevents recovery without human intervention. Once invasive shrubs become established they tend to increase in density and out-compete other native vegetation for soil moisture, nutrients, and sunlight. They are less susceptible to drought than herbaceous species. Lands with high densities of invasive brush typically exhibit accelerated soil erosion rates, decreased water infiltration and decreased biodiversity. Arizona has experienced degraded water quality due to erosion and an interrupted hydrologic cycle as a result of these vegetative changes. Mesquite, acacia, and mimosa are now dominating landscapes that used to be grasslands to the point that vast areas do not provide the same quality of wildlife habitat they did prior to European settlement. With the exception of riparian systems, much of the change is the result of an altered fire regime due to the removal of grass, which is the primary carrier of fire in semi-arid systems, and fire suppression.

The BLM is proposing treatment of approximately 1,015 acres within the Oak Creek Allotment to reduce woody vegetation and establish an equilibrium between woody species and perennial grasses within the allotment (Map 1). The U.S. Department of Agriculture – Natural Resources Conservation Service (NRCS) and the permittee would participate as partners in the project.

1.4 Purpose and Need

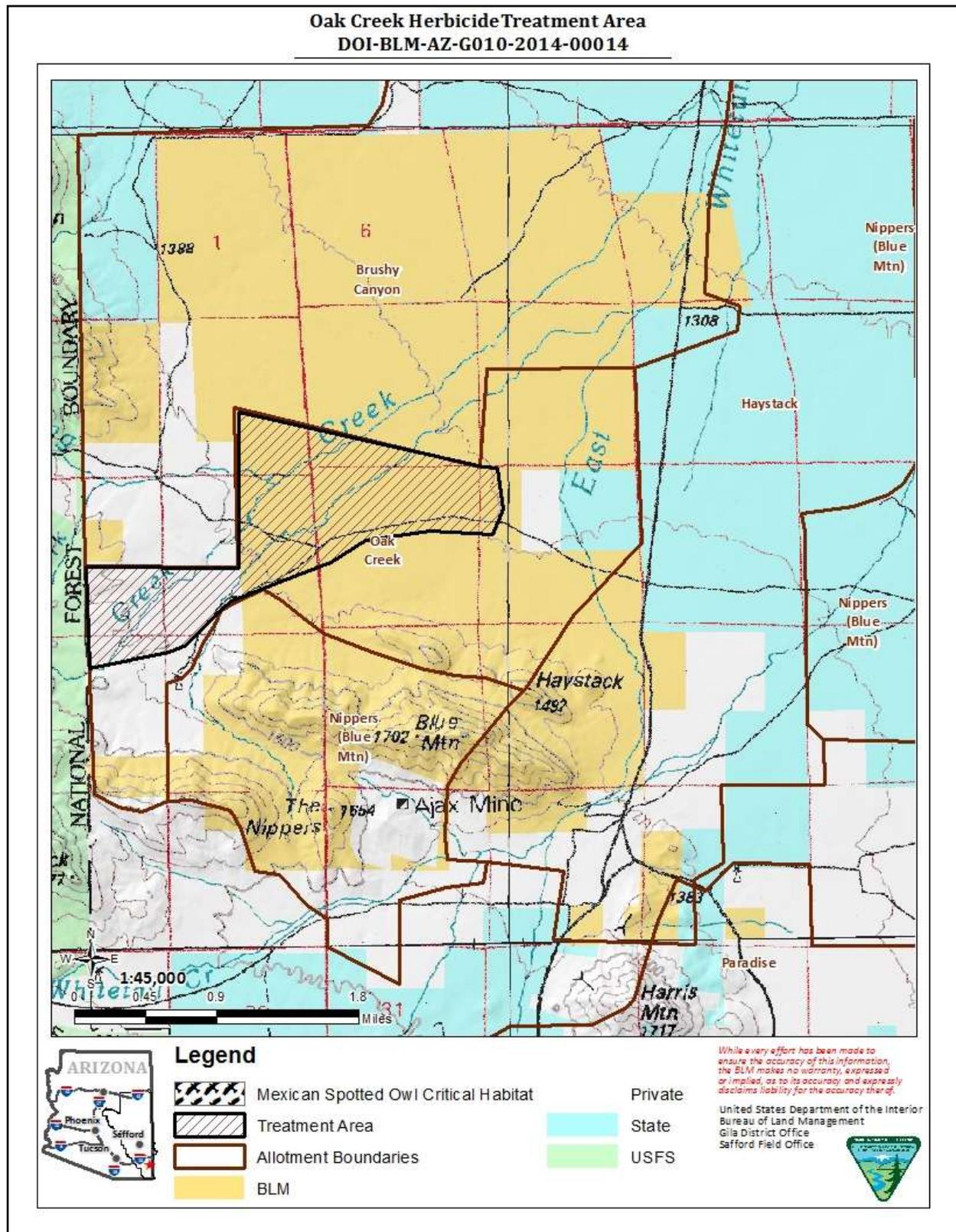
The BLM's purpose for the action is to improve the balance of shrubs and grasses, reduce runoff and soil erosion within the watershed, and increase wildlife habitat values within the Oak Creek Allotment.

The need for action is established by the BLM's responsibility under the Federal Land Policy and Management Act (FLPMA; 43 USC 1701 et seq.) to manage public lands in a manner that protects the quality of ecological, environmental, and water resource values (43 USC 1701.a.8) and to manage on the basis of multiple use and sustained yield (43 USC 1701.a.7). The need for this action is also established by BLM's responsibility under the Public Rangelands Improvement Act of 1978 to "manage, maintain, and improve the condition of the public rangelands so that they become as productive as feasible for all rangeland values..." (43 USC 1901.b.2). Throughout the area invading brush species, including mesquite (*Prosopis juliflora* var. *velutina*), wait-a-minute bush (*Mimosa biuncifera*), catclaw (*Acacia greggii*), and whitethorn (*Acacia constricta*), have increased and are preventing native grasses from flourishing, compared to reference site conditions described in ecological site descriptions compiled by the NRCS.

1.5 Decision to be Made

The BLM will decide whether or not to conduct an aerial herbicidal brush control treatment on the Oak Creek Allotment.

Map 1: Oak Creek Allotment Boundary



1.6 Conformance with BLM Land Use Plan(s)

The proposed action is in conformance with the Approved Safford Resource Management Plan/Record of Decision (RMP, ROD) (BLM 1991, 1993).

The proposed action is in conformance with the Safford RMP because it is specifically provided for in the following decisions:

Management Concern 7 Vegetation: Upland vegetation on public lands within the Safford District will be managed for livestock use, watershed protection, reduction of non-point source pollution, threatened and endangered species protection, priority wildlife habitat, firewood and other incidental human uses. Best management practices and vegetation manipulation will be used to achieve desired plant community management objectives. Treatments may include various mechanical, chemical and prescribed fire methods.

1.7 Relationship to Statutes, Regulations, or Other Plans

BLM's authority for management of upland vegetation (vegetation outside riparian zones) comes from the *Endangered Species Act (1973)*, *Taylor Grazing Act (1934)*, *Public Rangelands Improvement Act (1978)* and *The Federal Land Policy and Management Act (1976)*. These laws require BLM to manage vegetation for its use while maintaining sufficient ground cover to maintain and enhance watershed condition and reduce non-point source pollution from rangeland management and use activities.

The project will occur on public (BLM) land and private lands. The project conforms with decisions in the Arizona Statewide Land Use Plan Amendment for Fire, Fuels and Air Quality Management, 2003, Eastern Arizona Grazing EIS, 1986, Vegetation Treatments on BLM Lands in 13 Western States Programmatic Environmental Impact Statement, 1991, and Vegetation Treatments Using Herbicides on Bureau of Land Management Lands in 17 Western States Programmatic Environmental Impact Statement (PEIS), 2007.

1.8 Scoping, Public Involvement and Identification of Issues

The Council on Environmental Quality (CEQ) defines scoping as "... an early and open process for determining the scope of issues to be addressed and for identifying significant issues related to a proposed action" (40 CFR 1501.7). Scoping is an important underpinning of the NEPA process that encourages public input and helps focus the environmental impact analysis on relevant issues.

Scoping letters were sent to interested parties on November 9, 2012, to solicit input on the proposed actions and to identify issues; the deadline for comments was November 30, 2012 (Appendix A). Although the scoping letter sent out indicated that this would be a decision under BLM grazing regulations, a re-evaluation of the proposed action has resulted in the action now being taken as a vegetation management activity, since actions

would be taken under the grazing regulations. However, the same issues will be addressed, and the scoping comments received were used to craft this EA.

The following issues were identified by interested parties:

- Would the foraging habitat of the Lesser-Nosed Bat be affected?
- Would Jaguar and Ocelot habitats be disturbed?
- Would the project site's proximity to the Mexican Spotted Owl habitat disturb the species?
- Would the proposed action hinder or help erosion?
- Would the proposed action cause shrub increase?
- Where would the permittee's cattle be relocated to during the rest period?
- What are the overall impacts to the watershed?
- What is the fire history of the area and how would future fires impact the treatment area?

Additionally, the proposed action and alternatives were reviewed by the appropriate BLM specialists. The following resources were identified as potential issues: livestock/grazing management, vegetation, wildlife habitat and diversity, and Threatened and Endangered Species. Refer to Table 1, Potentially Impacted Elements/Resources, for the issues to be analyzed.

2 PROPOSED ACTION AND 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 BLM interdisciplinary team considered both alternatives to determine which action would be best for meeting the goals specified in the purpose and need. The alternatives considered but eliminated from further analysis are described in Section 2.3, along with the rationale for not further considering these alternatives.

2.1 Proposed Action Alternative

The proposed action is to conduct herbicide treatment of approximately 1,015 acres to reduce shrub cover and density in the Oak Creek Allotment (Map 1). The reduction of shrub species would allow perennial grasses to increase, enabling this portion of the Oak Creek Allotment to convert from shrub-dominated vegetation to an equilibrium between perennial grasses and woody species.

The herbicide application would be contracted out as a one-time treatment using one of the two proposed herbicide mixes, which would primarily effects woody species, and would be applied aurally. The aircraft would utilize GPS tracking navigation systems and calibrated emitters to ensure the intended treatment areas are treated and the intended volume of herbicide is applied. In order to achieve maximum potential for success, the treatment would take place during the budding season of woody species between mid-May and mid-June, 2015.

The following describes the two different chemical mixes proposed for use for this project, as well as additives that may be beneficial to treatment. The mixes and application methods and rates are in conformance with the Vegetation Treatments PEIS (BLM 2007). Both mixes, plus additives, may be tried on different areas to see which proves the best results.

- Chemical Mix 1: Tordon 22K (picloram = active ingredient) and Reclaim (clopyralid = active ingredient)
 - This mix would be applied aerially at a rate of two pints per acre of Tordon 22K mixed with Reclaim at a rate of 0.67 to 1.33 pints per acre, according to product label mix recommendations.
- Chemical Mix 2: Reclaim (clopyralid = active ingredient) and Remedy (butoxyethyl ester [BEE] of triclopyr = active ingredient)
 - This mix would be combined with water, surfactants, crop oils, or other adjuvants, for the elimination of mesquite.
 - This treatment would be applied aerially at a rate of five gallons per acre = 0.25 pounds of active ingredient per acre of each chemical.
 - The product label for Remedy recommends a tank mix with Reclaim to be applied at 0.25-0.5 pint of Remedy with 0.33-0.67 pint per acre of Reclaim. This recommendation is the equivalent of 0.125-0.25 lb. of active ingredient per acre of Reclaim and 0.125-0.25 lb. of active ingredient per acre of Remedy.
- Additives for Chemical Mixes 1 and 2: Oil-water emulsion, per label instructions, would act as a surfactant to improve herbicide absorption into leaf cells.
 - This additive would be applied aerially, with an oil-water mix of 5:1 (five parts water to one part oil) with an appropriate emulsifier.
 - Maximum application rate would not exceed one gallon of oil per acre. Dow AgroSciences recommends a 1% v/v (1:100) addition of methylated seed oil (MSO) and a non-ionic, low-foam penetrating surfactant at one quart per 100 gallons of mixture.

The proposed action abides by all of the BLM's standard operating procedures (SOPs) and best management practices.

During the treatment and for two spring and summer growing seasons the rancher would distribute their cattle to one of the Ol' Morani ranch's adjacent allotments (Oak Creek is one of the 6 BLM allotments leased by the Ol' Morani Ranch), without exceeding the grazing capacities of those allotments, and therefore the permit will be issued as "non-use" for those seasons. Allotments may be temporarily placed in "non-use" status as per 43 CFR 4130.4.

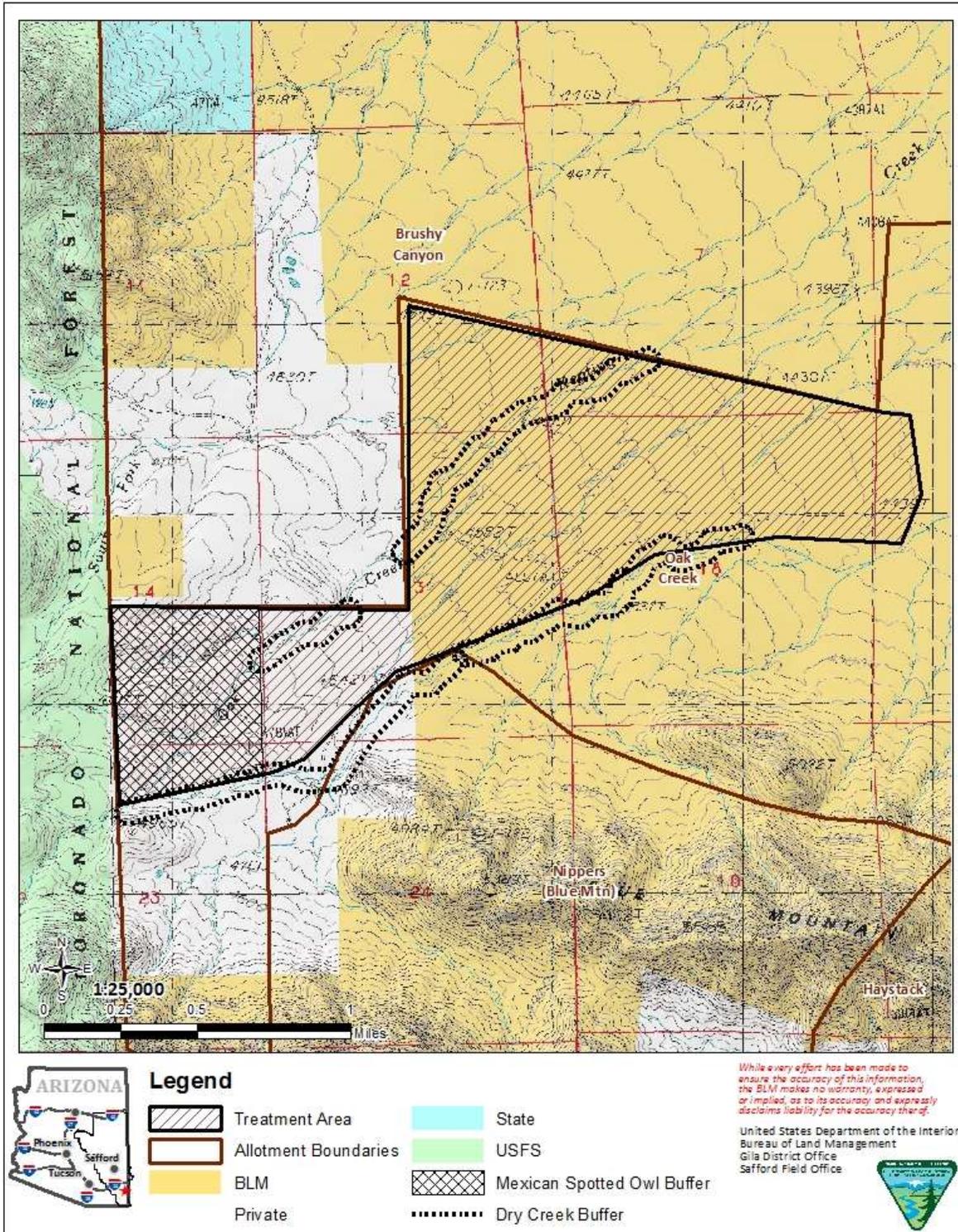
2.1.1 Design Features

The following design features are included in the proposed action to minimize impacts:

- The aerial application of liquid herbicide would require a staging area where the liquid would be loaded into an aircraft. The staging area would be located as near as possible to the application site and the aircraft would use either a nearby airport or an existing road as a landing pad. No new ground disturbance will be created for the staging area.
- The primary access road into the allotment would be closed during the treatment. If a county road is needed for aircraft staging, takeoff, and landing the county and Department of Public Safety (DPS) will be notified.
- If a chemical spill occurs at the staging area, actions would be taken to contain the spill, absorb the spill using appropriate materials, and properly dispose of the absorbent material and contaminated soil off-site.
- Herbicides would be applied at the typical, rather than the maximum, application rate.
- Applying the treatment at the appropriate droplet size would minimize possible drifting to non-target areas.
- Application would not take place, or would be discontinued, during periods of adverse weather, including wind speeds greater than six miles per hour.
- Ambient temperature would be considered and application would not occur, or would be discontinued, during times of temperature inversions (a smoke device maybe used to detect temperature inversions).
- The aircraft would be fitted with a Global Positioning System (GPS) receiver which would display the treatment and exclusion areas and track the herbicide application during flight.
- In order to maintain wildlife corridors, a 200-foot buffer would be maintained on both sides of Oak Creek and Keating Creek. No herbicides would be applied to creeks. To ensure little to no herbicide concentrations reaching downstream or permeating subsurface waters, no water would be present when the herbicide is applied (Map 2).
- No human disturbance associated with the project would occur within $\frac{1}{4}$ mile of known Mexican Spotted Owl nest sites during the nesting season, and a buffer would be designated to ensure herbicide application would only occur on areas greater than $\frac{1}{2}$ mile away from designated Mexican Spotted Owl critical habitat on Forest Service land (Map 2).
- Livestock would be removed from the treatment area before herbicide treatments are applied, and grazing would be deferred for two spring and summer growing seasons following application. Rest would be incorporated for longer than two years if precipitation is inadequate to allow recovery during the first three growing seasons. Rest may extend outside the growing season as determined by monitoring to ensure that ground cover (plant basal, leaf litter, etc.) remains on site to protect soil.
- The BLM would inspect the project area prior to treatment to ensure no people or cattle are in the treatment area.
- The occupants of the house on private land to the west of the proposed treatment area would be notified of the proposed action one month prior.
- Herbicide spraying by hand may be used following the aerial application to achieve treatment goals.

Map 2: Dry Wash and Mexican Spotted Owl Buffer Areas

**Oak Creek Herbicide Treatment Area
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2.1.2 Monitoring

The project area would be visually monitored for two weeks following the treatment to ensure no cattle are present.

The number of agaves in the treatment area would be monitored before the treatment and after for a minimum of three years to assess the herbicide's effect on agave populations. This monitoring would specifically document the mortality of agaves and growth of new agaves.

The two historical monitoring sites located in the proposed treatment area would be visited to collect long-term trend data (composition, frequency, and cover) and short-term (utilization and indicators of rangeland health) data before the treatment and for three consecutive years following the treatment. Additional monitoring sites may be established if one of the two ecological sites in the treatment is inadequately represented.

These sites would be monitored by the BLM, NRCS, and the permittee.

2.2 No Action Alternative

Under the No Action Alternative, the vegetation would not be treated with herbicides. The encroaching brush species would likely continue to increase in density and cover at the expense of perennial grass species.

2.3 Alternatives Considered but Eliminated from Further Analysis

There are three effective methods of shrub control: the first is the proposed action, chemical treatment; the second is mechanical removal; and the third is prescribed burning.

2.3.1 Mechanical

Mechanical control of shrubs is an alternative to chemical treatments. Mechanical control can involve several methods including cutting or chopping, chaining, root plowing, and grubbing. Cutting (by hand or machine) is ineffective on the target species in this area because they re-sprout. Root plowing may damage desirable plants and require reseeding, which may not be successful. Grubbing is effective on the target species and the soil disturbance may help to retain water on the site, thus aiding new grass growth. However, the costs of mechanical control are generally higher than chemical treatments. If significant cultural resources are present, mechanical treatments may have more potential impact than chemical treatments. Mechanical methods are best suited to treat relatively low-density stands of shrubs, for shrub species where effective herbicides are not available, or where chemical treatments would have unacceptable risks. BLM found that none of these conditions were met in the proposed project area, thus the mechanical control alternative was rejected because it does not meet the purpose and need of the project.

2.3.2 Prescribed Fire

Prescribed fire is another alternative for controlling shrubs. It is generally believed that periodic fire during pre-settlement times was in large part responsible for keeping shrub densities low and grass dominance of vegetation in many parts of the desert grassland. Lack of fire due to reduction of fuels by historical heavy livestock grazing and aggressive control efforts by residents and government agencies allowed shrubs to increase at the expense of grasses. However, once the woody species have encroached on an area, it may not be possible to restore grass dominance by fire because shrubs reduce the amount of fine fuel (grasses) required to carry a fire. Additionally, many of the shrub species are not killed by a single fire due to re-sprouting. Prescribed fire repeated periodically may be effective to maintain grassland once the shrub density has been reduced and grass cover increased, but it usually cannot be used to convert shrubland to grassland. This method was therefore rejected as an initial treatment for shrub control because it does not meet the purpose and need of the project, although its use as a maintenance tool is recognized.

2.3.3 Passive Restoration

Passive restoration was also considered but eliminated from further analysis because it is not an effective method for shrub control in southeastern Arizona, and therefore does not meet the purpose and need of the project. The vegetation community is already dominated by woody species which are out competing grass species. The removal of cattle from the area for any extended period of time would not establish an equilibrium between woody species and perennial grasses without further treatment.

3 AFFECTED ENVIRONMENT

3.1 Elements/Resources of the Human Environment

The BLM is required to consider many authorities when evaluating a Federal action. Table 1 lists all resources/elements of the human environment considered by BLM resource specialists in determining potential impacts of the proposed action or other action alternatives. For resources/elements that were considered but not analyzed further, the rationale for the determination is provided. If an element was determined to be potentially impacted, it was carried forward for detailed analysis and is discussed in this EA.

Table 1. Potentially Impacted Elements/Resources

Resource	Determination	Rationale for Determination
NP = Not Present in the area that would be impacted by the proposed action or other action alternative NI = Present, but not affected to a degree that would mean detailed analysis is required, or impacts disclosed previously in a separate, referenced NEPA document PI = Present with potential for impact; analyzed in detail in this EA		
Air Quality	NI	None of the alternatives are expected to have measurable impacts to air quality.
Areas of Critical Concern	NP	The project would not occur in or adjacent to Areas of Critical Environmental Concern
Cultural Resources	NI	There would be no impact to cultural resources with the proposed action because there would be no ground disturbance via aerial herbicide spraying.
Environmental Justice	NI	No disproportionately high or adverse health or environmental effects would impact low income or minority populations as a result of the proposed action or the alternatives.
Farmlands (Prime or Upland)	NP	There are no prime or unique farmlands within or near the project area.
Floodplains	NP	The project would not affect floodplains as defined by Executive Order 11988 (1977).
Grazing Management	PI	See discussion in Affected Environment/Environmental Consequences
Geology/Mineral Resources	NI	No impacts are anticipated since there would be very limited ground disturbance.
Human Health and Safety (Herbicide Projects)	PI	See discussion in Affected Environment/Environmental Consequences
Invasive Species and Nonnative Species	NP	No known noxious or invasive weed populations are present in the project area and the risks of future infestations are low with the proposed action or the alternatives.
Land Use Authorization	NI	There are no potential conflicts with existing or proposed land use authorizations.
Native American Religious Concerns	NP	No Native American cultural or religious concerns were identified within or near the project area.
Paleontological Resources	NI	There would be no impact to paleontological resources because there would be very little, if any, ground disturbance.

Resource	Determination	Rationale for Determination
NP = Not Present in the area that would be impacted by the proposed action or other action alternative NI = Present, but not affected to a degree that would mean detailed analysis is required, or impacts disclosed previously in a separate, referenced NEPA document PI = Present with potential for impact; analyzed in detail in this EA		
Recreation	NP	There are no developed recreation facilities in the project area.
Socioeconomic Values	NI	Implementation of the proposed action or alternatives would not impact socioeconomic levels.
Soils	PI	See discussion in Affected Environment/Environmental Consequences
Special Status Species – Animals	PI	See discussion in Affected Environment/Environmental Consequences
Special Status Species – Plants	NP	There are no special status plant species that occur in the project area.
Threatened or endangered Fish/Fisheries	NP	There are no open waters or aquatic systems, nor is there any opportunity for them to develop. There would be no effect by either the proposed action or alternatives.
Threatened or endangered plant species	NP	No threatened or endangered plant species occur in the project area.
Threatened or endangered terrestrial species	PI	See discussion in Affected Environment/Environmental Consequences
Vegetation	PI	See discussion in Affected Environment/Environmental Consequences
Visual Resources	NI	The project area is categorized as class four for visual resource management objectives. The objective of this class is to partially retain the existing character of the landscape. Changes should repeat the basic elements found in the predominant natural features of the characteristic landscape. The proposed action is in compliance with this goal, as treatment would reduce but not totally eliminate shrubs.

Resource	Determination	Rationale for Determination
NP = Not Present in the area that would be impacted by the proposed action or other action alternative NI = Present, but not affected to a degree that would mean detailed analysis is required, or impacts disclosed previously in a separate, referenced NEPA document PI = Present with potential for impact; analyzed in detail in this EA		
Wastes (hazardous or solid)	NI	No Hazardous or Solid Waste would be stored or disposed of as a result of this project.
Water Quality and Quantity (drinking/ground)	NI	Little to no herbicide would reach downstream channels or permeate to subsurface water. The herbicide would not contact surface or ground water and thus would not impact water quality and quantity.
Wetland/Riparian Zones	NP	There are no wetlands or riparian areas within or adjacent to the project area. Oak Creek and Keating Creek are both intermittently flowing streams; neither "creek" supports wetland or riparian features.
Wild and Scenic Rivers	NP	This project is in compliance, as there are no Wild and Scenic Rivers within or adjacent to the project area.
Wild Horses and Burros	NP	Not present
Wilderness/Wilderness Study Area	NP	The project area does not occur within or adjacent to a designated wilderness or a Wilderness Study Area. Wilderness values would not be impacted by the proposed action or the no action alternative.
Wilderness characteristics	NP	The public land in the area does not meet the minimum standards for wilderness character.
Wildlife	PI	See discussion in Affected Environment/Environmental Consequences

3.2 Resources Brought Forward for Analysis

3.2.1 Threatened and Endangered Species

The BLM reviewed the current U.S. Fish and Wildlife Service Cochise County list of Threatened, Endangered, and Candidate Species (Table 2 below), and determined that the Jaguar (*Panthera onca*), Ocelot (*Leopardus [Felis] pardalis*), Lesser Long-Nosed Bat (*Leptonycteris curasoae yerbabuenae*), and Mexican Spotted Owl (*Strix occidentalis lucida*), and their critical habitats, may be affected by the proposed action (Map 3).

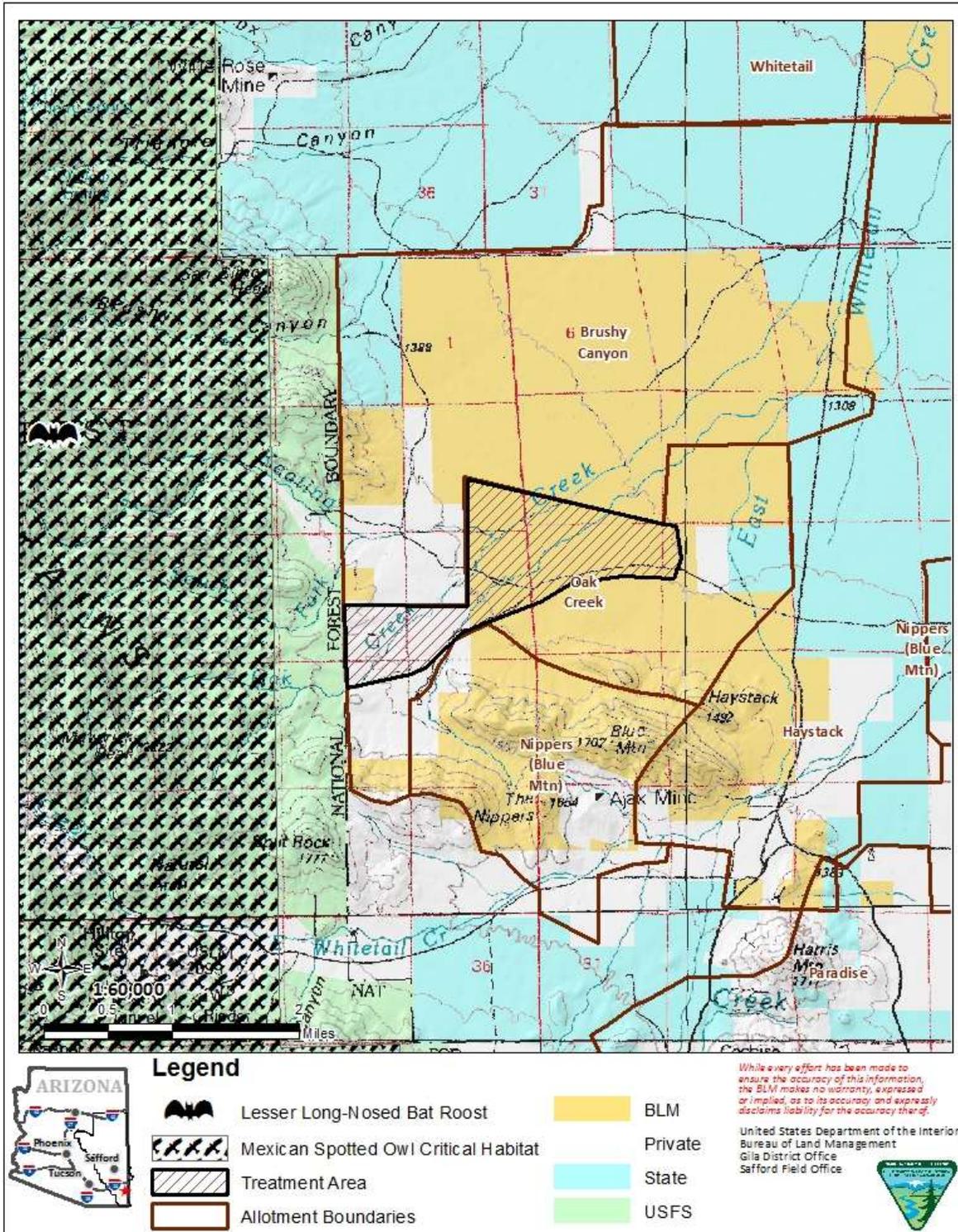
The BLM considers the Chiricahua Mountain range a suitable habitat for both Jaguars and Ocelots. Recent known locations for both species are approximately 50 miles or greater from the project area; however, Oak Creek and Keating Creek drain out of the Chiricahua Mountains, causing the project area to be a potential movement corridor.

Important roost sites for Lesser Long-Nosed Bats are within two miles of the project area on the south side of a high ridgeline of the Chiricahua Mountains. Because eleven agaves are to be found within the proposed project area, it is considered to be foraging habitat for Lesser Long-Nosed Bats.

The west side of the project area is a Forest Service boundary. Forest Service administered lands west of this boundary are designated as a critical habitat for Mexican Spotted Owls. The closest known Primary Activity Center (PAC) is on Forest Service administered land, over three miles from the project area.

Map 3: Oak Creek Treatment area and Critical habitats

**Oak Creek Herbicide Treatment Area
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3.2.2 Wildlife

Wildlife habitat in the project area occurs along a gently sloping bajada between the Chiricahua Mountains and the San Simon River, and vegetation is relatively uniform, shrub-dominated desert grassland. The area currently provides habitat for mule deer, javelinas, mountain lions, coyote, quail, and cottontail rabbits, as well as many non-game species. However, the diversity of wildlife is limited due to the dominance of shrubs at the expense of perennial grasses and other life forms.

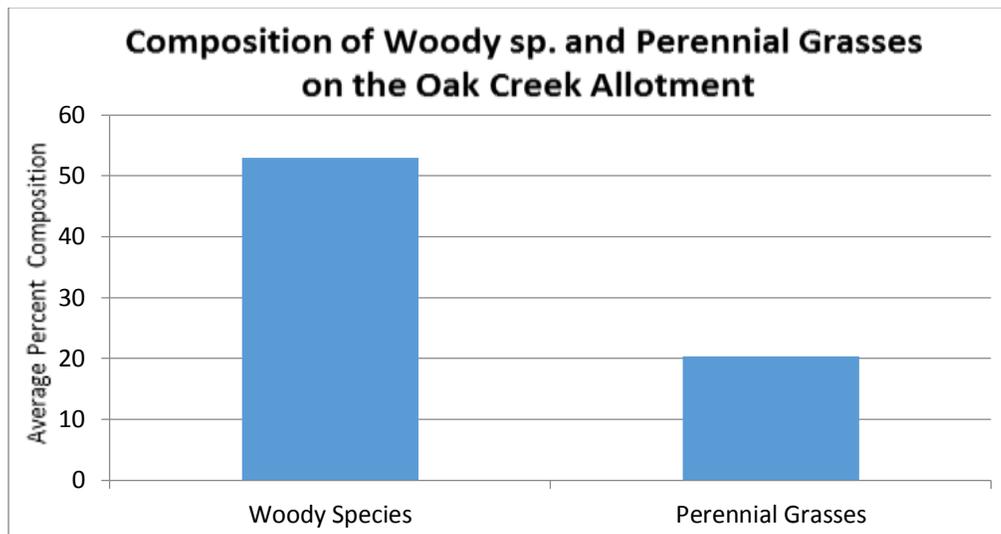
A review of the Arizona Game and Fish Department's Heritage Data Management System documented that in addition to the species discussed in the Threatened and Endangered Species section, Bartram Stonecrop, a BLM sensitive species, also occurs within five miles of the project area. However, there is no expectation that Bartram Stonecrop would occur in or adjacent to the project area. Typical habitat for the species is cracks in rocky outcrops in shrub live oak-grassland communities along meandering arroyos on sides of rugged canyons, usually heavy litter-cover and shade, where moisture drips from rocks, and often with Madrean evergreen woodland (Arizona Game and Fish Department 2001). This habitat is not present in the project area.

3.2.3 Vegetation

The treatment area is located within Major Land Resource Area 41-3, Southeast Arizona Basin and Range Land Resource Unit (LRU) 41-3, Arizona Semi-Desert Grassland, and Annual Precipitation Zone 12-16 inches. A field evaluation of soil characteristics and vegetative production on-site in the proposed project area revealed two ecological sites within the proposed treatment area: Clay Loam Upland and some Loamy Upland. Historically, both of these ecological sites have an aspect of open grasslands. The historical climax plant community (HCPC) for loamy upland sites is composed of 62.5% perennial grasses, 12.5% forbs, and 25% shrubs (NRCS 2013). The HCPC for clay loam upland sites is similar but has 67% perennial grasses, 17% forbs, and 17% shrubs (NRCS 2013).

In order to assess the allotment's similarity to HCPC, vegetation was monitored on three sites, occurring on either loamy uplands or clay loamy uplands, across the allotment in 2011 (Table 1).

Figure 4: Woody species composition vs. perennial grass species composition from 2011.



Monitoring in 2011 showed that the average percent composition between both ecological sites was 53% for woody species and 20% for perennial grass species. Through consultation between wildlife biologists, rangeland management specialists, and natural resources specialists a desired plant community (DPC) was set to an attainable goal of an average composition of 40% perennial grass species, 40% woody species, and 20% forbs. The DPC was set based on the multiple use goals of wildlife, hydrology, and rangeland management.

3.2.4 Soils

The area was mapped as part of the *Soil Survey of San Simon Area, Arizona, Parts of Cochise, Graham, and Greenlee Counties between 1973 and 1975* (USDA 1980). The project area was mapped into three soil-mapping units, described as follows:

- Unit 12- Comoro soils
 - Comoro soils make up 80% of the mapping unit, with the remainder making up small units of Eba, White House, Grabe, and Santo Tomas soils. Typically Comoro soils are a dark sandy loam throughout and have a depth of greater than 60 inches and are well drained. These soils occur on nearly level to gently sloping, alluvial fans and terraces. Runoff resulting from precipitation is medium, and permeability of the subsoil is moderately rapid.
 - HCPC, identified as grassland with widely dispersed shrubs, has changed to a scrubland with few perennial grasses.
- Unit 16- Eba gravelly sandy loams
 - Eba gravelly sandy loam comprises 70% of the mapping unit. Included in the mapping unit are small areas of Tubac, Forrest, White House, Artesia, and Santo Tomas soils which make up 30% of the mapping unit. This soil is deep (over 60 inches), well drained, and typically has a thin gravelly sandy loam surface with a

very gravelly clay loam or very gravelly sandy clay loam subsoil to a depth of 15 inches and very gravelly clay to a depth of about 33 inches. Eba occurs on gently sloping, high alluvial fans and terraces formed from old mixed alluvium. Hazard to water erosion is slight and permeability is slow.

- This unit's HCPC, identified as grassland with scattered shrubs and low trees, is now composed almost completely of shrubs and low trees, with perennial grasses a minor component.
- Unit 36-Santo Tomas soils
 - Levels of Santo Tomas cobbly fine sandy loam and Santo Tomas very gravelly loam are about equal and make up 65% of the unit. Included in up to 35% are small areas of Arizo, Comoro, Whitehouse, and Eba soils. These soils are nearly level to moderately sloping, very deep, and well drained. Typically the surface is grayish brown cobbly fine sandy loam or very gravelly loam about two inches thick. The underlying material is very gravelly fine sandy loam to a depth of 34 inches, and the underlying material is a very gravelly fine sandy loam to a depth of 60 inches or more. Surface runoff is medium, hazard to water erosion is slight to moderate, and the permeability is moderate.
 - These soils lie in and near drainages.

3.2.5 Grazing Management

The Oak Creek Allotment allows for 121 Animal Unit Month (AUM) of which 74 are from BLM land. The permit is issued for yearlong use by cattle.

3.2.6 Health and Human Safety

The Vegetation Treatments PEIS discusses Health and Human Safety in regards to herbicide handling and application. Refer to pages 4-174 of the Vegetation Treatments PEIS.

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. Impacts can be "beneficial/positive" or "detrimental/negative." Cumulative effects disclose the potential direct and indirect impacts of the proposed action and alternatives when considered in addition to other past, present, or reasonably foreseeable future actions within the project and surrounding area.

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

4.1 Environmental Consequences of Proposed Action

4.1.1 Threatened and Endangered Species

The BLM completed a consultation pursuant to the Endangered Species Act (ESA) with the U.S. Fish and Wildlife Service (USFWS) on the impacts of the proposed action on listed species. The BLM consulted on the potential direct and indirect impacts to individual species as well as the impact to movement corridors of Jaguars and Ocelots, Mexican Spotted Owl critical habitat, and the loss of foraging habitat for Lesser Long-Nosed Bats. The USFWS found that the proposed action “may affect, but is not likely to adversely affect” the listed species (02EAAZ00-2012-I-0247). As a result, the BLM has incorporated design features into the proposed action to eliminate or limit adverse effects to listed species (see Map 3 for buffer areas).

Table 2: Endangered Species List of Cochise County

Common Name	Scientific Name	Listing Status*	Determination of Effect
*E=Endangered T=Threatened C=Candidate P=Proposed D=Delisted			
American Peregrine falcon	<i>Falco peregrinus anatu</i>	D	Delisted species, evaluated as a special status species. Peregrines could occur in the area.
Arizona tree frog	<i>Hyla wrightorum</i>	C	No determination on candidates, evaluated as a special status species. Known locations and suitable habitat greater than five miles away.
Beautiful shiner	<i>Cyprinella formosa</i>	T	No effect - Known locations, suitable habitat, and critical habitat are greater than five miles from the action area.
Canelo Hills ladies'-tresses	<i>Spiranthes delitescens</i>	E	No effect - Known locations, suitable habitat, and critical habitat are greater than five miles from the action area.
Chiricahua leopard frog	<i>Rana chiricahuensis</i>	T	No effect – Known locations, and proposed critical habitat are greater than five miles from the action area. Historic locations and potential suitable habitat on the forest may exist within five miles but not in the project area. The extended action area is all down slope and away from any suitable habitat.

Common Name	Scientific Name	Listing Status*	Determination of Effect
*E=Endangered T=Threatened C=Candidate P=Proposed D=Delisted			
Cochise pincushion cactus	<i>Coryphantha Cochise pincushion robbinsorum</i>	T	No effect - Known locations, suitable habitat, and critical habitat are greater than five miles from the action area.
Desert pupfish	<i>Cyprinodon macularius</i>	E	No effect - Known locations, suitable habitat, and critical habitat are greater than five miles from the action area.
Desert tortoise (Sonoran population)	<i>Gopherus agassizii</i>	C	No determination on candidates, evaluated as a special status species. Known locations and suitable habitat greater than five miles away.
Gila chub	<i>Gila intermedia</i>	E	No effect - Known locations, suitable habitat, and critical habitat are greater than five miles from the action area.
Gila topminnow (incl. Yaqui)	<i>Poeciliopsis occidentalis</i>	E	No effect - Known locations, suitable habitat, and critical habitat are greater than five miles from the action area.
Huachuca springsnail	<i>Pyrgulopsis thompsoni</i>	C	No determination on candidates, evaluated as a special status species. Known locations and suitable habitat greater than five miles away.
Huachuca water-umbel	<i>Lilaeopsis schaffneriana var. recurva</i>	E	No effect - Known locations, suitable habitat, and critical habitat are greater than five miles from the action area.
Jaguar	<i>Panthera onca</i>	E	May affect, not likely to adversely affect - Jaguars potentially occur within the action area. The action could directly disturb jaguars but it is extremely unlikely. The action could modify movement corridors along drainages. Conservation measures to buffer the effects to vegetation would be in place to minimize the impacts to the point of being discountable.
Lemmon fleabane	<i>Erigeron lemmonii</i>	C	No determination on candidates, evaluated as a special status species. Known locations and suitable habitat greater than five miles away.

Common Name	Scientific Name	Listing Status*	Determination of Effect
*E=Endangered T=Threatened C=Candidate P=Proposed D=Delisted			
Lesser long-nosed bat	<i>Leptonycteris curasoae yerbabuena</i>	E	May affect, likely to adversely affect: Several known roosts occur within five miles of the project area. It is likely that the proposed action would take place when the bats are in these roosts and therefore potentially disturbed. Conservation measures to buffer the roosts from the proposed action would minimize the disturbance to the point of being discountable. By nature the proposed action would impact agaves and in turn adversely affect foraging habitat of the bats. A total of 11 agaves were found in an intensive survey of the project area.
Loach minnow	<i>Tiaroga cobitis</i>	T	No effect - Known locations, suitable habitat, and critical habitat are greater than five miles from the project area.
Mexican spotted owl	<i>Strix occidentalis lucida</i>	T	May affect, not likely to adversely affect: PACs and critical habitat occur within five miles of the action area. The action could directly disturb owls, but it is extremely unlikely. The action could affect critical habitat, but conservation measures to buffer the effects to vegetation in critical habitat would be in place that would minimize the potential impacts to the point of being discountable.
Mountain plover	<i>Mountain plover</i>	P	No effect - Known locations, suitable habitat, and critical habitat are greater than five miles from the action area.
New Mexico ridge-nosed rattlesnake	<i>Crotalus willardi obscurus</i>	T	No effect - Known locations, suitable habitat, and critical habitat are greater than five miles from the action area.
Northern aplomado falcon	<i>Falco femoralis septentrionalis</i>	E	No effect - Known locations, suitable habitat, and critical habitat are greater than five miles from the action area.
Northern Mexican gartersnake	<i>Thamnophis eques megalops</i>	C	No determination on candidates, evaluated as a special status species. Known locations and suitable habitat greater than five miles away.

Common Name	Scientific Name	Listing Status*	Determination of Effect
*E=Endangered T=Threatened C=Candidate P=Proposed D=Delisted			
Ocelot	<i>Leopardus (Felis) pardalis</i>	E	May affect, not likely to adversely affect: Ocelots potentially occur within the action area. The action could directly disturb ocelots, but it is extremely unlikely. The action could modify movement corridors along drainages. Conservation measures to buffer the effects to vegetation would be in place to minimize the impacts to the point of being discountable.
San Bernardino springsnail	<i>Pyrgulopsis bernardina</i>	C	No determination on candidates, evaluated as a special status species. Known locations and suitable habitat greater than five miles away.
Sonora tiger Salamander	<i>Ambystoma tigrinum stebbinsi</i>	E	No effect - Known locations, suitable habitat, and critical habitat are greater than five miles from the action area.
Southwestern willow flycatcher	<i>Empidonax traillii extimus</i>	E	No effect - Known locations, suitable habitat, and critical habitat are greater than five miles from the action area.
Spikedace	<i>Meda fulgida</i>	T	No effect - Known locations, suitable habitat, and critical habitat are greater than five miles from the action area.
Sprague's pipit	<i>Anthus spragueii</i>	C	No determination on candidates, evaluated as a special status species. Known locations and suitable habitat greater than five miles away.
Yaqui catfish	<i>Ictalurus pricei</i>	T	No effect - Known locations, suitable habitat, and critical habitat are greater than five miles from the action area.
Yaqui chub	<i>Gila purpurea</i>	E	No effect - Known locations, suitable habitat, and critical habitat are greater than five miles from the action area.
Yaqui topminnow	<i>Poeciliopsis occidentalis sonoriensis</i>	E	No effect - Known locations, suitable habitat, and critical habitat are greater than five miles from the action area.
Yellow-billed cuckoo	<i>Coccyzus americanus</i>	C	No determination on candidates, evaluated as a special status species. Known locations and suitable habitat greater than five miles away.

4.1.2 Wildlife

The proposed action would impact 1,015 acres of wildlife habitat by converting shrub-dominated vegetation to a more balanced grass/shrub vegetation community in the short-term (less than 10 years), and would result in a proportional shift in wildlife. Oak and

Keating Creeks are two major drainages that run high during monsoonal floods, and a buffer around both creeks would be employed to ensure no herbicide is applied and therefore would help maintain wildlife movement corridors on the allotment. A reduction in woody species and the anticipated increased production of grasses and herbaceous species would increase the amount and diversity of vegetation available for wildlife forage and cover within the treatment area. Large game species would overall benefit from the shift in vegetation.

The proposed action would largely benefit small species such as sparrow species, including grasshopper sparrow and Botteri’s sparrow. These species would likely increase in both abundance and diversity as grasses re-dominates the area. This is consistent with the habitat goals of Arizona Partners in Flight (APIF). APIF recommends habitat conversion in patches from shrub-invaded desert grasslands to desert grasslands (Latta, et. al. 1999).

A summary table for desert grassland priority species is presented in Table 2 below.

Table 3: Desert Grasslands Priority Species and Habitat Needs

Priority Species	Vegetation Composition	Vegetation Structure	Abiotic Factors	Landscape Factors
Aplomado Falcon	Grasses; Yucca or mesquite savannah (for eating)	Open grassland with scattered tall yucca and/or mesquite	N/A	Fragmentation - patch size a factor; The edge effects Great Horned Owl predation; Fire beneficial to maintain habitat
Botteri's Sparrow	Bunchgrass, sacaton; Shrub component	Ground cover - tall, high-stem density	Bajadas and floodplains	Fire increased productivity (prey); Flooding in sacaton; Nutrient importation, soil moisture
Cassin's Sparrow	Grasses - grama, three-awns, sporobolus; Shrub component- whitehorn, acacia, mesquite, ocotillo, yucca	Ground cover - important, but not quantified; grasses not forbs	N/A	Disturbance; Fire; At or nearing climax
Rufous-Winged Sparrow	Grasses - grammas, three-awns, sporobolus, tobosa; Shrub Component – mesquite; Also common in upland Sonoran Desert w/out grassland	Ground cover – bunchgrasses; Canopy - Partial w/ grass understory	Elevation ≤ 1,220 m (4,000 ft.) to lower elevation limits of grassland; Flat to rolling hills	Fire negative, reduces and/or eliminates woody cover

Priority Species	Vegetation Composition	Vegetation Structure	Abiotic Factors	Landscape Factors
Baird's Sparrow	Bunchgrasses - grammas, three-awns, lovegrasses, bluestem	Ground cover; Thatch, high density; No canopy	Elevation 915-1,525 m (3,000-5,000 ft.); Rolling grasslands (slopes)	Periodic fire to reduce woody cover
Grasshopper Sparrow (wintering)	Bunchgrasses - grammas, three-awns, lovegrasses, bluestem	Ground cover; Thatch, high density; No canopy	Elevation 915-1,525 m (3,000-5,000 ft.); No slope necessary	Periodic fire to reduce woody cover
Grasshopper Sparrow (breeding)	Bunchgrasses - grammas, three-awns, lovegrasses, bluestem	Ground cover; Thatch, high density; No canopy	Elevation 915-1,525 m (3,000-5,000 ft.)	Periodic fire to reduce woody cover

The short-term conversion of shrub-domination to a balanced grass/shrub vegetation community is not self-maintaining through the long-term (greater than 10 years). Routine treatments of herbicides or fire would have to be considered in the future if vegetation goals are to be maintained. In general, vegetation conversions that increase patchiness and edge effect also increase wildlife diversity.

Although documented risk factors from direct contact and consumption by wildlife from the proposed herbicides exist, the BLM concluded that the proposed herbicides to be used in the project area, in typical concentrations, pose no to very-low risk to wildlife (Vegetation Treatments PEIS BLM 2007a). Aircraft noise may disturb wildlife but only for the short duration of the treatment.

4.1.3 Vegetation

Historical overgrazing, lack of fire, periodic drought, and possibly, climatic changes has caused an increase in shrubs within the Oak Creek allotment. Studies show that without intervention, shrub cover and density typically continue to increase, thereby further reducing perennial grasses, wildlife values, soil protection, and watershed function.

The proposed action would directly impact 1,015 acres by reducing woody species so that perennial grasses can increase. It is expected that the herbicide treatment would kill between 50% and 80% of the target species, leaving individual plant species that are killed by the herbicides as dead standing material. It is expected that ecological conditions, as measured by a similarity index, how closely an area matches reference conditions, would improve from low 30% to low 60% in the short-term. In the long-term, the presence of perennial grasses would deteriorate as brush density increases if further vegetation treatments such as fire are not applied. The proposed action would improve the ecological

site condition of the rangeland, reduce erosion, and would reduce sedimentation in the water.

4.1.4 Soils

The proposed action would increase soil erosion in the short-term until perennial grass species increase. In the long-term, the proposed action would overall reduce soil erosion. The proposed action would not destabilize drainages, riparian areas, or wetlands due to their exclusion from the treatment. Aerial application would not cause ground disturbance and, subsequently, cause no increase in sedimentation. There would be no herbicides applied during inclement weather or when there is forecast for heavy rains, as the foliar treatment would not be as effective and could potentially be carried outside the project area.

Picloram, an active ingredient in Chemical Mix 1 can move in the soil, especially sandy soils, and is persistent. Since the surface texture of the soils in the project are sandy loams and gravelly sandy loams, minimal movement of the herbicide may occur. Picloram's half-life can range from one month to several years, both direct sunlight and microbacteria, however, can speed up the decomposition process. Clopyralid, also an active ingredient of Chemical Mix 1, is moderately persistent in soils. Because it is degraded entirely by soil microbes, soil conditions that maximize microbial activity (warm and moist) would facilitate clopyralid degradation. The average half-life of clopyralid in soils is one to two months, but can range from one week to one year depending on the soil type, temperature, and rates of application (James, et. al. 2004).

Chemical Mix 2, like Mix 1, contains clopyralid but also butoxyethyl ester (BEE) of triclopyr. Triclopyr has been found to degrade rapidly with an average soil half-life of 30 days, and in a warm climate degrades even faster. In non-sandy soils, triclopyr has been found not to move more than 15 centimeters.

Given the nearly flat topography, average precipitation amounts, and soil textures, it is expected that the herbicides described above would remain in place and degrade relatively quickly. Soil erosion would be reduced as perennial grass species increase, producing a moderate-positive short-term impact. If treatments continue in the long-term, invading shrub species would continue to be quelled while grasses continue to increase, and soil erosion would remain at a minimum.

4.1.5 Grazing Management

Since cattle would be removed from the Oak Creek Allotment and prevented from using the allotment for at least two spring and summer growing seasons following treatment, the proposed alternative would have a temporary adverse impact to grazing. The permittee would lose approximately 148 AUM. However, as grasses are re-established, forage would increase over the long term. The proposed action would reduce cover and density of shrubs and allow for more production of perennial grasses, which would be a positive impact to livestock grazing, since most of the shrubs have limited value for livestock grazing. If there

is a significant increase in key forage production the potential for an increase in authorized AUMs through the NEPA process is available through CFR 43 4110.3 “changes in grazing preference”. However, no increase in AUMs is anticipated at this time.

4.1.6 Health and Human Safety

The Vegetation Treatments PEIS discusses Health and Human Safety in regards to herbicide handling and application. Refer to pages 4-174 of the Vegetation Treatments PEIS for potential impacts. In summary, the BLM has determined that the herbicides listed in the PEIS, which includes the herbicides proposed for this action, are not unduly harmful to humans when used in accordance with label specifications and BLM guidelines.

4.2 Environmental Consequences of the No Action Alternative

4.2.1 Threatened and Endangered Species

Under the no action alternative the proposed action would not take place and therefore have no effect on listed species.

4.2.2 Wildlife

Under the no action alternative there would be no vegetation conversion and the area would continue to lose grass density and production, and shrubs would continue to increase in density and cover. Soil erosion would increase, thereby reducing long-term productivity of the site. Wildlife that requires grassland habitat or which benefit from a diversity of grassland and shrublands would have diminished habitat values.

4.2.3 Vegetation

The no action alternative would allow the subject area to continue to lose grass density and production in the short- and long-term, while invasive brush species would continue to increase. Eventually, the area would become almost devoid of grasses, increasing soil erosion, and decreasing the site’s production potential.

4.2.4 Soils

The no action alternative would allow shrubs to continue to increase and grass cover to decrease. As a result, soil erosion would accelerate, topsoil would be lost, and larger amounts of sediment would be transported downstream and off-site. This would cause a moderate-negative impact in both the short and long-term.

4.2.5 Grazing Management

Under the no action alternative, the vegetation community within the proposed treatment area would continue towards woody species dominance and would eventually out-compete native grasses. Therefore, the quality and quantity of available forage for livestock would

continue to decline. However, under the no action alternative, the grazing permittee would not have to temporarily place the allotment in non-use.

4.2.6 Health and Human Safety

Under the no action alternative, there would be no impacts on health and human safety.

4.3 Cumulative Impacts Analysis

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).

The short-term effects of the proposed action would not exceed two years due to the deferment of grazing for two spring and summer growing seasons. The total life of the proposed action and its alternative is ten years: this time frame is considered to be most appropriate for considering the incremental effect of action 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.

The Cumulative Impact Analysis Area (CIAA) is defined as East Whitetail Creek Hydrologic Unit Code 10 (HUC10) and the Cave Creek HUC10 which is approximately 478,000 acres within the Southern San Simon Valley extending south of Interstate-10 along the Arizona New Mexico state line. This CIAA was selected because cumulative impact analysis is done at the level at which impacts occur. In this case, the vegetation treatment would impact a portion of the watershed, thus the greater watershed area was used as the geographic area for analysis.

4.4 Past Actions

Historically the San Simon Valley was settled by farmers and ranchers to supply the increasing demand for food by numerous army posts and mining camps in the area (Gilbert and Maynard 1970). In the late 1800s the demand for meat increased and 50,000 head of cattle were driven from Texas to graze in the San Simon ranges. A severe drought hit southeastern Arizona and southwestern New Mexico in 1902 and 1905 which left many cattle dead. In the following years heavy rains and excessive runoff eroded the land substantially leaving the once lush San Simon meadows with drifting sands and deep bank-cutting in the drainages.

The San Simon Valley has never fully recovered from these events. There have been efforts to conserve soil with small diversion dams, contour furrows, and gully plugs built by the

Soil Conservation Service and the Civilian Conservation Corp. Revegetation has also been attempted in the San Simon Valley but with mixed results.

The designation of the Chiricahua National Monument, primarily on the west slopes of the Chiricahua Mountains but some lands within the CIAA, was used to protect unique geological, cultural, and wildlife features. Other minor past activities within the CIAA that are expected to continue in the future include road construction and maintenance, mining, hunting, dispersed recreation, authorized and unauthorized woodcutting, and wildfire suppression/use.

4.5 Present Actions

An additional 2,000 acres of shrub reduction treatment are proposed for private and state land east of the project area. In total there would be 3,000 acres of shrub treatment, or 0.6% of the CIAA. These herbicide treatments are aimed at the reduction of shrubby species within the CIAA. These treatments were done at lower elevations to reduce the composition of creosote and increase perennial grasses.

Other projects proposed for private and state land include rebuilding of fences to wildlife safety standards, maintenance of livestock waters to ensure wildlife amiability, and implementation of a rotational grazing system. Other present activities within the CIAA include agriculture, road construction/maintenance, authorized and unauthorized woodcutting, mining, grazing, hunting, and dispersed recreation.

4.6 Reasonably Foreseeable Future Actions

Planned actions within the reasonably foreseeable future (RFF) within the CIAA include prescribed and rotational grazing, mechanical vegetation treatments, prescribed fire, vegetation seeding, and the installation of the Southline transmission line in the northern portion of the CIAA along Interstate-10.

4.7 Cumulative Impacts to Threatened and Endangered Species

4.7.1 Cumulative Impacts of the Proposed Action

The Mexican Spotted Owl has designated critical habitat within the National Forest in the western portion of the CIAA. Past actions such as logging, wildlife, road or site construction that results in fragmentation of the forest were detrimental to owl populations. Other activities such as hiking, shooting, off-road vehicle activity in or near roosting, or foraging sites may result in the abandonment of an area and indirectly may affect habitat parameters from trampling, vegetation removal, or increase fire risk. The proposed action

would have no impact on Mexican Spotted Owl habitat due to the half mile buffer from the forest that was designated to mitigate against herbicide drift and noise caused by the aircraft applying the herbicide.

The Lesser Long-nosed Bat occupies a few roosts within the CIAA. The primary food source for the lesser long-nosed bat in southeastern Arizona from mid-summer through fall is Palmer's agave. Past actions such as the harvesting of agaves, the collection of cacti, the conversion of habitat for agricultural uses, livestock grazing, woodcutting and other development have led to its decline. The proposed action would take place within a 40 mile forage radius from a known bat roost. However, there are only eleven Palmer's agaves known to exist within the proposed treatment area. The effects of herbicide on the agave are unknown; however, the loss of eleven agaves would not significantly affect the available lesser long-nosed bat forage within the CIAA.

Jaguars and Ocelots are known to travel within the CIAA. A number of threats contributed or continue to affect jaguars including habitat loss, persecution, poaching of prey and fragmentation of populations across portion of their range. The proposed treatment would not significantly influence jaguars or ocelot habitat or corridors due to buffers designated around washes which may be used as corridors.

4.7.2 Cumulative Impacts of the No Action Alternative

The status of Mexican Spotted Owl within its critical habitat should continue to improve from detrimental past actions such as logging, wildlife, road or site construction. However, other activities such as hiking, shooting, off-road vehicle activity in or near nesting, or foraging sites may continue to take place.

The available forage for Lesser Long-nosed Bat roosts within the CIAA may continue to decline due to actions such as the harvesting of agaves, the collection of cacti, the conversion of habitat for agricultural uses, livestock grazing, woodcutting and other development.

Jaguars and Ocelots traveling within the CIAA will continually experience threats of habitat loss, persecution, poaching of prey and fragmentation of populations across portion of their range.

4.8 Cumulative Impacts to Wildlife

4.8.1 Cumulative Impacts of the Proposed Action

Many high and low elevation wildlife and big game species are known to exist and travel within the CIAA. Development such as farming, road construction, logging, fence building, and transmission line right-of-ways have fragmented wildlife habitat and reduced available travel corridors. Human activities such as hiking, shooting, off-road vehicle activity, hunting, and poaching cause disruptions in wildlife populations. The proposed action

would open up shrublands making habitat available for more grassland wildlife species while preserving wildlife corridors across the treatment area. The proposed action may also decrease habitat availability for shrub-dependent species.

4.8.2 Cumulative Impacts of the No Action Alternative

Development and human activities will continue to persist causing a reduction in wildlife habitat, travel corridors and disruptions in wildlife populations. Wildlife species that rely on open grassland habitat will continue to decline as woody species continue to encroach. Shrub-dependent wildlife species will continue to inhabit the area.

4.9 Cumulative Impacts to Vegetation

4.9.1 Cumulative Impacts of the Proposed Action

The vegetation within the CIAA has and is continually experiencing impacts from development such as farming, road construction, and transmission line construction. Human and natural impacts such as off-roading, herbicide treatment, logging, historical overgrazing, woody species encroachment, drought, and wildfires have also impacted the vegetation within the CIAA. The proposed action would assist in bringing the treatment area into equilibrium between grass and woody species thus reducing the risk of severe wildfires and soil erosion.

4.9.2 Cumulative Impacts of the No Action Alternative

The no action alternative would allow for the continual encroachment of woody species within the CIAA. Not treating the BLM lands within the area would prevent the attainment of a landscape-scale vegetation treatment, thereby limiting the overall effectiveness of multiple vegetation treatments in the area. Progress towards overall rangeland health would be curtailed.

4.10 Cumulative Impacts to Soils

4.10.1 Cumulative Impacts of the Proposed Action

The soils within the CIAA have continually experienced impacts from farming, road construction, logging, recreational off-roading, historical overgrazing, woody species encroachment and wildfires. The encroachment of woody species and therefore the reduction of perennial grasses and forbs can reduce the overall ground cover and decrease the infiltration rate allowing for wind and water erosion to increase. The proposed action would reduce the amount of woody species cover and increase perennial grass species cover thus bolstering soil resistance to erosion.

4.10.2 Cumulative Impacts of the No Action Alternative

Under the no action alternative impacts would continually allow for the encroachment of woody species and therefore the increased potential for soil erosion.

4.11 Cumulative Impacts to Grazing Management

4.11.1 Cumulative Impacts of the Proposed Action

Grazing has been a continual action in the CIAA since it was settled in the mid-1800s. Since then impacts to grazing management have been due to development such as farming and road construction as well as human and natural impacts such as off-road recreation, herbicide treatments, historical overgrazing, woody species encroachment, wildfires, and drought. The proposed action would cause an initial reduction of the grazing capacity within the CIAA but would improve the lands overall resistance to grazing practices.

4.11.2 Cumulative Impacts of the No Action Alternative

Under the no action alternative the CIAA would continue to become less suitable for grazing practices due to woody species encroachment. Grazing may be shifted to non-BLM portions of the Ol' Morani Ranch if more forage becomes available where herbicide treatments have occurred.

4.12 Cumulative Impacts to Health and Human Safety

4.12.1 Cumulative Impacts of the Proposed Action

Health and human safety has been impacted within the CIAA due to the reduction in air quality from wind erosion caused by drought and farming, herbicides, and wildfires. The proposed action would negatively impact health and human safety in the short-term, the time of the treatment, but overall improve air quality by increasing the CIAA's resistance to wind erosion by increasing perennial grass cover.

4.12.2 Cumulative Impacts of the No Action Alternative

Although the short-term impacts to health and human safety from conducting the herbicide treatment would be avoided under the no action alternative, there would be greater long-term adverse impacts to air quality due to the increase in wind erosion caused by woody species encroachment.

5.0 CONSULTATION AND COORDINATION

5.1 Persons/Agencies Consulted

- USFWS
- Arizona Natural Resource Conservation Districts State Association (AZNRCD)
- Arizona State Land Department (AZSLD)
- Ol' Morani LLC
- Natural Resource Conservation Service (NRCS)

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- Linda Peery, Wildlife Biologist, Coronado National Forest
- Tim Goodman, Wildlife Biologist, BLM Safford Field Office
- Doug Whitbeck, Rangeland Management Specialist, BLM Safford Field Office

6.1 Reviewers

- Nancy Favour, Planning and Environmental Specialist, BLM Arizona State Office
- Elroy Masters, State Wildlife Lead/Acting Branch Chief for Resources, BLM Arizona State Office
- Sharisse Fisher, GIS Specialist, BLM Arizona
- Melanie Barnes, Assistant Field Office Manager, BLM Arizona

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Appendix A: List of Interested Parties

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