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BUREAU OF LAND MANAGEMENT
LAS CRUCES DISTRICT OFFICE
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ENVIRONMENTAL ASSESSMENT

OTERO COUNTY RESTORATION INITIATIVE

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CHAPTER 1. INTRODUCTION

1.1 RESTORE NEW MEXICO AND THE OTERO COUNTY RESTORATION INITIATIVE

The Otero County Restoration Initiative is an undertaking by the Bureau of Land Management (BLM) Las Cruces District Office (LCDO) to implement the Restore New Mexico program in Otero County, New Mexico. Restore New Mexico is an aggressive partnership between the BLM, landowners, other agencies, and conservation partners to restore grasslands, woodlands, and riparian areas to a healthy and productive condition. More information about this ambitious program can be found on the following website: http://www.blm.gov/nm/st/en/prog/restore_new_mexico.html.

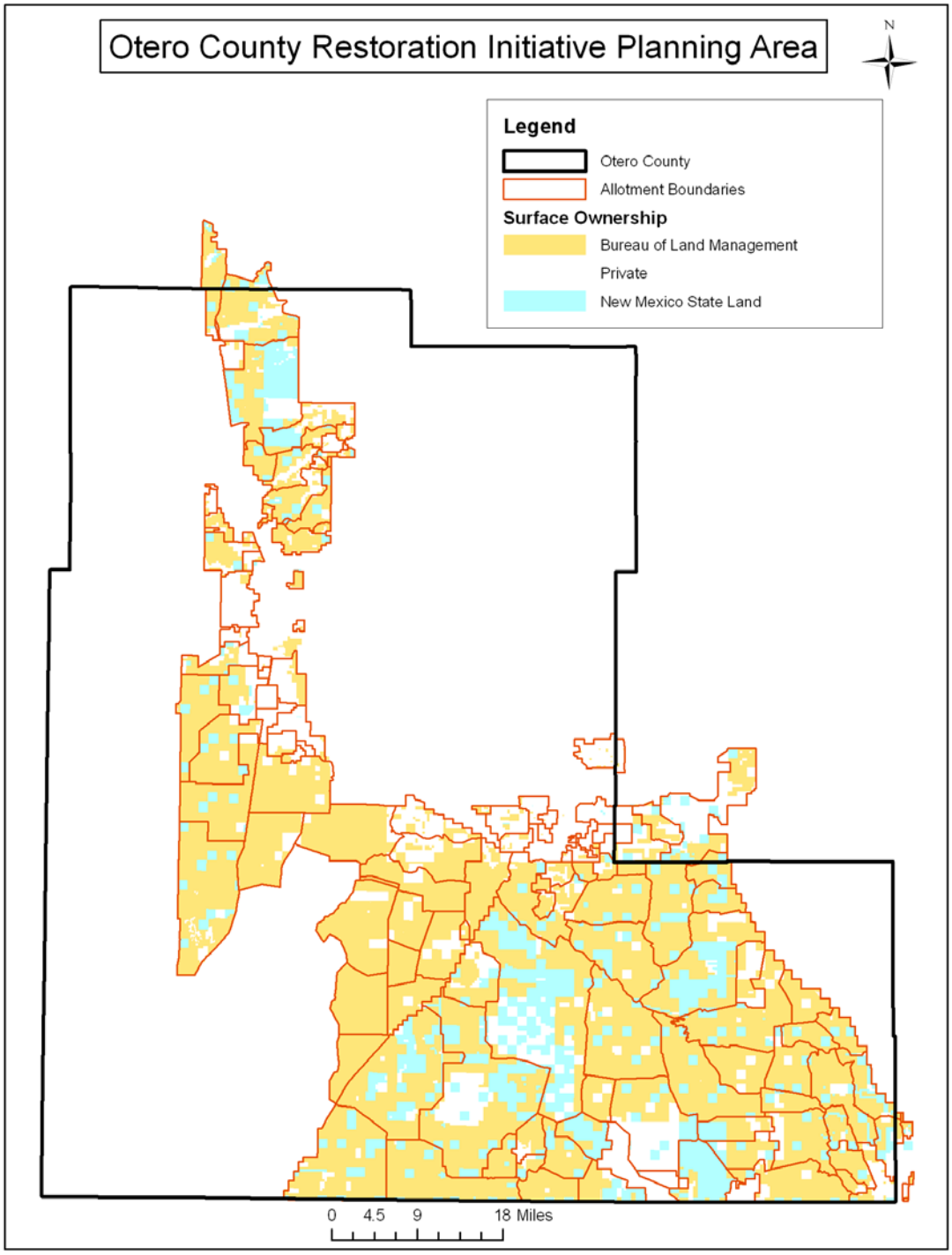
The key goals of BLM New Mexico's are:

1) Restore habitat for fish, wildlife, and endangered species.
2) Reverse expansion of invasive plant species.
3) Reverse habitat fragmentation from historic oil and gas development and ensure responsible energy development.
4) Improve water quality.
5) Reduce impacts from catastrophic wildfire.

This environmental assessment (EA) is being prepared to evaluate vegetation treatments on public lands within Otero County. This EA analyzes impacts of vegetation treatment projects from a landscape perspective and delineates the parameters under which future vegetation treatments in the Otero County Restoration Initiative Area would be completed. This approach allows for a more thorough view of cumulative effects than a project specific assessment approach. When projects are considered within the Otero County Restoration Initiative Area in the future, as long as treatment design and post treatment management incorporate the project parameters outlined in this EA, no further National Environmental Policy Act (NEPA) analysis would be needed. Documentation that treatments are consistent with this analysis will be through the BLM's *Determination of NEPA Adequacy* (DNA) process.

Vegetation treatment projects would consist of four different treatment types: 1) chemical, 2) prescribed fire, 3) manual and 4) mechanical treatments. Vegetation treatment projects will occur in livestock grazing allotments (Map 1). The most appropriate treatment or combination of treatments would be implemented based on criteria outlined in this document. This EA will serve as a planning document for the LCDO through 2018. A few grazing allotments extend outside of the Otero county boundary, but would be included in the proposed treatment area.

MAP 1: OTERO COUNTY RESTORATION INITIATIVE AREA

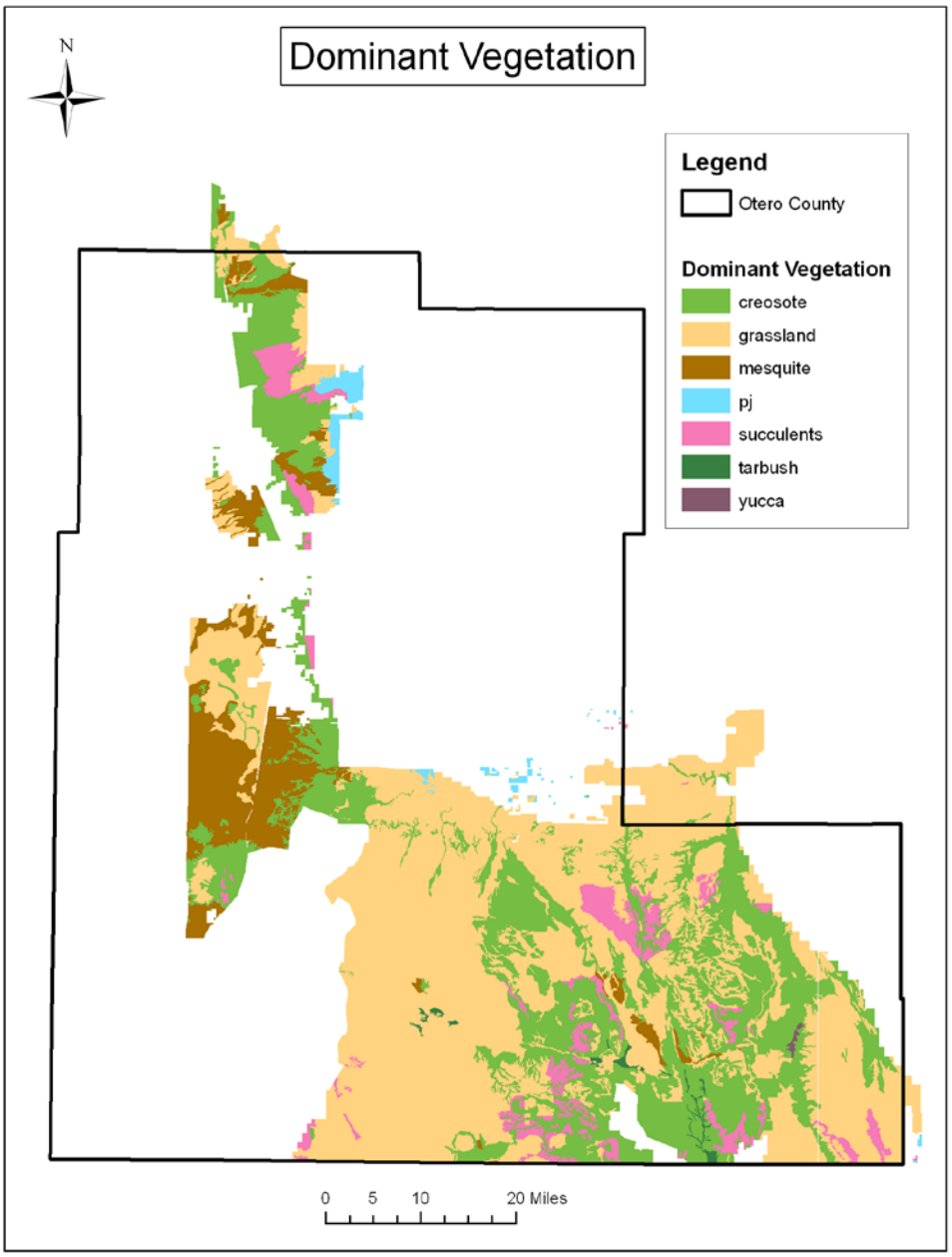


1.2 PURPOSE AND NEED FOR THE PROPOSED ACTION

Inventory data from the 1970's and 1980's show that over 789,000 acres within Otero County are shrub dominated. Creosote bush, tarbush, mesquite, tasajillo, and juniper are all native plants to southern New Mexico, but considered to be invasive in most ecosystems. Once these

species become established in areas, they tend to increase in density and out-compete other native vegetation for soil moisture, nutrients, and sunlight. Lands with high densities of these species typically exhibit accelerated soil erosion rates, decreased water infiltration, and decreased biodiversity. About one-fourth of the 13.4 million acres of public land in New Mexico need some restoration activity to help return these lands to a healthier, natural state (http://www.blm.gov/nm/st/en/prog/restore_new_mexico.html). Creosote, mesquite, acacia, tarbush, juniper, and other less desirable species are now dominating landscapes that used to be grasslands to the point vast areas do not provide the same quality of wildlife habitat they did prior to European settlement. Map 2 shows the dominant vegetation types within the Otero Country Restoration Area.

MAP 2: DOMINANT VEGETATION TYPES



Most ecological sites have some restoration potential but ability to recover varies depending

primarily on current condition, follow-up livestock management and post treatment precipitation. Of these, livestock management is the only post treatment variable under the BLM's control. This document defines the parameters under which treatments on public land would be carried out and managed to ensure success in obtaining the overall goal of improving watershed and habitat conditions in the project area. It is important to understand that following treatment, management of public land will be an integral component of each project. Management must be adaptable to account for yearly precipitation fluctuations to reach a site's capability for vegetation recovery.

Implementing the proposed action would facilitate meeting the five key goals of Restore New Mexico. An additional goal specific to the Otero County Initiative is to restore the native vegetative assemblage in treatment areas to the appropriate diversity and density for each specific treatment site, eventually improving watershed conditions and native wildlife species habitat over the landscape.

The treatments evaluated in this EA would be part of a long-term, ongoing effort to achieve and maintain healthy watershed conditions in a semi-arid environment where recovery is slow and biotic systems will continue to be stressed by mandated resource and land use demands for which they are not well-adapted.

1.3 CONFORMANCE TO LAND USE PLANNING

The proposed action conforms to the White Sands Resource Area /Resource Management Plan (WSRA/RMP), dated October 1986; decision RM-5, page 34, "Through land treatment projects (chemical, mechanical, and burning) on 241,576 acres, forage production will increase by 20,006 AUMs in the long term…".

1.4 RELATIONSHIP TO STATUTES, REGULATIONS AND OTHER PLANS

The proposed actions and alternatives are consistent with the Federal Land Policy and Management Act of 1976 (43 U.S.C. 1700 et seq); the Taylor Grazing Act of 1934 (43 U.S.C. 315 et seq.); the Public Rangelands Improvement Act of 1978 (43 U.S.C. 1901 et seq.); the Carlson-Foley Act (1968); and the Federal Noxious Weed Act (1974), as amended by Section 15 - Management of Undesirable Plants on Federal Lands. The proposal is consistent with and tiered to the New Mexico Record of Decision dated July, 1991, for the Vegetation Treatment on BLM Lands in Thirteen Western States, Final EIS (USDI BLM, May 1991) and the 2007 *Final Vegetation Treatments Using Herbicides on Bureau of Land Management Lands in 17 Western States Programmatic Environmental Impact Statement (PEIS)* (USDI BLM 2007). The project conforms to the 1994 Environmental Impact Statement for Rangeland Reform. The proposed action is consistent with the Decision Record and Resource Management Plan Amendment For Fire and Fuels Management on Public Lands in New Mexico and Texas (2004). The proposed action is consistent with The Interagency Prescribed Fire: Planning and Implementation Procedures Reference Guide (2009). The proposed action is consistent with the White Sands Resource Area Resource Management Plan (WSRA/RMP), as amended by the Record of Decision for the Standards for Public Land Health and Guidelines for Livestock Grazing Management, (2001).

CHAPTER 2- PROPOSED ACTION AND ALTERNATIVES

2.1 PROPOSED ACTION

The proposed Otero County Restoration Initiative area totals approximately 1,433,132 acres, of which about 927,778 are BLM land. Also included in the restoration initiative area is approximately 600,000 acres of the co-use portion of McGregor Range, which are BLM lands withdrawn for Fort Bliss military activities.

The proposed action is to apply vegetation treatments to restore the native vegetative assemblage, and improve watershed function and wildlife habitat. Treatment techniques (herbicide, fire, mechanical and manual) would be used individually or collectively to achieve changes in the vegetative species assemblages to be more consistent with the ecological reference state of each particular ecological site. Reference states reflect conditions that occurred prior to settlement and land use of the late 1800s.A comparison of inventory data collected by LCDO in the late 1970's and early 1980's with State and Transition Models available in the NRCS's Ecological Site Descriptions (http://www.nm.nrcs.usda.gov/technical/fotg/section-2/ESD.html) indicate approximately 789,000 acres in the Otero County Initiative area are shrub invaded and may have potential for successful treatment (Table 1). Not all acres shown in Table 1 would be treated even though they may be far removed from the ecological reference state.

The proposed action does not include restoration projects within wilderness study areas (WSAs), although vegetative and soil characteristics indicate that some areas within the WSAs do have potential for successful restoration treatment. If projects in WSAs are considered, they would be analyzed in site specific environmental assessments.

Table 1. Potentially Treatable Acres of Shrub Invaded Lands

	BLM	State	Private	Total
Creosote	320,150	115,093	74,091	509,334
Mesquite	119,031	10,977	13,232	143,240
Pinyon/Juniper	11,025	1,954	4,681	17,660

Additional livestock numbers would not be authorized based solely on implementation of treatments, nor on increased forage production resulting from treatments. Forage increases as a result of grassland restoration treatments would be reserved first to meet the needs for proper watershed function.

2.1.A Treatment Parameters

Several individual vegetation treatments would likely take place each year. Treatment locations and acreage to be treated within any one year would be dependent upon availability of funding, ability of the livestock operator to successfully manage livestock to accomplish treatment objectives, and factors such as mesquite phenology or grass cover available to carry fire in a given year. Some sites would likely be treated with a combination of techniques, for example conducting a prescribed fire on an area that had been treated by herbicide previously and recovered to the extent fire could begin to play a role in maintaining and improving watershed and/or habitat condition of the site.

2.1.B Treatment Criteria

Treatment areas and projects would be selected and designed based on interdisciplinary review. At a minimum, these eight criteria would be reviewed by an interdisciplinary team to determine if treatment is appropriate. The eight criteria are:

1. Is the proposal consistent with the key goals of Restore New Mexico?Does the site need to be treated?
2. Are native species seed sources available on the site and are they in sufficient quantities to allow establishment of the desired vegetative assemblage?
3. Can livestock management be accomplished to allow recovery of the treatment to full potential in terms of hydrologic function and habitat quality?Do site characteristics, such as soil composition, lend the site to treatment with methods included in this analysis?
4. Would the treatment predispose the site to invasion by exotic plants?
5. Would negative impacts to resource values be within an acceptable level?
6. Would endangered, threatened, proposed species or critical habitat be affected or jeopardized? Would state listed and other special status species (SSS) be moved toward threatened or endangered status?

2.1.C Standard Operating Procedures Included in the Proposed Action

1. Each proposed treatment would be reviewed through the DNA process to ensure potential impacts have been analyzed and levels of impact are consistent with relevant existing NEPA analyses. NEPA documents relevant to the Proposed Action include:

    a) This document.
    b) White Sands Resource Area /Resource Management Plan (WSRA/RMP), dated October 1986
    c) New Mexico Standards for Public Land Health Guidelines for Livestock Grazing Management, Final EIS, USDI BLM, New Mexico State Office, January 2000.
    d) Riparian and Aquatic Habitat Management in the Las Cruces Field Office – New Mexico EIS.
    e) The Vegetation Treatment on BLM Lands in Thirteen Western States, Final EIS (USDI BLM, May 1991).
    f) The 2007 *Final Vegetation Treatments Using Herbicides on Bureau of Land Management Lands in 17 Western States Programmatic Environmental Impact Statement (PEIS)* (USDI BLM 2007).
    g) Other specific activity plan level NEPA analysis that would apply to the proposed treatment site such as that associated with an allotment management plan or coordinated resource management plan.

2. Each proposed project would be reviewed by an interdisciplinary team prior to design and implementation to consider and resolve resource conflicts with regard to achieving the key goals of Restore New Mexico. Completion of the Otero County DNA Checklist (Appendix 3) would be a mandatory component of each project to ensure each project is consistent with the goals of Restore New Mexico and the conditions and analysis included in this EA. Protective and mitigative measures would be incorporated into project design to ensure type and level of impact is consistent with existing NEPA analysis.

3. Each proposed project would be evaluated with regard to potential for impacts to a current list of special status species. No treatment would be implemented that is not consistent with current Bureau policy for special status species (SSS). Where a federally listed or proposed species may be affected, Section 7 or 10 Endangered Species Act compliance would be completed as appropriate and the results incorporated into treatment design.

4. The appropriate level of cultural resources inventory would be determined by the procedures described in the "Protocol Agreement between the New Mexico Bureau of Land Management and New Mexico State Historic Preservation Officer" (June 2004) or successor documents (the Protocol Agreement). Protective measures would be incorporated to the project design as appropriate to ensure compliance with the National Historic Preservation Act.

5. Prior to completion of any vegetation treatments, deferment and rest requirements would be discussed and agreed to with cooperators to ensure management prior to, and following treatment will result in the success of the treatment in terms of recovery of the native vegetative assemblage, hydrologic function, and habitat provision to site potential. Agreements would be documented via a cooperative agreement. Agreements would be adaptable to account for factors such as drought and subsequent requirements for longer recovery, but in general, would have the following requirements:

Rest from Livestock Grazing - Tebuthiuron: Areas treated with tebuthiuron would be completely rested from livestock grazing for a minimum of 2 growing seasons (July 1 through October 31) the second and third summers following application. Rest would be incorporated for longer than 2 years if precipitation is inadequate to allow recovery during the first 3 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.

Rest from Livestock Grazing – Clopyralid/Triclopyr: Livestock shall be removed from pastures to be treated with clopyralid and triclopyr prior to treatment, and the treated pastures shall be completely deferred from livestock grazing from June 1 through October 31 for a minimum of 3 growing seasons after treatment. Rest would be incorporated for longer than 3 years if precipitation is inadequate to allow recovery during the first 3 growing seasons. Rest may extend outside the growing season as determined by monitoring to ensure ground cover (plant basal, leaf litter, etc.) remains to protect soil.

Rest from Livestock Grazing – Fire: Because fire treatments in the Otero area depend largely on a continuous cover of grass to carry fire between woody plants, removal of grazing is generally necessary one or more years prior to the treatment to allow fuel growth and to preserve the grass canopy. Rest following treatment would also be required and would begin the year of the burn.

Because fire treatments can remove a large amount of vegetal cover and leave the site prone to erosion, post treatment rest would be designed to allow maximum recovery as rapidly as possible. Depending on resource objectives, rest could just be deferment based on species in the burned area for one or more years, but might be year round for one or more years. Post-burn precipitation and vegetative recovery would impact deferment time. Pre and post burn livestock management would be determined for each treatment depending on the site and specific objectives of the treatment.

Rest from Livestock Grazing – Mechanical and Manual: Rest timing and length would be determined for each specific treatment and developed based on the extent and type of treatment, the treatment objectives and the site location. Most if not all mechanical and manual treatments would be in conjunction with a larger burn that would have associated rest requirements or would be spot treatments (such as individual salt cedar trees) that would not require rest.

Allowed Grazing Use Level: For the greatest potential to attain the key goals of Restore New Mexico, a maximum of 40 percent use of current year's growth of key forage species would be allowed in treated pastures during the deferment years following treatment. This would ensure herbaceous cover remains on site to provide seed source, protect against erosion and add to the litter layer, which is paramount to soil nutrient cycling and repartitioning of nutrients to interspaces between shrubs. Depending on the site and specific treatment objectives, more stringent forage utilization constraints might be applied, however, these requirements would be discussed with the permittees and incorporated as part of the cooperative agreements.

6. All herbicide treatments would be applied as per the chemical label, State law and BLM's Programmatic Environmental Impact Statement (PEIS) for Vegetation Treatments with Herbicides (USDI 2007a).

7. All prescribed fire would be conducted in accordance with a burn plan developed for each specific project.

8. For vegetation treatments involving chemical herbicides, studies would be established on each treatment to assess the degree to which the treatment meets the key goals of watershed and habitat improvement. Parameters measured to infer success would include, but not be limited to, basal cover and species composition. Studies would establish a baseline, but timing may vary depending on vegetation response to the chemical. Studies would be reread during the last year of scheduled growing season rest and at least 5 years thereafter. Where possible, each transect would be matched with a paired transect outside the treatment. Transects would be permanent and would include photo points. While transects may be read at any time, transects should be read at the about the same time, that is, if baseline is established in January, rereads should occur in January if at all possible. Study design would be consistent across the Initiative Area to allow a cumulative assessment of the restoration effort through time.

9. Grazing use levels would be monitored on treatments to ensure utilization of key forage species is not more than 40%.

10. Monitoring for prescribed fire, mechanical and manual treatments would be treatment specific, but designed to assess success or failure of the treatment with respect to the objective(s) of the treatment.

11. All sites would also be monitored to ensure noxious species do not become established. Where identified, control measures would be implemented.

2.1.C Common Design Features

Each treatment would include a number of features to ensure negative impacts are minimized to the extent possible and ensure the treatments are consistent with the SOP's listed above. These are specific protective measures that would be identified for each treatment during the

DNA and treatment design process. Due to the large scope of this EA in terms of geographic area, variety of soil types, variety of vegetative communities, large number of special status species, number of types of treatment considered, relatively high density of prehistoric and historic resources, mixed land ownership pattern, high diversity of wildlife and variety of resource uses, it is impractical to produce a comprehensive list of every measure that might be incorporated into any given treatment. Following is a partial list of design features to generally be incorporated:

1. **SSS Plants:** Proposed treatment areas where habitat or other information suggests possible presence of SSS plants would be surveyed prior to treatment for occurrence as appropriate. Site and treatment specific buffers or other protective measures (e.g. burning when plant is dormant) would be established to ensure SSS plants are not negatively impacted beyond acceptable levels. In some cases, studies would be implemented to determine susceptibility to herbicide where the potential for impact would not be more than the individual plant or animal level. Acceptable level of impact would be determined as per regulations and policy (e.g. Consultation with FWS where a federally listed plant may be affected).

2. **SSS Buffers**: The Biological Assessment (USDI BLM 2007c) developed for the PEIS listed specific buffer distances for herbicides by application method where a federally listed or proposed plant species is present. Buffer distances for other SSS plant species would be site and species-specific, but based on those included in the Biological Assessment.

3. **Desirable Plant Buffers:** No herbicide application within 100 meters of areas containing significant stands of desirable native trees or shrubs as determined by the Wildlife Biologist or review team (such as little-leaf sumac, skunkbush sumac, desert willow, hackberry, soapberry, willow, oaks, cottonwood, etc.) or other important wildlife habitat susceptible to the herbicide to be used on the treatment. Each treatment would be designed to limit impacts to important wildlife habitat inclusions to ensure impacts do not approach the local population level.

4. **Raptor Nest Buffers:** No liquid herbicide application within 200 meters of active raptor nest sites. No herbicide application within 100 meters of any stick nest if the substrate species is susceptible to the herbicide to be used in that treatment (For example, tebuthiuron application could occur within 100 m of a soaptree yucca with a stick nest because tebuthiuron does not kill soaptree yucca. Conversely, a little-leaf sumac with a stick nest would be buffered to ensure it would not be killed.)

5. **Water Buffers:** All range improvement water sources troughs and/or dirt tanks in the vicinity of the treatment area would be buffered a minimum of 100 meters to ensure exclusion from chemical treatment.

6. **Wind Restrictions:** In order to avoid chemical “drift”, application of liquid herbicide spray, application would not occur when wind speed exceeds seven (7) mph or wind velocities are inconsistent. Application of tebuthiuron pellets would not occur when wind speeds exceed fifteen (15) mph.

7. **Timing:** Application of tebuthiuron pellet herbicide would be conducted in the fall/early winter to coincide with typically gentle rainfall to minimize herbicide movement with runoff.

8. **Off-Road Travel:** In areas where ATV's or other vehicles are used off road in planning, mapping, or carrying out the project, prior to entering the area they would be high-pressure spray washed to remove any soil or plant parts to ensure that weed seeds are not carried to the treatment area. Off-road travel would occur only on dry soil surfaces to minimize soil compaction and rutting, and would not occur in sensitive areas.

9. **Noxious Weed Prevention:** Hand tools to be used in manual treatments and prescribed burns would be cleaned before being brought to the project site, to avoid transferring noxious weed seeds.

10. **Treatment Shape:** Treatments would be designed to minimize impacts to visual resources by avoiding straight or block shapes.

11. **Monitoring:** Monitoring **s**tudies would be established for vegetation treatments according to standards developed by the LCDO. Data would be collected to assess the degree to which the treatment meets the key goals of watershed and habitat improvement. Workload associated with monitoring treatments would be contingent on staffing levels and funding availability

2.1.D Treatment Techniques of the Proposed Action

2.1.D.1 Tebuthiuron™ Treatment

Tebuthiuron™ (i.e. Spike 20P) would be applied as a small pellet directly onto the soil using a calibrated applicator mounted to aircraft. The clay pellet dissolves with precipitation and the herbicide percolates into the soil where it is taken into the plant by the roots and translocated to the leaves where it inhibits photosynthesis. Application would be in the fall/early winter to take advantage of typically gentle rainfall in fall and winter. Tebuthiuron would be applied at a rate of 0.5 to 0.75 pound active ingredient (a.i.) to areas that are dominated by target species including creosote bush, tarbush, or whitethorn acacia.

Application of the pellets would involve setting up a staging area, where the pellets would be loaded into the aircraft. The staging area would be located as near as possible to the application site and aircraft might use existing roads as landing strips. Roads would be blocked during take-offs and landings.

Mandatory buffer distances were included in the PEIS Biological Assessment (USDI BLM 2007c) for federally listed and proposed plant species (TEP) for tebuthiuron for liquid applications. The proposed action for the Otero Initiative Area includes only granular/pelleted form application at ½ to ¾ lb ai/ac rate (typical). The PEIS Biological Assessment indicated buffers were not applicable for pelleted tebuthiuron due to the low potential for wind drift. However, because of the potential for movement in or on the soil, it has been LCDO policy to incorporate 100 meter buffers around non-target plants or special habitat sites within treatment areas for pelleted application. This policy is carried forward in the proposed action.

2.1.D.2 Reclaim™ and Remedy™ Treatment

The herbicides proposed for treatment of mesquite are Reclaim™ (*clopyralid)*, and Remedy™ (butoxyethel ester [BEE] of *triclopyr)* in a tank mix of water, surfactants, crop oils, or other adjuvants, applied at a rate of five gallons per acre from an ATV or aircraft. The proposed rate

of application would be ¼ pound of active ingredient (ai) per acre of each chemical. The product label for Remedy recommends a tank mix with Reclaim to be applied at 1/4 to 1/2 pint of Remedy with 1/3 to 2/3 pint per acre of Reclaim. This recommendation is the equivalent of ⅛ to ¼ lb ai / acre of Reclaim and ⅛ to ¼ lb. ai / acre of Remedy. The herbicides would be applied in the spring and early summer, typically between mid-May until mid-June. Application of the liquid herbicide would involve setting up a staging area, where the liquid would be loaded into the aircraft. The staging area would be located as near as possible to the application site and aircraft might use existing roads as landing strips. Roads would be blocked during take-offs and landings.

Mandatory buffer distances included in the PEIS Biological Assessment (USDI BLM 2007c) for federally listed and proposed plant species for clopyralid are listed below. Buffers for other SSS plants would be site specific but based on these.

1. Since the risks associated with using a high boom are unknown, use only a low boom during ground applications of this herbicide within ½ mile of terrestrial threatened or endangered (TEP) plant species or aquatic habitats in which TEP plant species occur.
2. Do not apply by ground methods at the typical application rate within 900 of terrestrial TEP species.
3. Do not apply by ground methods at the typical application rate within ½ mile of terrestrial TEP species.
4. Do not apply by aerial methods within ½ mile of terrestrial TEP species.
5. In areas where wind erosion is likely, do not apply within ½ mile of TEP plant species.

2.1.D.3 Triclopyr and Imazapyr Treatment

The herbicides proposed for use to treat saltcedar are Triclopyr, sold under the names of Garlon 4 and Remedy, and Imazapyr sold under the trade name Arsenal or Habitat. These chemicals are effective when applied aerially or from the ground to individual trees. The Otero Initiative Area does not contain large areas of monoculture saltcedar where aerial application would be feasible. Saltcedar occurs as scattered stands of a few trees or individual trees. Most occurrences of salt cedar are at dirt tanks. Large trees would be cut and herbicide applied to the fresh cut stump or to foliage the following year when the tree has resprouted and grown sufficiently to absorb enough herbicide to kill the root system. With small trees, herbicide would be sprayed directly onto the canopy from the ground via a backpack or vehicle mounted sprayer. Triclopyr and Imazapyr applications are effective at any time of the growing season but success is best in early fall when the tree is drawing resources into the root system. Where practical, treatments would be timed for this period.

Mandatory buffer distances included in the PEIS Biological Assessment (USDI BLM 2007c) for federally listed and proposed plant species for Triclopyr and Imazapyr are listed below. Buffers for other SSS plants would be site specific but based on these.

Triclopyr BEE

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

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

Imazapyr

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

2.1.D.4 Picloram Treatment

A common occurrence in the project is the invasion of tasajillo (*Opuntia leptocaulis)* as a thick understory to the more dominate, taller-growing creosote. Past experience has shown that when creosote is treated and controlled in these situations, the tasajillo invasion can become worse. Tasajillo may be treated two years after the creosote to allow some of the creosote overstory to become decadent and expose the tasajillo. Tasajillo will then be treated with Tordon 22K (picloram) at a rate of one quart per acre in a tank mix, aerially applied or applied by hand. In order to avoid chemical “drift”, application of herbicide liquid spray on tasajillo would not occur when wind speed exceeds six (6) mph or wind velocities are inconsistent and when the air temperatures are less than 90 degrees F to minimize volatilization.

2.1.D.5 Prescribed Burn Treatment

A burn plan would be developed prior to any prescribed burn occurring. Prescribed fire is the preferred treatment to reduce woody species, but as discussed above, its utility is largely limited in the Otero Initiative Area by the lack of grass available to carry fire. Most lowland and bajada areas would require chemical treatment initially, with fire as a potential follow-up method in future years after the herbaceous species component has recovered to an extent it will carry fire. Late spring through early summer is most conducive to burning in the initiative area and is the time in which most natural fires occur. Prescribed fire treatments may be carried out at other times of the year depending on treatment objectives. Prescribed fire would be used in a number of situations, primarily broadcast burning in a specific treatment area as the primary treatment or as a follow-up to another treatment type. Prescribed fire could also be used when burning slash piles or lop-and-scatter treatments subsequent to cutting to thin woodland or shrubland sites. Methods of ignition would include aerial and/or ground techniques (helitorch or ATV-mounted drip torches).

2.1.D.6 Manual and Mechanical Treatment

Although manual vegetation treatment is labor intensive and costly on a per unit of area basis, compared to prescribed burning or herbicide application, it is species selective and can be used in areas such as sensitive habitats or where human health and safety are concerns. Manual treatments would be applied when chemical or prescribed burning is not appropriate. An example would be where desirable vegetation is closely intermingled with targeted species.

Another example might be where the treatment area is too close to a waterway to apply chemicals. Hand pulling is often the most appropriate method for pioneering infestations of exotic species such as when yellow star-thistle begins to establish in riparian habitat. Hand-operated power tools and hand tools would be used in manual vegetation treatments to cut, clear, or prune woody species. Manual treatments might be followed by prescribed fire, or chemical in a cut-stump application, depending on resource objectives and treatment design. Several mechanical methods are available for vegetation treatment. For the most part, target species in the Otero Initiative Area do not lend themselves to mechanical treatment because they vigorously resprout.

Mechanical treatment would not be used on a landscape scale under the proposed action. However, mechanical treatment may be used on individual plants, such as juniper or salt cedar, to control target plants while avoiding impacts to non-target plants in the immediate vicinity. While it remains a technique that may be incorporated under this initiative, use is expected to be extremely minimal and localized.

2.2 ALTERNATIVE A: NO ACTION

Under this alternative no vegetation would be treated. Selection of the No Action Alternative would result in continued soil loss and deficiencies in hydrologic cycle from brush encroachment. Overall species composition and pounds per acre would continue to remain in an undesirable state resulting in more eolian and alluvial soil loss from that of a higher seral state plant community.

2.3 ALTERNATIVES CONSIDERED BUT NOT ANALYZED

2.3.1 Biological Control Alternative

There currently is no known specific, effective method of biological control for targeted species. Biological treatments therefore will not be analyzed.

2.3.2 Treatment with Other Chemical Alternative

There are other chemicals that control invasive brush species. BLM rejected the use of these chemicals due to impacts to non-target vegetation and/or increased impacts to soil or water resources, or reduced cost effectiveness. Therefore, the use of these chemicals as a primary control for target species will not be analyzed.

2.3.3 Mechanical Treatment Only Alternative

There are no proposed treatment areas that would lend themselves to only mechanical treatment. Mechanized equipment has an overall negative impact on soils, vegetation, and wildlife habitat resources and is also very expensive. Mechanical treatment alone would not be consistently effective on the main target species in a cost effective manner, and would result in unacceptable resource damage.

CHAPTER 3- AFFECTED ENVIRONMENT

GENERAL SETTING

The EA area includes much of Otero County located in south-central New Mexico. It encompasses all lands administered by BLM including approximately 600,000 acres of the co-use portion of McGregor Range. The EA area borders White Sands Missile Range and Holloman Air Force Base to the west, Lincoln County to the north, Lincoln National Forest to the north and east, and Texas to the south. Some of the major landforms include the Tularosa Basin along the west side, the frontal escarpments of the Sacramento Mountains and Guadalupe Rim along the east, the Brokeoff Mountains, Crow Flats basin, Otero Mesa, and the Cornudas Mountains in southern Otero County. Elevations range from about 3700 feet in the Tularosa Basin and Crow Flats to over 7300 feet in the lower Sacramento Mountains and Guadalupe Rim escarpment. Average annual precipitation ranges from 8 to 10 inches in the basin to 14 to 16 inches at the higher elevations. About 60 percent of the annual precipitation falls from July to October, most from brief, but sometimes heavy, thunderstorms. The major vegetative zones are Chihuahuan Desert grasslands and shrublands at lower elevations, blue grama and black grama grasslands on the Otero Mesa, and pinyon-juniper woodlands at higher elevations.

Historical and present use of the public land within the proposed Otero Restoration area includes livestock grazing, mining, utility routes, communications sites, transportation, and many types of recreation including hiking, bird-watching, photography, and hunting.

3.1 AIR

The Clean Air Act (CAA) provides for primary National Ambient Air Quality Standards (NAAQS) to protect human health and secondary NAAQS to protect welfare, including property and crops. Air pollution damages ecosystems and limits visibility so the CAA also attempts to provide protection for natural systems as well as human health through the prevention of significant deterioration (PSD) and the visibility protection programs. Areas that are cleaner than required by the NAAQS for particulates, SO2, and NO2 are designated in one of three classes that determine the amount, or “increment”, of additional air pollution allowed in each area. Most of New Mexico, including the EA area, is PSD Class II increment which allow for moderate deterioration of air quality.

The primary sources of air pollution throughout Otero County is pm10 (dust) which occurs during high wind events, common during the spring months in southern New Mexico, and pm2.5 (smoke) resulting from large fires.

Prescribed burns are permitted when conditions are most favorable to minimize impacts to the public. Air Quality and smoke management are regulated by the New Mexico Air Quality Bureau. In the event of a prescribed burn, a burn plan would be developed and would address the impacts smoke would have on the air quality to ensure they are acceptable.

3.2 SOILS

Soils of Otero County were mapped by NRCS with much of the EA area being compiled in the Soil Survey of Otero Area, New Mexico: Parts of Otero, Eddy, and Chaves Counties (USDA,

NRCS, June, 1981). There has since been an update of the soil survey for Fort Bliss Military Reservation area (including McGregor Range co-use area). Soil maps and detailed data and interpretations for each of the soil map units and series may be found for both of the soil surveys at: http://websoilsurvey.nrcs.usda.gov/app/HomePage.htm.

The General Soils Map for Otero County provides a broad perspective of the soils and landscapes of much of the EA area. Three broad soil categories are listed based primarily on parent materials from which the more general soil map units were identified.

1) Shallow to deep, well drained soils that formed in gypsiferous material.
   These soils generally include those very steep soils on hills and breaks north of Alamogordo and Tularosa, the moderately sloping soils on uplands along the toe-slopes, and nearly level "gyp" soils on the basin floor south of Alamogordo extending westward toward Holloman. Soils high in gypsum are also typical in the Crow Flats area.

2) Shallow, well drained soils that formed in material derived from limestone.
   These are primarily soils that formed on limestone hills found throughout the EA area, including higher elevations north of Bent, the Sacramento Escarpment and southern Sacramento Mountains, the Cornucopia Hills, Collins Hills, Guadalupe Rim, and Brokeoff Mountains.Note: Shallow soils having formed from igneous sources occur in and around the Cornudas Mountains in southern Otero County.

3) Shallow to deep, well drained and somewhat excessively drained soils that formed in alluvium and eolian material.
   These include gravelly soils on alluvial fans/piedmonts along higher mountains throughout the EA area, loamy soils in and around draws, and sandy soils near the basin floor which have been re-worked by wind and formed dunes around mesquite shrubs. This broad soil type would also include the shallow to deep soils over caliche on the rolling hills on McGregor Range and Otero Mesa.

3.3 WATER

The major perennial stream in the project area is the Tularosa Creek. The Tularosa Creek watershed drains over 120 square miles, but only approximately 12 miles of the lower reach of the stream is in the EA area. Flows in the lower reaches of Tularosa Creek average 14 cubic feet per second (cfs), but peak flows have exceeded 2000 cfs in 15 of the last 50 years in the lower reaches of the stream. The lower stream reach (perennial reaches below the old U.S. 70 crossing) of Tularosa Creek is currently listed in the 2008-2010 CWA 303d/305b Integrated Report, but has not been assessed (http://www.nmenv.state.nm.us/swqb/303d-305b/2008-2010/).

Numerous other springs, seeps, and small riparian areas occur throughout the project area. Most drainages within the EA area are considered ephemeral, flowing only after high precipitation events, although the headwaters of some of the major drainages may be perennial outside of the EA area. Many earthen water impoundments (tanks), wells, and troughs are located within the area, constructed for domestic, livestock, and/or wildlife use.

Groundwater depths vary greatly depending on location. Well depths vary from less than 100 feet around the Village of Tularosa to over 1000 feet in the southern Sacramento Mountains.

3.4 VEGETATION

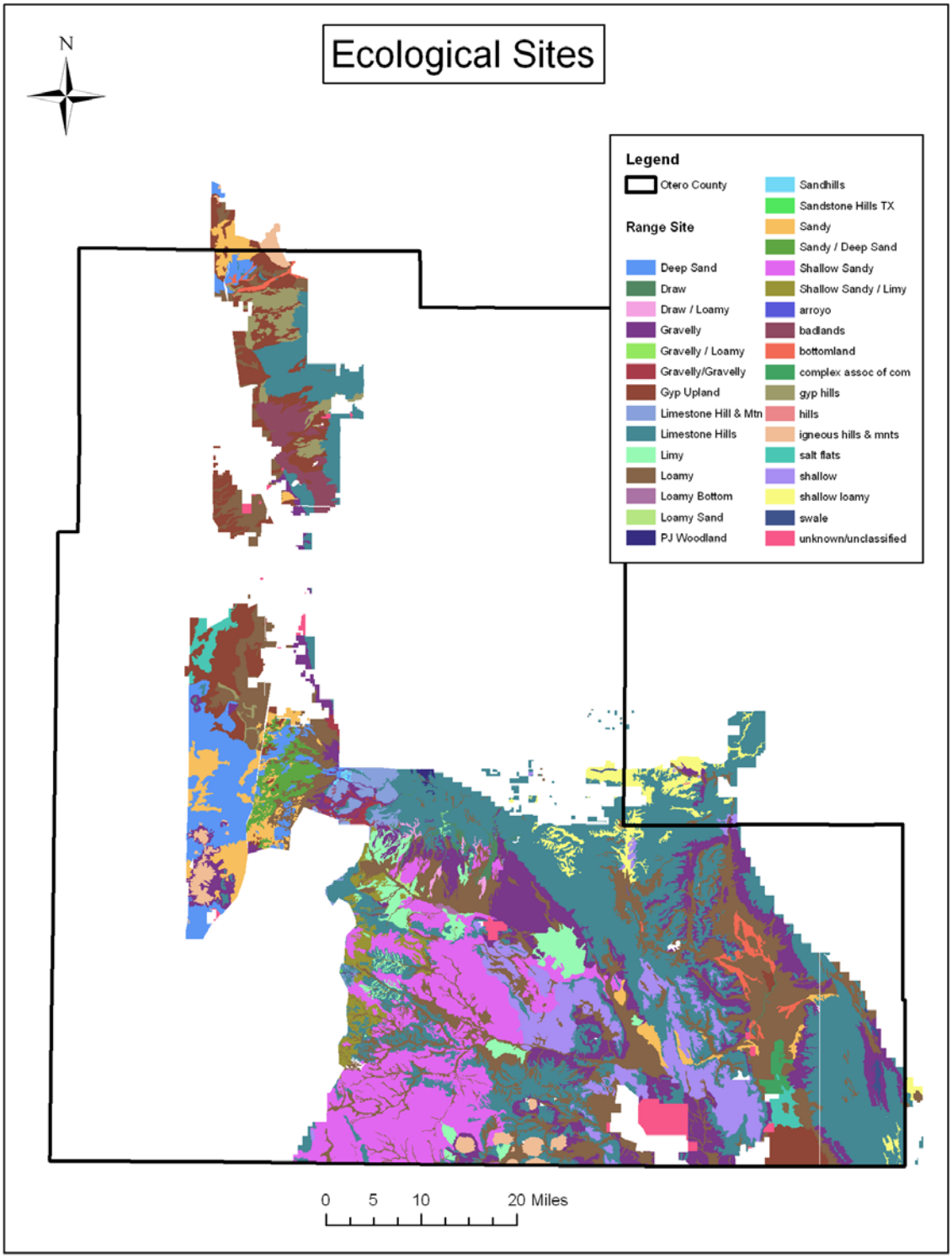
There are two major land resource areas described within the Otero Restoration area as described by the NRCS: The Southern Desertic Basins, and the Plains and Mountains and the Pecos-Canadian Plains and Valleys. Many different vegetative assemblages are present within those areas, and they are broken out as ecological sites. An ecological site is defined as a distinctive kind of land, with specific characteristics, that differs from other kinds of land in its ability to produce a distinctive kind and amount of vegetation. Approximately19 different ecological sites are found within the proposed Otero Restoration area (Map 3).

Detailed descriptions of each ecological site found within the proposed area may be obtained from the Natural Resource Conservation Service website:

SD-2: http://www.nm.nrcs.usda.gov/technical/fotg/section-2/esd/1983mlramap/sd2.html
SD-3: http://www.nm.nrcs.usda.gov/technical/fotg/section-2/esd/1983mlramap/sd3.html
SD-4: http://www.nm.nrcs.usda.gov/technical/fotg/section-2/esd/1983mlramap/sd4.html
CP-4: http://www.nm.nrcs.usda.gov/technical/fotg/section-2/esd/1983mlramap/cp4.html

Rangeland condition is commonly determined by comparing the present vegetative community to the potential climax community for that particular site. In many cases vegetative communities are dynamic having transitioned from grassland to a shrub-dominated state. These changes may have been triggered by natural events, management actions, overgrazing, or a combination thereof. Eventually some areas may degrade to a threshold state in which a return to the previous state is not possible on a practical timescale without significant input such as treatments.

Map 3 Ecological Sites within the Otero Restoration Initiative Area.



3.5 NON-NATIVE AND INVASIVE PLANT SPECIES

Legally, a noxious weed is any plant designated by a Federal, State or county government as injurious to public health, agriculture, recreation, wildlife or property. Generally, noxious weeds are aggressive, difficult to manage, and can be parasitic, carriers or hosts of harmful insects or disease. In most cases noxious weeds are non-native species, although they can be native, new to, or not common in, the United States. Recent federal legislation has been enacted requiring state and county agencies to implement noxious weed control programs.
Table 2 shows the noxious and undesirable weed species identified as present in Otero County.

Table 2. Designated Noxious* and Undesirable Weed Species Identified in Otero County	
African rue*	*Peganum harmala*
Bull thistle*	*Cirium vulgare*
Canada thistle*	*Cirsium arvense*
Field bindweed*	*Convolvulus arvensis*
Hoary cress*	*Cardaria spp.*
Jointed goatgrass	*Aegilops cylindrica*
Leafy spurge	*Euphorbia esula*
Malta starthistle	*Centaurea melitensis*
Musk thistle	*Carduus nutans*
Poison hemlock*	*Conium maculatum*
Purple Star-thistle	*Centaurea calcitrapa*
Russian knapweed*	*Acroptilon repens*
Russian olive	*Eleaegnus angustifolia*
Saltcedar	*Tamarix ramosissima*
Siberian elm	*Ulmus pumila*
Spotted knapweed*	*Centaurea maculosa*

Invasive plants include not only noxious weeds, but also other plants that are not native to this country. The BLM considers plants invasive if they have been introduced into an environment where they did not evolve. As a result, they usually have no natural enemies to limit their reproduction and spread. Some invasive plants can produce significant changes to vegetation, composition, structure, or ecosystem function.

Infestations of noxious or invasive plants can have a disastrous impact on biodiversity and natural ecosystems. They can:

1) reduce opportunities for hunting, fishing, camping and other recreational activities
2) decrease wildlife habitat quality and quantity by disrupting natural plant communities and reducing habitat diversity
3) out-compete native vegetation for light, water and soil nutrients
4) displace wildlife and SSS
5) incur high costs in treatment and loss of productivity
6) decrease the quality and quantity of agricultural products through resource competition
7) negatively affect livestock productivity by displacing native forage with species that are either unpalatable or toxic
8) increase livestock producers' animal health care and feeding costs.

Keeping these species from being introduced into new areas is the most effective management strategy for reducing their spread. They can be accidentally established in new sites through activities that bring seeds or plant parts, or bring soil that may contain such seeds or plant parts. The use of vehicles, machinery, tools, or the introduction of livestock or wildlife that have been in areas that contain noxious or invasive plants can promote the spread of these species.

3.6 WILDLIFE AND WILDLIFE HABITAT

The distribution and quality of wildlife habitats on these allotments reflects impacts from many decades of livestock grazing. As a result, the existing abundance and distribution of wildlife species reflects the capability of habitats on these allotments to support wildlife on a grazed landscape.

The BLM conducted an inventory of wildlife habitats in Otero County using the Integrated Habitat Inventory and Classification System (IHICS) in 1982. Standard Habitat Sites (SHS) occurring in these allotments as of 1982 include:

- Creosote Flat
- Creosote Rolling Upland
- Salt Flats
- Grass Flat
- Grass Rolling Upland
- Grass Mountain
- Mesquite Rolling Upland
- Mixed Shrub Rolling Upland
- Mixed Shrub Mountains
- Pinyon-Juniper/Grass Mountain
- Arroyo

Standard Habitat Site descriptions can be found starting on page 3-21 of the White Sands Resource Area Draft Resource Management Plan/Environmental Impact Statement.

The treatment areas provide habitat for approximately 10 species of amphibians, 40 species of reptiles, 70 species of mammals, and 200 species of birds. Tables of wildlife found in Otero County, by habitat type, are available from the Bureau of Land Management, Las Cruces District Office.

3.7 SPECIAL STATUS PLANT SPECIES

Special Status plant species include plants that are listed as Endangered, Threatened, proposed, or species of concern by the United States Fish and Wildlife Service (USFWS), State of New Mexico (NM), or the BLM. Presence of special status plant species and their habitats in Otero and Chaves Counties was considered using LCDO species occurrence/habitat records and New Mexico Natural Heritage Program species records. Species descriptions and distributions were derived from LCDO office records and New Mexico Rare Plant Technical Council [NMRPTC. 1999. New Mexico Rare Plants. Albuquerque, NM: New Mexico Rare Plants Home Page http://nmrareplants.unm.edu (Latest update: 18 January 2006)].

Based on evaluation of the above information, 13 species and/or habitats could occur in the affected allotments (Table 3). There are no known occurrences of special status plants on the specific allotments proposed for treatments.

Table 3. Special Status Plant Species Potentially Occurring in the Project Area*	
Species	**Status**
Alamo beardtongue	NM and USFWS Species of Concern
Arizona coralroot	NM and USFWS Species of Concern
Cliff Nama	NM and USFWS Species of Concern
Grama grass cactus	BLM Sensitive
Gray sibara	BLM Sensitive
Guadalupe mescal bean	BLM Sensitive
Guadalupe rabbitbrush	BLM Sensitive
Hairy muhly	NM and USFWS Species of Concern
Kuenzler's hedgehog cactus	NM and Federally Endangered
Mescalero pennyroyal	NM Species of Concern
New Mexico rock daisy	BLM Sensitive
Villard pincushion cactus	NM Endangered and USFWS Species of Concern
Wright's marsh thistle	NM Endangered and USFWS Species of Concern

*All species on the list are considered BLM Sensitive Species.

Alamo beardtongue (*Penstemon alamosensis)* This perennial forb grows in sheltered rocky areas, canyon sides, and canyon bottoms, on limestone between 4,300 and 5,300' elevation.

Arizona coralroot *(Hexalectris spicata* variety *arizonica)* This orchid grows in heavy leaf litter in oak, pine, or juniper woodlands over limestone.

Cliff nama *(Nama xylopodum)* This herbaceous perennial grows in partly shaded limestone cliffs in mountain shrub and pinyon-juniper habitats from 4,500 to 6,500' elevation.

Grama grass cactus *(Sclerocactus papyracanthus)* This cactus occurs in two ecotypes occurring from 5,000 to 7,300'. The two ecotypes include grama and galleta grasslands with sandy soils and alkali sacaton grasslands in gypseous soils.

Gray Sibara (*Sibara grisea*) This annual forb grows in crevices and limestone cliffs in shrubby and pinyon-Juniper habitats from 4,500-6,000'. Livestock grazing is not believed to be a threat.

Guadalupe mescal bean (*Sophora gypsophila* variety *guadalupensis*) An evergreen shrub, unpalatable to livesock, grows in limestone of the Guadalupe and Brokeoff Mts. at 5,200-6,700'.

Guadalupe rabbitbrush (*Ericameria nauseosa* variety *texensis*) This small shrub grows in crevices on cliff faces, boulders, and canyon bottoms of desert shrub and pinyon-Juniper woodland habitats of the Guadalupe and Brokeoff Mountains between 4,900 and 7,000'.

Hairy muhly *(Muhlenbergia villiflora* variety *villosa)* This rhizomatous perennial grass grows in open desert grassland in alkaline to calcareous soils from 4,800 to 5,200 feet elevation.

Kuenzler's hedgehog cactus (*Echinocereus fendleri* variety kuenzleri) This small cactus occurs mainly on grassy limestone ridge tops with rock soil, along the eastern side of the Guadalupe Mountains, eastern and northwestern sides of the Sacramento Mountains, on the southern side of the Capitan Mountains, and near Carrizozo, at 5,200-6,900' (Mike Howard, BLM, personal communication). It is found on gentle, south-facing or nearly flat ridge tops and limestone ledges, in grass and juniper woodland habitats. It is susceptible to overcollection,

trampling by livestock, and fire. Critical habitat has not been designated for it. Surveys for this cactus in previous treatment areas have been negative.

Mescalero pennyroyal *(Hedeoma pulcherrimum)* This perennial forb grows on steep hillsides in pinyon-juniper and conifer forests from 5,000 to 9,000' elevation.

New Mexico Rock Daisy (*Perityle staurophylla* variety *staurophylla*) This woody, perennial forb grows in crevices in limestone cliffs and boulders, usually on north and east slopes, from 4,900-7,000'. It is believed to be relatively secure because of the difficulty in accessing its habitat.

Villard pincushion cactus *(Escobaria villardii)* This small cactus grows in loamy soils in desert grass/shrub types on limestone benches from 4,500 to 6,500 feet elevation.

Wright's marsh thistle *(Cirsium wrightii)* This biennial to perennial forb grows in wet, alkaline spoils in spring seeps from 3,450 to 8,500 feet elevation.

3.8 SPECIAL STATUS ANIMAL SPECIES

Special Status animal species include animals that are listed as Endangered, Threatened, proposed, or species of concern by the United States Fish and Wildlife Service (USFWS), State of New Mexico (NM), or the BLM. Special Status animal species lists for Otero County were compiled from: www.wildlife.state.nm.us/conservation/threatened_endangered_species/index.htm and http://www.fws.gov/southwest/es/newmexico/SBC_view.cfm?spcnty=Otero. Known geographic distribution and habitat requirements were considered for each species in comparison with habitat types on the allotments. The results of this analysis are that of 41 species listed by the FWS as species of concern in Otero County, 22 species are considered to have potential habitat within the treatment areas (Table 4).

Table 4. Potentially Occurring Special Status Wildlife Species *

Species	Status
American peregrine falcon	USFWS Species of Concern, NM Threatened
Baird's sparrow	USFWS Species of Concern, NM Threatened
Bald Eagle	USFWS Threatened, NM Threatened
Burrowing owl	USFWS Species of Concern
Common ground dove	NM Endangered
Ferruginous hawk	BLM Sensitive
Gray vireo	NM Threatened
Loggerhead shrike	USFWS Species of Concern
Mountain Plover	USFWS Species of Concern
Northern Aplomado falcon	USFWS Proposed
Gray-banded kingsnake	NM Endangered
Mottled rock rattlesnake	NM Threatened
Texas horned lizard	BLM Sensitive
Big free-tailed bat	BLM Sensitive
Cave myotis	BLM Sensitive
Desert bighorn sheep	NM Endangered
Fringed myotis	BLM Sensitive
Long-eared myotis	BLM Sensitive
Long-legged myotis	BLM Sensitive
Spotted bat	USFWS Species of Concern, NM Threatened
Townsend's big-eared bat	USFWS Species of Concern
Western small-footed myotis	BLM Sensitive

*All species on the list are considered BLM Sensitive Species

American Peregrine falcon (*Falco peregrinus*). Peregrine falcons prefer cliff habitats, but feed on small birds in most habitat types.

Baird's sparrow (*Ammodramus bairdi*). This sparrow is a grassland species, and is believed to have declined significantly because of the loss of grassland habitats.

Bald eagle (*Halieaeetus leucocephalus*). These eagles primarily occur along coastlines, rivers, and lakes and feed on fish. Wintering bald eagles are occasionally seen in the area feeding on deer and other carcasses.

Burrowing owl (*Athene cunicularia*). This species is found in a variety of habitat types, and prefers dirt banks or prairie dog and other burrows for nesting habitat. These birds will excavate their own burrows too.

Common ground dove (*Columbina passerina pallescens*). This dove is a grassland species, and is believed to have declined significantly because of the loss of grassland habitats.

Ferruginous hawk (*Buteo regalis*). These hawks winter in the area after nesting further north, they prefer open grasslands for feeding.

Gray vireo (*Vireo vicinior*). This species prefers juniper and piñon-juniper savannah habitats, and is believed to have declined because of juniper invasion and replacement of savannah habitats with thick stands of juniper monoculture.

Loggerhead shrike (*Lanius ludovicianus*). These birds are common to all habitat types in the proposed action area, but are often associated with yucca grasslands.

Mountain plover (*Eupoda montana*). This grassland bird uses prairie dog borrows for nesting.

Northern aplomado falcon (*Falco femoralis septentrionalis*). These flacons occur in grasslands, grassland-yucca savannahs, and other grass savannah types. They are endangered as a result of nesting failures associated with historic use of DDT and loss of grassland habitats.

Gray-banded kingsnake (*Lampropeltis alterna*). These snakes occupy rocky habitats, particularly steep to precipitous rocky hillsides and cliffs. In New Mexico they are known only from the Guadalupe Mountains, but probably occur at low densities over many of the rocky hills and mountains of Otero County.

Mottled rock rattlesnake (*Crotalus lepidus lepidus*). These snakes occupy the same rocky and cliffy habitats as the gray-banded kingsnake.

Texas horned lizard (*Phrynosoma cornutum*). This species occupies diverse habitats, but feeds exclusively on harvester ants, which feed on grass seeds.

Big free-tailed bat (*Tadarida molossus*), Cave myotis (*Myotis velifer*), Fringed myotis (*Myotis thysanodes*), Long-eraed myotis (*Myotis evotis*), Long-legged myotis (*Myotis volans*), Spotted bat (*Euderma maculatum*), Townsend's big-eared bat (*Plecotus townsendii*), and western small-footed myotis (*Myotis leibii*). These bats roost in caves, rock crevices, tree hollows, and cliff cracks at low to moderate elevations. They feed on insects at night, often concentrating on

insects attracted to or emerging from water sources, and they will drink from free water surfaces. The spotted bat may be the rarest bat with a large range in New Mexico.

Desert bighorn sheep (*Ovis Canadensis*). These sheep historically occupied steep to precipitous desert mountain habitat in Otero County. They no longer occur here, but if domestic sheep and goats, and non-native Barbary sheep are ever eradicated, the habitat could again be suitable for Desert bighorn sheep.

3.9 LIVESTOCK GRAZING

There are 104 BLM livestock grazing allotments currently within the Otero Restoration area (See Appendix 1 for a listing).

The allotments are primarily permitted for grazing cattle, sheep, and horses. Grazing allotments vary tremendously in size, from just a few animals, to over 3,000 head. Most allotments are authorized for year long livestock grazing, and are made up of public, State, private and other lands owned or controlled by the permittees.

There are also 14 grazing units on McGregor Range. The grazing season of use is determined on a unit by unit basis and units are obtained for grazing through competitive bidding at public auction.

3.10 CULTURAL RESOURCES

Distribution of cultural material is indicative of a dynamic use of natural resources. There are many documented prehistoric sites in this area, ranging from Archaic Native American, through Proto-historic Apache sites, large areas containing remnants of roasting pits and other Native American habitation indicators dot the area.

A progression of settlement patterns by European and Hispanic peoples can still be seen in the skeletons of homesteads and earthworks, i.e., troughs, fence lines, roads, wells, and cisterns, that are rediscovered from time to time. Land use changed with their coming and the introduction of grazing animals. The intensity of grazing was profitable for a time but costly to some cultural remains.

Finally a major transition in land use left unique traces in the cultural environment; the military annexation of large parcels of land in the region. This opened a new and vigorous period of study known by some archaeologist as, the atomic west, or the cold war west. Remnants of testing by early U.S. Army Air Corps personnel can be found in the area. Observation structures, old casings of fired munitions, aircraft parts, and long forgotten targets can still be discovered in this region. The primary cultural uses of the area today include ranching, hunting, and other outdoor recreation. McGregor Range is additionally used for military training.

3.11 VISUAL RESOURCES

The proposed action includes lands that have been classified into Visual Resource Management (VRM) classes through the White Sands Resource Management Plan (BLM 1985). The lands proposed for treatment are almost entirely within VRM Class III and IV areas.

Some juniper areas near Tularosa Creek and U.S. Highway 70 may be in the VRM Class II area because of visibility from U.S. 70. These lands were historically juniper savannah type. During approximately the last two decades, junipers have been increasing to create thick stands that have changed the lines, color, and texture of the landscape in this area.

3.12 RECREATION

The areas proposed for treatment currently are open to recreation use by the public. The primary recreational activity is hunting for deer, dove, quail, and oryx. Dispersed recreation, such as hiking, camping, horseback riding and photography occurs at low levels as well.

Most of the lands proposed for treatment are currently designated as open to all vehicle use. Vehicle tracks created by off-highway vehicle use regularly develop into new vehicle trails.

CHAPTER 4. ENVIRONMENTAL IMPACTS

4.1 AIR

4.1.1 Proposed Action Impacts to Air

Herbicide Application

The staging area would probably receive small amounts of the herbicide dust from loading the pelleted herbicide; however, a single prolonged exposure is not likely to result in the chemical being absorbed through the skin in harmful amounts, according to the Material Safety Data Sheet (MSDS). There could be a short-term impact to air quality during the herbicide application of both pelleted and liquid herbicides. The herbicide labels and Standard Operating Procedures would be followed to minimize drift and volatilization. Federal, State and local air quality regulations would not be violated.

As vegetative communities responded to the treatment, over several years, increased vegetative ground cover would reduce erosion of soil by wind and water to below pre-treatment levels.

Prescribed Burning

Preparation of firebreaks and pre-burn scouting and off-road vehicular travel could result in some disturbance to ground and resulting airborne dust. Ignition of the vegetation would create smoke. After the fire is completed, the ash created from the burned vegetation combined with soils made bare and vulnerable to wind erosion would create additional short-term impacts to air quality by contributing to the particulate matter in the air.
As vegetative communities responded to the treatment, over several years, increased vegetative ground cover would reduce the windborne erosion of soil to below pre-treatment levels.

Manual and Mechanical Treatments

Manual treatment of small areas would result in some disturbance to the ground and a small increase in windborne dust. The use of machinery would allow for treatment of larger areas and would cause greater disturbance to the ground, and a correspondingly larger potential for windborne soil. With both types of treatment, the additional impacts would be temporary. As vegetative communities responded to the treatment, over several years, increased vegetative ground cover would reduce the windborne erosion of soil to below pre-treatment levels.

4.1.2. No Action Impact to Air

Implementation of the no action alternative would not change current levels of air quality. Fugitive dust would continue to be generated from areas of bare spaces unprotected by vegetation during periods of high wind events and there would be no improvement of air quality as a result of vegetative treatments.

4.2 SOILS

4.2.1. Proposed Action Impacts to Soils

Herbicide Application

The primary impact to soils will be the reduction of vegetative ground cover following the application of herbicide. Pelleted tebuthiuron is formulated to be applied on the soil surface and infiltrated into the root zone of the target species. Under normal conditions, creosotebush produces fewer and fewer leaves each year for three to five years until the plant dies. Liquid herbicides generally begin taking affect on the target species soon after application with noticeable results occurring during that same growing season.

Canopy cover provided by the target shrubs is reduced until herbaceous vegetation can take advantage of increased soil moisture made available as a result of the dying shrubs. The decreased ground cover following treatment could influence the potential for soil erosion by wind and water in the short term. Once grasses and forbs recover, however soil loss from the site will be reduced. Increased herbaceous vegetative species will generate more litter and organic material on the site improving soil stability.

Although herbicides would not alter a soil's physical properties, there may be indirect effects on soil microorganisms. Depending on the application rate and the soil environment, herbicides can either stimulate or inhibit soil organisms. When herbicide treated vegetation decomposes, the resulting addition of organic matter to the soil can support increased populations of microorganisms. Soil microorganisms can metabolize herbicides and often are reported to be responsible for herbicide decompositions.

Prescribed Burning

Many physical, chemical, mineralogical, and biological soil properties can be affected by fire. The effects are chiefly a result of burn severity, which consists of peak temperatures and duration of the fire. Climate, vegetation, and topography of the burnt area control the resilience of the soil system; some fire-induced changes can even be permanent. Low to moderate severity fires, such as most of those prescribed in fire management, promote renovation of the dominant vegetation through elimination of undesired species and transient increase of available nutrients. No irreversible ecosystem change occurs, but the enhancement of hydrophobicity can render the soil less able to soak up water and more prone to erosion. Severe fires, such as wildfires, generally have several negative effects on soil. They cause significant removal of organic matter, deterioration of both structure and porosity, considerable loss of nutrients through volatilisation, ash entrapment in smoke columns, leaching and erosion, and marked alteration of both quantity and specific composition of microbial and soil-dwelling invertebrate communities. However, despite common perceptions, if plants succeed in promptly recolonising the burnt area, the pre-fire level of most properties can be recovered and even enhanced.

Manual and Mechanical

Manual treatments would impacts on soils over a smaller area. Soils would be disturbed and loosened in the areas where people would be walking and working during the removal of

shrubs, creating a temporary and small increase in erosion. Shrubs removed would be lopped and piled, to lessen the potential of soil loss due to erosion. As the vegetation regenerates, and additional ground cover is gained, soil impacts would drop to below pre-treatment levels.
Use of mechanical treatment over larger areas would disturb and loosen soils throughout the treatment area. This type of treatment would result in the removal of some grasses and forbs and would leave areas bare of ground cover temporarily. The large area of vulnerable soils would significantly increase the potential for erosion by wind and water until sufficient ground cover became reestablished.

4.2.2. No Action Impacts to Soils

Implementation of the no action alternative would result in no significant change in the soil resources. Soils in areas where shrubs are increasing may be subjected to increased erosion by wind and water due to increased bare ground and increased bare patch size. Increased bare areas would also expose more soil and be subjected to decreased soil moisture and above and below ground organic material.

4.3 WATER

4.3.1. Proposed Action Impacts to Water

Herbicide Application

Herbicides may enter surface water impoundments during treatment through accidental direct application. Chemical drift over water might also occur during adverse weather. Per the standard operating procedures and common design features, the possibility of chemical drift away from targeted locations during application would be reduced. With the exception of salt cedar treatments, a buffer area of a minimum of 100 meters would be designated around the waters prior to application of herbicides, to ensure the tanks and wells are excluded from chemical treatment.

Salt cedar treatments for salt cedar in riparian areas would only be applied from helicopter or by hand to reduce the potential for damage to non-target species.

After treatment, pelleted herbicide could be displaced through surface runoff, should an intense rainfall event occur shortly after application, before the pellets have dissolved into the soil. Application according to the SOP and common design features would avoid the time of year when such storms are likely and would avoid treatment within larger drainages, where chemical would be more likely to be transported by runoff. Wells in the proposed treatment area are deep below the ground surface, giving low potential for herbicide percolating into groundwater aquifers.

Clopyralid is a chemical which can travel though soil and under certain conditions contaminate groundwater. The MSDS recommends that Clopyralid not be applied where soils have rapid to very rapid permeability throughout the profile (such as loamy sand to sand) and the water table of an underlying aquifer is shallow, or to soils containing sinkholes over limestone bedrock, severely fractured surfaces, and substrates which would allow direct introduction to an aquifer. This chemical would not be applied in areas with underlying shallow aquifers, or other potentially problematic areas.

Over the long-term, increased herbaceous ground cover would slow runoff and allow for greater infiltration of water into the ground.

Prescribed Burning

Prescribed burns would temporarily create bare areas on the ground that would have potential for soil erosion through surface runoff. As revegetation occurred post-treatment, bare areas would decrease in size to less than pre-treatment levels, leading to improved groundwater infiltration.

Manual and Mechanical

Manual treatment would be carried out in relatively small areas, which would reduce the potential impact of such treatment. Soils would be loosened and disturbed by the vegetation removal and any redistribution of the plant materials. Some non-target vegetation could be removed in the process, and bare ground would be increased.

The use of machinery to remove shrubs would produce similar, but much greater impacts. The increase in bare ground would add to the potential for short-term erosion and decreased surface water quality. Water does not percolate as well or as quickly into bare soils as it does into ground with vegetation. Ground water resources would not be recharged as rapidly as when vegetation is present. These effects would continue to some extent until sufficient ground cover became reestablished.

4.3.2. No Action Alternative Impacts to Water

If the No Action Alternative was selected, then there would be no improvement in ground cover in the long term. If upland conditions continue to deteriorate, there could be an increase in runoff, resulting in increased soil erosion, and a deterioration of watershed condition and down-gradient water quality.

4.4 VEGETATION

4.4.1. Proposed Action Impacts to Vegetation

Herbicide Application

The herbicides proposed for use in the proposed Otero Restoration area are relatively safe and effective for rangeland use, but can have affects off-site and on non-target species. The treatments would be designed to reduce damage to non-target vegetation by using appropriate application rates, adjusting timing of application, and designing leave-out areas and buffering along drainages.

In general, chemical treatment is expected to decrease the cover and density of certain shrubs while increasing the cover and density of desirable grasses and forbs and some other shrub species. Herbaceous production, ground cover, and community structure would be shifted toward intermediate grass dominated states that vary in grass cover depending on the degree of retrogression present at treatment (or conversely the remaining cover of grasses and non-affected shrubs available to re-establish in the site). In areas where sufficient grass cover is not present, there is potential for large increases of exotic (such as tumbleweed) and native annual forbs and grasses as well as potential for a relatively barren aspect. Some injury or loss of non-

target forb and shrub species would be likely to occur.

Forbs and grasses could begin to re-establish late in the growing season or the following year from the soil seed bank, depending on the amount and timing of precipitation received. Information on each of the herbicides discussed below has been collated from the product labels, MSDS, and the Weeds Control Methods Handbook, (Tu et. al 2001).
Spike 20P™ (*Tebuthiuron*) Treatment

Tebuthiuron, used primarily for control of creosote, is applied as a clay pellet that dissolves with precipitation or moisture. Tebuthiuron is active and mobile in the soil and is translocated from the soil by roots through the plants to the leaves where it inhibits photosynthesis. Lack of chlorophyll essentially causes starvation of the plant over time.

Generally, wind drift of Tebuthiuron is low when applied in the form of a clay pellet. The mobility of the herbicide is greatly influenced by the soil texture, for this reason the SOP provides for application during months when there is relatively low probability of high rainfall events that would allow for increased movement across the soil surface and through the soil column.
In laboratory studies, 14C Tebuthiuron leached slowly through a muck soil, but leached more readily through a sand soil column. In field studies, 14C Tebuthiuron leached slowly in medium textured soils with 2-3 percent organic matter. Tebuthiuron was found in runoff water in field studies on controlled watersheds when storms occurred immediately after application. Metabolism, degradation, and leaching of Tebuthiuron in soil were studied in the laboratory and field. The half-life of Tebuthiuron was 10 to 13 months in field studies conducted in moderate-to-high rainfall areas. In low rainfall areas, the rate of dissipation was much slower. In southwestern New Mexico, the half-life would be approximately 30 months +/- 10 months. Tebuthiuron is generally considered a non-selective herbicide when used at application rates much greater than this proposal. Grasses as well as shrubs and forbs are affected by the herbicide at higher rates. However, at an application rate of ½ lb active ingredient per acre, grasses are not greatly affected by the herbicide and are benefited by reduced competition for nutrients and space. Application at this rate can cause some mortality in forbs. Shrubs such as tarbush and mariola are susceptible to Tebuthiuron at the proposed rates, while mesquite is not susceptible to the ½ lb per acre application rate. Non-target, desirable shrub/tree species known to be susceptible to this chemical are ocotillo, desert willow, wolfberry, little-leaf sumac and juniper.

Grasses and herbaceous plants may be affected by Tebuthiuron during the first year following treatment, in particular at the higher application rate (3/4lb per ac). An increase in ground cover and density of grasses and forbs would be expected by the second growing season, as competition for water and nutrients with shrubs decreases.

A study conducted on the vegetation and soils changes in areas treated with Tebuthiuron by the Las Cruces District over a 17 year period found approximately 85% mortality of creosotebush with a 95% reduction in canopy cover (Perkins et al. 2006). Little evidence of re-establishment of creosotebush in the short-term was found. Cover of short and mid grass species (such as burrograss, fluffgrass, tobosa, and bush muhly) increased significantly after treatment with Tebuthiuron. While there were regional differences in grass response, in general short grass cover was highest 4 to 8 years following treatment. Mid-grass cover was generally highest in areas treated 14 to 17 years previously. In addition, soil nutrients, which had become localized under the canopies of creosotebush plants, began to disperse back into the interspaces between the dead shrubs. This suggests that further re-establishment of herbaceous vegetation between shrubs should continue to occur in the future.

Adequate deferment from livestock grazing following treatment is necessary to promote grass and herbaceous plant recovery and spread. Plants must have the opportunity to grow vigorously, create carbohydrate stores, and reproduce sufficiently to be able increase as expected. Without such deferment, the gains expected from treatment may not occur, and rangeland health may decrease to below pre-treatment levels.

Reclaim™ (*Clopyralid)* and Remedy™ (butoxyethel ester [BEE] of *Triclopyr)* Treatment Clopyralid is a highly active water soluble liquid product used primarily for control of mesquite. It is a systemic, post-emergent auxin-mimic type herbicide that is effective against many species of Compositae, Fabaceae, Solanaceae, and Apiaceae. Very small applications of this product can kill or injure sensitive broadleaf plants. It has little effect on grasses and other monocots, and also does little harm to members of the Brassicaceae.

Clopyralid affects plants directly through application to foliage and indirectly through root uptake from treated soil. Clopyralid passes rapidly into leaves and roots of plants and is rain-fast within two hours. Once inside the plant, Clopyralid is converted to the anion form and transported throughout the plant. It is not readily degraded by the plant and can be persistent, even in non-susceptible species. It has auxin-like activity, inducing severe epinasty and hypertrophy of the crown and leaves.

Other effects include increases in tissue water content making plants brittle and easily broken; increase in cell division and respiration and decrease in photosynthesis; and loss of ability of roots to uptake soil nutrients and stem tissues to move food through the plant. Mortality of plants is due to the combination of physiological effects.

Spray drift can severely affect sensitive plants during active growth or dormant periods. Clopyralid may injure legumes and certain other broadleaf plants. However, the stand and growth of established perennial grasses is usually improved after spraying, especially when rainfall is adequate and grazing is deferred. Newly seeded grasses may be injured until well established as indicated by tillering, development of a secondary root system, and vigorous growth.

Once Clopyralid is applied to soils, it rapidly disassociates, becoming extremely soluble in water, and does not bind strongly with soil particles. Clopyralid's half-life in the environment averages one to two months and ranges up to one year depending on the soil type, temperature, and rates of application. It is degraded almost entirely by microbial metabolism in soils and aquatic sediments. Clopyralid is not degraded by sunlight or hydrolysis. It does not appear to be strongly adsorbed on soil and may be subject to leaching. The inability of Clopyralid to bind with soils and its persistence implies that Clopyralid has the potential to be highly mobile and a contamination threat to water resources and non-target plant species, although no extensive offsite movement has been documented.

Control of rangeland brush can be unsatisfactory under adverse growing conditions, such as severe drought stress. Inadequate mortality may occur to target species.

The herbicidal symptoms of mesquite treated with the chemical are often different from those resulting from application of other herbicides. In some years, complete brownout and leaf drop of treated mesquite may be delayed and not occur before the first frost. Other herbicidal symptoms often observed include discoloration and rupture and/or "bleeding" of bark, branches, and trunks.

Triclopyr

Triclopyr is a selective systemic herbicide used to control woody and herbaceous broadleaf plants. It is particularly effective against root-sprouting species and also at controlling woody species with cut-stump or basal bark treatments. It has little or no impact on grasses. Triclopyr is a butoxyethyl ester formulation and is sold under the trade name Garlon 4™, Remedy™ is the butoxyethyl ester formulation.

Triclopyr kills plants by mimicking the plant growth hormone auxin, and when administered at effective doses, causes uncontrolled and disorganized plant growth that leads to plant death. The exact mode of action of Triclopyr has not been fully described, but it is believed to acidify and "loosen" cell walls, allowing cells to expand without normal control and coordination. Low concentrations of Triclopyr can stimulate RNA, DNA, and protein synthesis leading to uncontrolled cell division and growth, and, ultimately, vascular tissue destruction. Conversely, high concentrations of Triclopyr can inhibit cell division and growth.

Triclopyr is degraded by sunlight, microbial metabolism, and hydrolysis. Hydrolysis of the ester to the acid form occurs readily in the environment and within plant. It is reported that the ester is converted to an acid with a half-life of three hours, and that the rate of hydrolysis in water increases with an increase in pH. In soils, it will degrade rapidly to the parent compound, Triclopyr acid. The formulation binds well with soils, and therefore, is not likely to be mobile in the environment. The ester can be highly volatile and is best applied at cool temperatures on days with no wind. Because the salt cannot readily penetrate plant cuticles, it is best used as part of a cut-stump treatment or with an effective surfactant.

The average half-life of Triclopyr acid in soils is 30 days. The ester is not water-soluble and can take significantly longer to degrade. It can bind with the organic fraction of the water column and be transported to the sediments. Microbial metabolism accounts for a significant percentage of Triclopyr degradation in soils. In general, warm, moist soils with a high organic content will support the largest microbial populations and the highest rates of herbicide metabolism. It was found that microbial degradation of Triclopyr was significantly higher in moist versus dry soils, and higher at 30º C than at 15º C (DT50 is 46 days versus 98 days in dry soils, and 57 days versus 199 days in moist soils, respectively. Additionally, the presence of sunlight plays a role in the rates of microbial metabolism of Triclopyr. Microbial metabolism was slowed when soil was deprived of light.

The formulation is hydrolyzed to the acid after entering plant tissue. The acid tends to remain in plants until they die or drop leaves and begin to decay. It is reported that Triclopyr in evergreen foliage and twigs showed remarkable persistence. Although concentrations of Triclopyr in the soil will decrease quickly and remain low through the winter, levels can rise again in the spring if a new supply of contaminated foliage falls from defoliating crowns. In non-target plants, Triclopyr soil residues can cause damage via root uptake.

Adjuvants and surfactants are added to the tank mix to improve the effectiveness and reduce off site drift of the herbicide they are added to, either increasing its desired impact and/or decreasing the total amount of formulation needed to achieve the desired impact. Some adjuvants enhance the penetration of herbicide into plants by ensuring adequate spray coverage and keeping the herbicide in contact with plant tissues, or by increasing rates of foliar and/or stomatal penetration and reduce the time needed for the herbicide formulation to become rainfast.

Oil adjuvants can increase the penetration of oil-soluble herbicides into plants, and are commonly used when conditions are hot and dry, and/or when leaf cuticles are thick. They are derived from either refined petroleum (mineral) oils or from vegetable oils (including seed oils), and do not readily mix with water. Therefore, when an oil adjuvant is combined with water in a spray tank, a surfactant emulsifier must also be added, which distributes the oil droplets uniformly throughout the mix.

Surfactants facilitate or enhance the emulsifying, dispersing, spreading, sticking or wetting properties of the herbicide tank mix. Surfactants reduce surface tension in the spray droplet, which ensures that the formulation spreads out and covers plants with a thin film rather than beading up. This facilitates herbicide absorption into the plant.

The recommended adjuvant type for Triclopyr and Clopyralid is nonionic surfactant. Nonionic surfactants have no ionic charge and are hydrophilic (water-loving). They are generally biodegradable and are compatible with many fertilizer solutions.

Reclaim/Remedy Mix - Treatment with the mix of herbicides would be expected to reduce the number of mesquites in the treated area. The percent killed is affected by a number of variables, and is not consistent. Along with mortality of mesquite, it is expected that there would be high mortality of non-target shrubs and many broadleaf annual and perennial forbs in the treatment area.

With the reduction in competition for water and nutrients, other species, especially grasses, would be expected to increase in ground cover and production. With adequate rest and recovery, if sufficient herbaceous production occurs, prescribed fire would be used to maintain the treatment by killing young plants and reducing the seed bank.

Imazapyr

Imazapyr is a non-selective herbicide proposed for use on salt cedar. It controls plant growth by preventing the synthesis of branched-chain amino acids. It is relatively slow acting, does not readily break down in the plant, and is therefore particularly good at killing large woody species. When applied to desirable forage grasses, it will cause severe injury, growth reduction, and grass mortality. The use of low volume, directed applications can minimize the impact on desirable species. For maximum effect, plants should be growing vigorously at the time of treatment.

It is readily adsorbed through foliage and roots, and therefore, could be injurious by drift, runoff, or leaching from the roots of treated plants. Because Imazapyr can be highly mobile, persistent, and can affect a wide range of plants, care must be taken in the application of this herbicide to prevent accidental contact with non-target species.

Imazapyr residues in soil following post-emergent application increased eight days after initial application and continued to increase until a peak of 0.23 ppm at day 231 post-treatment. These increases were tied to runoff of residues from plant surfaces following rainfall and to the release of residues from decaying plant matter.

Because Imazapyr is a weak acid herbicide, environmental pH will determine its chemical structure, which in turn determines its environmental persistence and mobility. Below pH 5 the adsorption capacity of Imazapyr increases, and limits its movement in soil. Above pH 5, greater

concentrations of Imazapyr become negatively charged, fail to bind tightly with soils, and remain mobile in the environment. Heavy rainfall caused significant movement of the herbicide, and leaching up to 50 cm deep in soils have been reported (WSSA 1994). Despite its potential mobility, Imazapyr has not been reported in water runoff, and has not been reported to have contaminated water. If it enters the water column, Imazapyr can be photo-degraded by sunlight with an average half-life of two days.

Imazapyr is not degraded significantly by photolysis or other chemical reactions. In soils Imazapyr is degraded primarily by microbial metabolism. It is not however, readily degraded in soils and can be very persistent. American Cyanamid (1986) reported that the half-life of Imazapyr in soils ranged from seven months to more than seven years, depending on soil type, temperature, and soil moisture. Degradation rates are decreased in anaerobic soil conditions (WSSA 1994). The manufacturer reports that in drought conditions, Imazapyr could persist for more than one year. The half-life of Imazapyr is shorter at cooler soil temperatures and in sandier soils (sandy loam versus clay loam). Microbial degradation additionally, was more rapid in soils that did not bind the herbicide strongly. Imazapyr that is bound strongly to soil particles may be unavailable for microbial degradation. The result is that off site plants could be affected for a relatively long time after application.

Prescribed Burning

In areas with sufficient understory of fine fuels, prescribed fire may be used to reduce shrub cover and density. As a follow-up to chemical or manual/mechanical treatment, fire would reduce the regrowth of small shrubs and accelerate the breakdown of remaining standing dead vegetation and litter. Whether used as an initial treatment or a follow-up treatment, prescribed burning should move shrublands toward, or maintain a grassland habitat type.

Manual and Mechanical

Manual treatments would be the localized removal of plants. Following the SOP, manual treatment would be particularly selective, allowing for treatment within sensitive areas. The removal of the target species would allow for rapid recovery of the other species present, though lack of competition for water, nutrients and light.

Mechanical treatment could be carried out over larger areas, and would have correspondingly larger impacts. Plant recovery would take longer due to increased disturbance of soil and vegetation but should move shrublands toward, or maintain a grassland habitat type.

4.4.2. No Action Impacts to Vegetation

Under the No Action Alternative, areas that are approaching the thresholds for economically viable and effective treatment may degrade beyond those thresholds, from shrub dominated states into shrubland states. These shrubland states host fewer grassland habitats and have unsustainable watershed functions and so do not meet the purpose and need.

4.5 NON-NATIVE AND INVASIVE PLANT SPECIES

4.5.1. Proposed Action Impacts to Non-Native and Invasive Plant Species

Herbicide Application

Little surface disturbance would be caused by chemical treatments. Most potential for introduction of these species would come though off road travel while designing and flagging treatment areas. Adherence to the SOP's and common design features would reduce the possibility of invasive or noxious species being introduced to new areas.

Prescribed Burning

Areas disturbed and made bare by fire would have some potential for spread of noxious plants or invasive plants, if introduced to the area. Primary potential for species spread would be existing populations within the treatment area or through introduction via the equipment used. Adherence to the SOPs and common design features would minimize this possibility.

Manual and Mechanical

Manual,and Mechanical treatments would create additional opportunities to transfer noxious weed seeds into new locations, with tools and equipment being brought to and used at the treatment locations. The surface disturbance caused by manual or mechanical removal of plants makes soils in the treatment areas more hospitable for the germination of introduced noxious or invasive species. Adherence to the SOPs and common design features would minimize this possibility.

4.5.2. No Action Impacts to Non-Native and Invasive Plant Species

Under the No Action Alternative invasive plant species are more likely to expand into eroded soils in which native species are not suited for competition. High run-off in areas with poor infiltration will also put native species at a disadvantage. Non native noxious weed species would remain limited to area where soils have been disturbed such as roadways, rights of ways, or fallow cultivated croplands.

4.6 WILDLIFE AND WILDLIFE HABITAT

4.6.1. Proposed Action Impacts to Wildlife and Wildlife Habitat

The proposed treatments are anticipated to have both beneficial and detrimental impacts to wildlife habitat, because different species have different habitat needs. Overall, the majority of the acreage affected by chemical brush control would be creosote rolling uplands, which are a poorer quality of habitat in the LCDO for supporting a diversity and abundance of wildlife species. The acreages to be chemically treated are not the lowest condition creosote stands, but are grasslands that are being, or have been, invaded by creosote, which tends to eventually form low-productivity monocultures. As discussed in the Vegetation section in Chapter 3, these are sites that are near the threshold for economical treatment. Treatment of these areas should benefit most species of native wildlife because the restored grasslands are expected to provide habitat for a greater diversity and abundance of wildlife species over time. Certain species that are not found in open grasslands may be negatively affected.

With chemical brush treatments, there would be relatively no short term impacts to wildlife other than temporary displacement of mammals and birds as the aircraft applies chemical. Large mammals would be expected to run from the disturbance and seek temporary refuge elsewhere, birds would be expected to similarly fly to other locations. As soon as the aircraft use stops, the

animals would be able to return to their normal behavior patterns and areas. Over the longer term, brush treatments would cause a gradual shift from shrubland to grassland, allowing grassland species to move in while shrubland species would relocate to nearby shrubby habitats.

With mechanical treatments, there would be more immediate short-term impacts, including greater direct mortality to reptiles, amphibians, and small mammals using the area than chemical treatment would cause. Since most of these animals burrow, they could be crushed in their burrows, or asphyxiated from collapse of the burrows by equipment. As with chemical treatment, larger mammals and birds would be anticipated to vacate the area and temporarily seek other habitat to use. In the long term, habitat conversion by mechanical brush control on native wildlife would be anticipated to increase productivity of grasses, forbs, and shrubs along with seed production and ground cover. The treatment would improve habitat for desert grassland wildlife species that have been displaced by shrub invasion, at least on a temporary basis. The brush treatment should enhance habitat for ground-nesting birds and seed-eating birds as well as rodents and rabbits, as well as predators of those animals. Mechanical treatment would create more diversity in microhabitats by providing dirt banks, low spots where water and seeds collect, and brush piles that would not be created as a result of the chemical treatment. Potentially, greater ecotonal habitat would be created, possibly providing increased diversity over the long term than would chemical treatment. Since mechanical treatment would be limited to small areas and individual plants, the anticipated impacts of mechanical treatment would be limited to small acreages, although habitat disturbance would include habitat crushed by the tracks or wheels of the equipment.

If fire is used as an initial or follow-up treatment to maintain grassland, impacts to wildlife and habitat would be beneficial to grassland species. Native wildlife would be expected to mostly survive fire by either vacating the area during fire or hiding in underground burrows. As the vegetation resprouts after fire, it would provide more digestible and nutritious forage for wildlife species, although cover would be limited until the vegetation grows back substantially. Generally, desert grasses and shrubs resprout rapidly following fire provided soil moisture and temperature are adequate.

The proposed action would convert up to 525,279 acres of creosote rolling upland habitat and up to 146,342 acres of mesquite rolling upland to grass rolling upland habitat. This conversion would be anticipated to provide beneficial effects for grassland-dependant wildlife species. Wildlife now using the area would for the most part be expected to continue using the area, although use patterns and species composition and densities may change. There are not detailed studies of the impacts of habitat conversion by chemical brush control on native wildlife, but the generally greater productivity of grasses, forbs, and shrubs along with better seed production and ground cover would be anticipated to benefit most native wildlife species. The treatment would improve habitat for desert grassland wildlife species that have been displaced by shrub invasion, at least on a temporary basis. If underlying ecological factors that precipitated the earlier conversion of grassland habitat to shrublands remain the same, a reversion to shrubs would be anticipated over time, and maintenance treatments may be necessary. The brush treatment should enhance habitat for ground-nesting insects and seed-eating insects, birds, rodents, and rabbits, and the predators of those animals. Creosote and mesquite obligate wildlife species now using the areas, if there are any, would be expected to disperse into the thousands of acres of adjacent, untreated creosote and mesquite habitats.

The proposed action would also reduce tasajillo densities on up to 92,684 acres. These acreages overlap to a great extent the 525,279 acres of creosote proposed for treatment.

Aquatic invertebrates potentially occurring in dirt tanks and water storages and troughs for livestock, would be avoided. Accidental overspray of a water source would result in low chronic risk for invertebrate species. There would be little to no risk of effect to invertebrates due to herbicide drift or run off into a water source (USDI BLM 2007). There would be low to no risk of toxic effects to pollinating insects contacting treated vegetation and small and large mammals consuming treated vegetation following application. Otherwise, no direct impact is expected to wildlife due to the application of tebuthiuron (USDI BLM 2007).

There are ocotillo and agave (food for nectar-feeing animals) within some of the proposed treatment areas, so the proposed action is anticipated to have adverse impacts to habitat for nectar-feeding species within the treatment areas over several years or more. These species would be anticipated to disperse to adjacent untreated areas. There is some yucca (soaptree, banana, and Spanish dagger yuccas) present in some of the treatment areas. Soaptree yucca is tolerant of the chemical at the proposed rate, so the proposed action should have no adverse effect on soaptree yucca and dependant species. It is unknown how Tebuthiuron may affect other yucca species in the treatment areas.

There is no bat roost habitat in the project areas and timing of the projects (Fall or Winter) would preclude any disturbance to nesting birds. Birds using the treatment areas would be expected to fly away from the aircraft during application. Tebuthiuron pellets are small enough that they will fall with insufficient force to cause direct harm to any native wildlife. During initial project design and layout dense stands of sumacs and other desirable shrubs for wildlife habitat have been delineated for exclusion of herbicide application. Pilots would also be instructed to shut off application if they see patches of sumacs from the air during application.

The proposed treatment would affect the spatial structure of the creosote rolling upland and grass rolling upland communities. The primary effect would be to reduce the acreage of creosote rolling upland and replace it with grass rolling upland, and to return this shrub-invaded grassland area to a grassland state. Some distinct edge would be created, improving ecotonal habitat and associated increased diversity. Anticipated changes in acreages and percentages of allotments by Standard Habitat Site percentages of treated allotments are shown in Table 5 assuming grassland restoration treatments are successful.

Table 5. Anticipated Changes in Standard Habitat Site Acreage in the Treated areas

Standard Habitat Site	Pre Treatment Acres	Post Treatment Acres
Creosote Rolling Upland	525,279	0
Mesquite Rolling Upland	146,372	0
Grass Rolling Upland	0	671,651

Other habitat types would be treated with mechanical and manual means, but habitat conversion is not anticipated from these treatments. Instead, these treatments are anticipated to focus primarily on juniper and riparian habitats. Specifically, juniper habitats would be thinned, to restore historical juniper savannah habitat where juniper has increased in density to form solid stands. Riparian areas would be treated to remove invasive, non-native individual plants, primarily saltcedar, but potentially including any noxious or undesirable weed listed in Table 2.

4.6.2. No Action Impacts to Wildlife and Wildlife Habitat

Under the No Action Alternative, the majority of the proposed treatment areas would continue to

be creosote rolling upland with low biological diversity, and would not provide suitable habitat for native desert grassland wildlife. Juniper would continue to increase, replacing juniper savannahs with dense, almost monocultural stands. Non-native noxious and undesirable weeds listed in Table 2 would be expected to continue to invade riparian and other areas, replacing native riparian and other habitats.

4.7 SPECIAL STATUS PLANT SPECIES

4.7.1. Proposed Action Impacts to Special Status Plants

Habitat for the following special status plant species does not occur in the proposed treatment areas, so the proposed action is anticipated to have no affect on individuals or habitats of the following species that were listed in the Affected Environment:

Alamo beardtongue
Arizona coralroot
Cliff nama
Gray sibara
Guadalupe mescal bean
Guadalupe rabbitbrush
Mescalero pennyroyal
New Mexico rock daisy
Villard pincushion cactus
Wright's marsh thistle

With chemical brush treatments, there would be relatively no short term impacts to special status plant species. As the chemical infiltrates the soil and takes effect, there may be some direct mortality or injury to special status plant species. This impact would be limited by Common Design Features listed in Section 2.1.C.1-3. Over the longer term, brush treatments would cause a gradual shift from shrubland to grassland, allowing grassland species to thrive while shrubland species would disappear from the treated areas.

With mechanical treatments, there would be a higher potential for direct impact such as crushing of individual plants. As with chemical treatment, this impact would be limited by the Common Design Features listed in Section 2.1..C.1-3.

If fire is used as a follow-up treatment to maintain grassland, it may have impacts to special status plant species including direct injury or mortality of individual plants. Fire Ecology studies of most of these species are lacking, although any of these plants that occur in grassland or woodland habitats that have a history of fire as a natural part of the ecosystem would be anticipated to be fire tolerant or fire adapted.

Grama grass cactus This cactus is not known to occur, but is likely to occur occur in some of the treatment areas, particularly on the Otero Mesa. The effects of Tebuthiuron on this cactus are unknown. Mechanical treatments and fire could cause direct mortality to this plant, as could chemical treatments of tassajillo. It is unknown whether fire is good or bad for the ecology of this cactus.

Hairy muhly Grass species usually survive chemical herbicide treatment and respond to the loss of competition from creosote. Because of this, the proposed action is anticipated to

enhance habitat for hairy muhly. This species would be anticipated to respond favorably after mechanical treatment or fire.

Kuenzler's hedgehog cactus This plant could be susceptible to chemical herbicide, but no potential habitat for this species occurs in the treatment areas, so the proposed action would not affect this species. Surveys would insure that mechanical treatment does not impact this plant, no mechanical treatment would be conducted if this plant was found. Recent studies indicate that fire may be beneficial to the ecology of this cactus. In the event that fire is planned in potential Kuenzler's cactus habitat, the BLM would prepare a Biological Assessment of the potential fire affects on Kuenzler's cactus and initiate consultation with the USFWS.

Common design features listed in Section 2.1.c would ensure that detrimental impacts to special status plant species would be avoided from fire, mechanical, and manual treatments.

4.7.2. No Action Impacts to Special Status Plant Species

Under the No Action Alternative, areas that were historically grassland habitats that have been invaded by creosote bush would continue to be creosote rolling upland with low biological diversity, and would not provide suitable habitat for native desert grasses including hairy muhley.

4.8 SPECIAL STATUS ANIMAL SPECIES

4.8.1. Proposed Action Impacts to Special Status Animal Species

The proposed action is anticipated to have no affect on individuals or habitats of the following species that were listed in the Affected Environment:

Bald eagle
Loggerhead shrike
Gray-banded kingsnake
Mottled rock rattlesnake
Desert bighorn sheep

With chemical brush treatments, there would be relatively no short term impacts to special status animal species other than temporary displacement of mammals and birds as the aircraft applies chemical. Large mammals would be expected to run from the disturbance and seek temporary refuge elsewhere, birds would be expected to similarly fly to other locations. As soon as the aircraft use stops, the animals would be able to return to their normal behavior patterns and areas. Over the longer term, brush treatments would cause a gradual shift from shrubland to grassland, allowing grassland species to move in while shrubland species would relocate to nearby shrubby habitats.

With mechanical treatments, there could be impacts, including direct mortality to special status reptiles, amphibians, and small mammals. Since most of these animals burrow, they could be crushed in their burrows, or asphyxiated from collapse of the burrows by equipment. In the long term, habitat conversion by mechanical brush control on special status animal species would be anticipated to increase productivity of grasses, forbs, and shrubs along with seed production and ground cover. The treatment would improve habitat for special status animal species that have been displaced by shrub invasion, at least on a temporary basis. The brush treatment

should enhance habitat for ground-nesting birds and seed-eating birds such as the Baird's sparrow common ground dove, and mountain plover, as well as predators of those animals including the peregrine and Northern aplomado falcons.

If fire is used as a follow-up treatment to maintain grassland, the beneficial impacts of grassland restoration to special status animal species relying on grassland habitats would be maintained over time.

Impacts to the remaining Special Status animal species listed in the Affected Environment are anticipated as follows:

American Peregrine falcon There is little likelihood of Peregrine falcons using the area during treatments, but if any are, they would be anticipated to avoid the aircraft applying chemical herbicides or equipment conducting mechanical treatments. There may be temporary disturbance to individual birds, but no long-term impact to them. Grassland restoration should enhance songbird populations, which in the long term would benefit this falcon.

Baird's sparrow These sparrows prefer grassland habitat, and should benefit from the re-establishment of grassland habitat, and increase in grass seeds and cover as a result of grassland restoration.

Burrowing owl Application of chemical herbicides and restoration of grasslands may enhance prairie dog habitat, which would benefit burrowing owls by enhancing black-tailed prairie dog habitat, providing additional nest and roost sites for these owls.

Common ground dove Grassland restoration is anticipated to be beneficial for these doves, and increase seeds and nest sites available to birds including the common ground dove.

Ferruginous hawk Grassland restoration should enhance rodent populations, improving winter habitat for these hawks.

Gray vireo Treatment of dense juniper and pinyon-juniper habitat is anticipated to create more open savannah habitat which gray vireos prefer, so the proposed action is anticipated to have beneficial effects for this species. Fire, mechanical, and manual treatments should have the greatest benefit to habitat for this species.

Mountain plover Application of chemical herbicides and restoration of grasslands may enhance prairie dog habitat, which would benefit mountain plovers by providing additional nest and roost sites.

Northern aplomado falcon. These birds would be expected to avoid the disturbance created by aerial chemical application or mechanical equipment during treatments. In the long term, grassland restoration is anticipated to provide up to approximately 670,000 acres of additional suitable habitat for this falcon in Otero County.

Texas horned lizard Application of chemical herbicides is anticipated to enhance Texas horned lizard habitat by creating more grass seed, which is the food of harvester ants, on which Texas horned lizards feed exclusively.

Bats It is unknown exactly how grassland restoration may impact habitat for these bats. It would not have any effect on roosting habitat, but may alter the availability of insect resources.

It is unknown whether any of these species would prefer grassland insects to shrubland insects, although it is anticipated that grassland restoration would increase insect numbers as a whole. Bats are anticipated to benefit from thinning of juniper by fire, mechanical, and manual treatments because restoration of savannah habitats would enable bats to once again feed in these areas. Increased bat use in the restored savannah habitats is anticipated to control insect infestations in woodlands.

Effects of the proposed chemical and mechanical vegetation treatments on special status species generally are the same as for wildlife and vegetation described above. There is low potential for toxic effects to terrestrial wildlife. There is greater potential for effects to aquatic associated wildlife such as the bat species, which may drink from the dirt tanks adjacent to the treatment areas and feed on insects emerging from those tanks. However, these effects are expected to be minimized or avoided altogether by buffering water sources from treatments. No mortality is expected.

The creosote (tebuthiuron) control would be conducted during October and would have no affect on nesting activities. Overflights by the aircraft during tebuthiuron application could disturb any special status animal species in the area at the time, but the animals would either rapidly relocate or the aircraft would rapidly pass over and be done with treatment on that site. This level of disturbance is not expected to result in mortality or otherwise cause take of any special status animal species.

Common design features listed in Section 2.1.c would ensure that detrimental impacts to special status plant species would be avoided from fire, mechanical, and manual treatments.

4.8.2. No Action Impacts to Special Status Animal Species

Under the No Action Alternative failure to restore grassland habitats would allow ongoing detrimental impacts to a variety of species to continue, including the Baird's sparrow, Burrowing owl, Common ground dove, Ferruginous hawk, Gray vireo, Mountain plover, Northern aplomado falcon, and Texas horned lizard. The ongoing invasion and replacement of grassland habitat by shrubs is considered to be detrimental to these species, both on a local and regional scale.

4.9 LIVESTOCK GRAZING

4.9.1. Proposed Action Impacts to Livestock Grazing

Herbicide Application

Chemical treatments are generally applied in a form, in a manner, or at such low rates that they do not affect livestock. Based on the risk analysis in Appendix E-8 of the 1991 Vegetation Treatment FEIS, the estimated doses for livestock would be well below the EPA risk criterion of 1/5 LD50 for all of the program herbicides. Therefore, the risk of direct toxic effect to these animals is negligible.

Livestock grazing management would be impacted by the required grazing deferment of the treatment area during the growing season. During the years that deferment is required; permittees would need to keep all stock out of the treated pastures during the deferment period, but would be allowed to graze the area in the remainder of the year. A maximum of 40 percent use of current year's growth of key forage species would be allowed during those deferment

years following treatment.

These constraints would give the permittee less flexibility in stocking for a few years. Smaller operations, those with a greater proportion of the allotment requiring rest at one time, and allotments with fewer pastures would be most strongly impacted.

Livestock grazing would be affected by changes in the forage supply and plant community. The vegetative treatments would suppress shrub species that are unpalatable or not normally grazed by livestock and allow more herbaceous plants (grasses and forbs) to be produced. A greater proportion of the vegetation produced would be consumable by livestock. Aerially applied herbicides may eliminate some shrubs and trees that livestock use for shelter, although drainages that support taller plants are largely avoided during treatment.

The proposed action would not allow for increases in permitted numbers of livestock due to increases in forage production resulting from treatments, to preserve the effect of the treatment for watershed function. Other benefits would occur for livestock grazing. The improved rangeland health would positively impact livestock by producing a larger and more reliable amount of forage. It would allow for better livestock nutrition, increased calf crops, and higher weaning weights. It would decrease the need for destocking in years of lower forage production, although such destocking continues to be highly encouraged. The advantages gained from improved rangeland health and watershed stability would assist in the long-term stability of the ranching operations.

Changes in grazing authorization would be consistent with the guidelines for livestock grazing management and could include adjustments in permitted use levels, season of use, kind of livestock, allowable use levels, and /or stocking rates if objectives are not being met. Increases in forage as a result of grassland restoration treatments would first be reserved to meet the needs for improved watershed function, wildlife habitat, and rangeland health.

Prescribed burning

Grazing deferment may be required prior to burning, to accumulate sufficient fine fuels to carry fire well. Livestock may need to be removed from pastures to be burned. Forage to be burned would be unavailable to be consumed by livestock. After burning, any required recovery, deferment periods, and restricted forage use levels would limit use of the burned pastures. These factors would impact livestock grazing management and the amount of feed available for stock to consume.

Manual & Mechanical

Grazing deferment or restricted forage use levels may be stipulated after manual or mechanical vegetation treatment, depending on the scope and size of the project. These factors would impact livestock grazing management and the amount of forage available for stock to consume.

4.9.2. No Action Impacts to Livestock Grazing

Under the no action alternative, resources for livestock grazing and management would remain unchanged or would continue to degrade. Treatment specific pasture deferment would not be required, and rangeland health and forage production would not be improved.

4.10 CULTURAL RESOURCES

4.10.1. Proposed Action Impacts to Cultural Resources

Herbicide Treatment

Aerial application of chemical would have no direct impact upon cultural resources. The increase in ground cover and reduction of erosion following treatment may offer some protection to resources that might currently be subject to damage or displacement.

Prescribed Burning

Prescribed fires and their management have undesirable impacts upon cultural resources ranging from destruction or damage to displacement through erosion. The level of cultural survey and any mitigative measures required depends on fuel load as well as other factors that contribute to the intensity of the burn. Cultural resource surveys would be considered on a case-by-case basis to avoid or minimize impacts to significant resources.

Manual and Mechanical

Site specific cultural resource inventories will be conducted prior to any ground disturbing activities and impacts to resources will be avoided or mitigated. Manual treatments, being small scale and low impact by comparison, tend to have minimal effect when cultural resources have been identified on the ground. Mechanical treatments are the most likely to impact cultural resources through damage and displacement of the archaeological record.

4.10.2. No Action Impacts to Cultural Resources

Under the no action alternative, no direct impacts would occur to cultural resources.

4.11 VISUAL RESOURCES

4.11.1. Proposed Action Impacts to Visual Resources

Implementation of the proposed action would cause changes in the lines, colors, and textures of the landscape. Specifically, greens would turn to yellows, and bumpy shrubby textures would be replaced by smoother grassy textures as the creosote, mesquite, tasajillo, and juniper are replaced with grasses. The edges of the treatment areas would produce new lines of contrast on the landscape that could be detectable by a keen observer. In the proposed juniper treatment areas, thick stands of juniper would be replaced by scattered stands of juniper that would be more similar to the historic view than the current thick juniper stands provide. This change in lines, colors, and textures of the landscape are not generally desirable under VRM Class 2 because these changes would be noticeable to the casual observer from U.S. 70, the key viewing area. However, since the thick stands of juniper have invaded in historic times, the treatments would move the viewshed toward historic conditions.

Herbicide Application

Care would need to be taken to carrying out treatments, to avoid leaving a sharp, linear contrast in vegetation type, especially in the most protected VRM classes. To bring about less obvious

treatment boundaries, treatments might need to be carried across fence lines or out to natural geographic breaks. Some hand treatment could occur near treatment boundaries in sensitive areas, to create a less defined edge to treatment. Following chemical treatment, dead shrubs may remain upright for a number of years, depending on weather conditions and other environmental factors. The branches would be visible, while gradually breaking down. Following treatment, there would be a change in the color and texture of the treated areas. The visual aspect would change from brush-dominated, to an area with more perennial grasses and forbs. The casual observer may recognize this, but the vegetative community would appear natural, and more closely aligned with the historic vegetation expected for the ecological site.

Prescribed Burning

Prescribed fires would be carefully planned to avoid the potential need to bring heavy machinery into Class 1 areas. Directly following the burn, the blackened area would show obvious, temporary changes. Over time, the area would green up, and regrowth would occur. Burning would greatly decrease the amount of visible dead shrubs, and would hasten the decomposition of any standing, burned vegetation.

Manual and Mechanical

The use of hand tools to manually remove shrubs would create small scale visible disturbance to the soils throughout the treatment area. Piles of stacked vegetation, although providing cover for various wildlife species, would not look natural. In the more sensitive VRM areas, alternate methods of dispersing removed vegetation could be necessary. The overall level of disturbance would not be great, and plant regrowth should quickly mute the effects. Use of machinery to remove shrubs could create long-lasting visible ground disturbance, created as machinery maneuvers to remove the plants. Such gouges would gradually be blunted and softened by winds and rain. The dead plants removed by equipment would not look particularly natural, and would remain until they slowly decay, or are burned by prescribed fires or natural wildfire.

4.11.2. No Action Impacts to Visual Resources

No Action Alternative Under the no action alternative, impacts to visual resources would remain unchanged.

4.12 RECREATION

4.12.1. Proposed Action Impacts to Recreation

Implementation of the proposed action is anticipated to change wildlife populations from shrubland to grassland species. While opportunities to hunt deer and pronghorn would remain unchanged pending license allocation changes by the New Mexico Department of Game and Fish, the quality of mule deer hunting would be expected to decline, while antelope hunting quality would be expected to increase in the treated areas as shrublands (favored by mule deer) are replaced by grasslands (favored by pronghorn). Opportunities to hunt oryx would remain unchanged, and quality of oryx hunting would be anticipated to remain the same. Quail hunting would be unaffected overall, although scaled quail would be anticipated to increase while Gambel's quail would be anticipated to decrease as grasslands replace shrublands. Implementation of the proposed action would enhance opportunities for hiking in areas that are currently impenetrable because of tasajillo. Implementation of the proposed action would not be

anticipated to affect opportunities for other recreational activities in the treated areas.

4.12.2. No Action Impacts to Recreation

Under the No Action Alternative the quality of mule deer hunting would be maintained, while opportunities to hunt antelope, and quality of antelope hunting, would be anticipated to decline over time because of conversion from grasslands to shrublands. Quail hunting opportunities woiuld not change significantly, although Gambel's quail would be expected to increase and scaled quail would be expected to decrease over time.

CHAPTER 5. CUMULATIVE IMPACTS

The National Environmental Policy Act directs analysis of cumulative impacts. Cumulative impacts of chemical herbicide application have been analyzed on a broad scale through Environmental Impact Statements including the White Sands Resource Area /Resource Management Plan (WSRA/RMP), October 1986; Vegetation Treatment on BLM Lands in Thirteen Western States, Final EIS (USDI BLM, May, 1991), and Vegetative Treatments Using Herbicides on BLM Lands, Final EIS (USDI BLM June, 2007). It is beyond the scope of this document to reanalyze cumulative impacts on such a large scale, but it is reasonable to analyze cumulative impacts in the area of the proposed action, Otero County, New Mexico.

Of the 789,000 acres of shrublands that occurred on BLM-administered public lands in Otero County in 1982, 91,472 acres (approximately 11.6%) have been treated since 1982 including 89,642 acres of creosote treatment using Spike 20P, and 1,830 acres of mesquite treatment using a mixture of Remedy and Reclaim. The 671,651 acres planned for treatment in the proposed action constitute an additional 763,123 of the shrublands in Otero County, which would bring the total treated acreage to 763,123 acres, comprising 85% of the shrubland acres on public land in Otero County.

Of the 615,092 acres of creosote shrubland that occurred on BLM-administered public lands in Otero County as of 1982, 89,642 acres (14.6% of the total) have been treated to kill creosote. Implementation of the proposed action would include treatment of the remaining acreage over a period of years. Appendix 2 shows the past herbicide treatments in Otero County.

CHAPTER 6: CONSULTATION AND COORDINATION

This Environmental Assessment has been prepared in consultation with:

Darrell Winfree, Cultural Resources – BLM
Phil Smith, Vegetation, Livestock, and Weeds – BLM
Adam Merrill, Minerals Specialist – BLM
Ray Lister, Supervisory Natural Resource Specialist – BLM
Leticia Lister, Supervisory Rangeland Management Specialist – BLM
Loraine Salas, Realty Specialist – BLM
Joe Sanchez, Recreation, Visual, and Wilderness – BLM
David Jevons, Hazardous Materials Coordinator – BLM
New Mexico Department of Game and Fish
New Mexico State Land Office

CHAPTER 7: REFERENCES

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APPENDICES

Appendix 1. Grazing Allotments within the Otero Restoration Area.

No.	Allotment Name	No.	Allotment	No.	A
7001	HIC RANCH LEASE	9003	J W	9048	DOG CANYON
7003	COYOTE CANYON	9004	BUTTERFIELD TRAIL	9049	STEWART RANCH
7005	UPPER LABORCITA	9005	NEW TANK DRAW	9050	CORNUCOPIA RANCH
7012	REAGAN DRAW	9006	CAUHAPE	9051	LUCKY DRAW
7013	APACHE	9007	FLEMING DRAW LEASE	9052	CONEJO ALLOTMENT
7014	MALONE DRAW	9008	CUTOFF RIDGE	9053	VAN WINKLE LAKE
7016	LA LUZ CANYON	9010	LITTLE AMERICAS	9054	GREGG CANYON LEASE
7017	WHITE SANDS LEASE	9011	BOX CANYON	9056	WILKERSON WELL
7018	FLETCHER SPRING	9012	BURNT WELL	9057	EAST FLEMING DRAW
7019	ALLEN DRAW LEASE	9013	Y BAR	9058	HOOK TANK
7020	TULAROSA CREEK LEASE	9014	DUGGAR ALLOT	9059	MOCCASIN DRAW
7022	SALADO CREEK	9015	BONITA DRAW LEASE	9060	WAYLAND CANYON LEASE
7028	SACRAMENTO LEASE	9016	CORNUCOPIA DRAW	9061	STEVENS DRAW
7029	MULE CANYON LEASE	9017	JAMES RANCH LEASE	9062	BROKEOFF RANCH
7030	DOMINGO SPRINGS RNCH	9018	HAT RANCH NO 1	9063	S SLASH 4 RANCH
7031	LABORCITA ALLOTMENT	9019	RICHARDSON LAKE LS	9064	CAMALACHE
7033	SUNSHINE RANCH	9020	MARTINE RIDGE	9066	MOCCASIN DRAW LEASE
7034	ESCONDIDO WELL	9021	PLOWMAN RIDGE	9067	WILDCAT CANYON
7035	LONE BUTTE LEASE	9023	JAMES RANCH	9068	DEADMAN
7037	OROGRANDE RANCH	9024	BARCLAY DRAW	15010	TEX-LINE
7039	LONE BUTTE	9025	MCVEIGH HILLS		
7044	BENT	9026	CHESS HOME		
7049	CRAWFORD DRAW	9027	EAST		
7050	BLACK LEDGE	9028	WICKER PLACE		
7051	WHITE SANDS RANCH	9029	MCARRON		
7053	UTTER ESTATE (unalloted)	9030	MULBERRY		
7054	BEEMAN CANYON LEASE (unalloted)	9031	B T RANCH		
7055	QUATRO AMIGOS	9032	L 6 BAR RANCH		
7056	NOGAL CANYON	9033	GUADALUPE RANCH		
7057	MESQUITE SPRING	9035	ELDO LEWIS		
7063	SAN ANDRES CANYON LS (unalloted)	9036	BOARDWELL CANYON		
7065	DOMINGO SPRING	9037	PAYNE RANCH		
7066	TECOLOTE CANYON	9038	KITCH RANCH		
7067	BAR HW RANCH	9039	PANTHER CANYON		
7068	DIAMOND A RANCH	9040	DINNER HILL		
7074	BAR HW RANCH LSE	9041	SACRAMENTO RIVER LS		
7075	DILLARD LEASE	9042	VEE PROD		
7080	THREE RIVERS RANCH	9043	SURVEYORS CANYON LS		
7081	HAY DRAW	9045	GEORGE DRAW		
9001	ALAMO MOUNTAIN	9046	INDIAN DRAW		
9002	WIND MOUNTAIN DRAW	9047	DEEP WELL		

Appendix 2. Previous Tebuthiuron Treatments within the Otero Restoration Area

Year	Project Name	Allotment No.	Chemical	Active Ingredient Per Acre	Acres Treated
1988	Lewis Brush Control		Spike 20P	0.5	1235
1988	Pup Canyon Brush Control		Spike 20P	0.5	4915
1994	Mulberry Brush Control		Spike 20P	0.5	1650
1995	Coyote Brush Control		Spike 20P	0.5	960
1996	Black Ledge Brush Control		Spike 20P	0.5	2885
1997	Bennett Brush Control		Spike 20P	0.5	1430
1997	Utter Estate Brush Control		Spike 20P	0.5	1420
1998	Domingo Canyon Brush Control		Spike 20P	0.5	3431
1998	Buck Pasture Brush Control		Spike 20P	0.5	1454
2000	3 Rivers GRT		Spike 20P	0.5	3522
2001	Owens Brush Control		Spike 20P	0.5	1530
2001	Coyote Canyon GRT		Spike 20P	0.5	2740
2002	North RR / Horse Trap GRT		Spike 20P	0.5	3020
2003	Hat Ranch GRT 2003		Spike 20P	0.5	790
2003	McGregor GRT 2003		Spike 20P	0.5	1730
2004	Tularosa Watershed Saltcedar		Arsenal	1% sol.	250
2005	Tularosa Watershed Saltcedar		Arsenal	1% sol.	214
2007	Box Canyon GRT		Spike 20P	0.75	1860
2007	Virden GRT		Spike 20P	0.5	585
2007	Virden Mesquite		Remedy/Reclaim	0.25/.25	1830
2007	Wilkerson Well GRT		Spike 20P	0.75	2100
2007	Wind Mountain GRT		Spike 20P	0.75	3885
2008	JD Yates		Spike 20P	0.75	4,798
2008	Cauhape GRT		Spike 20P	0.75	4,800
2008	McGregor Units 7, 8A&8B, 11, 14		Spike 20P	0.5	16,785
2008	Chosa GRT		Spike 20P	0.75	3,200
2008	Coyote Canyon (Stallings) GRT		Spike 20P	0.75	431
2008	Sowel Dean GRT		Spike 20P	0.75	4,800

Appendix 3. Otero Restoration Initiative DNA Checklist

Use in conjunction with the Las Cruces District Office DNA worksheet for all Restore New Mexico projects in the Otero Restoration Initiative. Use additional sheets as needed to answer all questions in detail.

Project Name:

1. Project Location (describe specific location information such as allotment, pasture and legal location):

2. Project description:
   Type (chemical, burn, mechanical, etc.):
   Specific target species:
   Project size:

3. Project site selection and design interdisciplinary team members:

4. Target date for project implementation:

5. Why is treatment needed (e.g. stable state? converted site? ongoing invasion? Describe reference site characteristics compared to current condition on the treatment site.)?

6. **Explain** how treatment would be consistent with each of the key goals of Restore New Mexico:
   1) Restore habitat for fish, wildlife and endangered species:

   2) Reverse expansion of invasive plant species:

   3) Reverse habitat fragmentation from historic oil and gas development and ensure responsible energy development:

   4) Improve water quality:

   5) Reduce impacts from catastrophic wildfire:

7. Describe parameters on the site that make it favorable to successful treatment results (e.g. native seed source available for adequate recovery of grasses; fuel load sufficient to carry fire; soil composition suitable for herbicide activity; etc.).

8. List potential negative impacts (non-target species present, indirect or cumulative impacts to

offsite areas while treatment area is deferred, etc.):

9. Special Status Species:

Attach list of special status species with potential to occur in the project area or be affected by the project. Include an affect determination and rationale for determination for each species.

Survey needed (plants and/or animal)? Yes☐ No☐ If yes, date of survey and results:

For non-federally listed or proposed special status species, is the proposal consistent with BLM policy? Yes☐ No☐ Explain why.

Is consultation, conference or notification with Fish and Wildlife Service required? Yes☐ No☐

Attach all documentation. Summarize results and date of conclusion:

10. Is cultural clearance required? Yes☐ No☐ If yes, Date completed:

11. Describe any indirect and cumulative impacts of the project including impacts from infrastructure such as fencing or water development needed for successful vegetation treatment, or impacts to grazed pastures while treatment is rested from livestock grazing. (If infrastructure is required, attach EA for those projects.)

12. Is the treatment within (wholly or partially) a Special Management Area or have potential to indirectly impact a Special Management Area outside the treatment (RNA, HMP, ACEC, WSA etc)? Yes☐ No☐

List all applicable:

Explain how the treatment is consistent with the management goals specific to the SMA:

13. List all protective measures, stipulations, SOP's and/or mitigation measures specific to this proposal (e.g. buffers around raptor nests, water points or arroyo habitat, timing to avoid migratory species or nesting season, rehabbing fireline, etc):

14. If treatment is a burn, attach a completed burn plan.

15. Are treatment monitoring transects established? Yes☐ No☐

Note UTM coordinates of treatment and control transects and monitoring schedule.

16. Document dates and results of exotic species monitoring:

17. Document plan for post treatment livestock management (scheduled rest from livestock grazing, requirements for additional rest, utilization limitations, etc.).