ENVIRONMENTAL ASSESSMENT

Pecos District Noxious and Invasive Weed Spot Treatment

Pecos District Office

DOI-BLM-NM-P010-2009-134-EA

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U.S. Department of the Interior
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I. BACKGROUND

A. Introduction

Within portions of the Pecos District Office invasive and non-native weeds have become established. These plants are often described as noxious weeds. Their presence on the landscape has a negative effect on watersheds, forage for both livestock and wildlife, wildlife habitat and the health of the land. The presence of these plant species and their continued spread affects the ability of the ecosystem to sustain a healthy biodiversity and to provide quality habitat.

A noxious weed is a plant that carries disease or has other adverse effects on the human environment and is, therefore, detrimental to the agriculture and commerce of the United States and public health. Generally, noxious weeds possess one or more of the characteristics of being aggressive and difficult to manage, parasitic, a carrier or host of harmful insects or disease, and being either non-native, new to, or not common in, the United States. In some cases noxious weeds are poisonous to wildlife and livestock. Noxious weeds are designated and regulated by various state and Federal laws. An invasive plant is defined as a plant not native to a community or if native, not dominant in that community, which has the potential to become a dominant species if left uncontrolled. Noxious weeds identified under state or federal laws are recognized as invasive plants as well.

These noxious and invasive plants can dominate and often cause permanent damage to natural plant communities. If not eradicated or controlled, noxious weeds will jeopardize the health of the public lands and the myriad of activities that occur on them. Noxious weed infestations destroy wildlife habitat; reduce opportunities for hunting, fishing, camping and other recreational activities; displace many Threatened and Endangered Species; reduce plant and animal diversity because of weed monocultures-single plant species that over run all others in an area; and disrupt waterfowl and neo-tropical migratory bird flight patterns and nesting habitats. Therefore, limiting the spread of noxious weed species is a priority for BLM.

B. Purpose And Need For The Proposed Action

The purpose of the Noxious and Invasive Weed Spot Treatment project is to meet the goals and objectives of ecological site description (ESD) or the desired plant community (DPC) by eradicating or controlling those plants that are classified as noxious, invasive, and/or non-native. Eradicating or controlling the spread of these species would provide for the stabilization of both the biotic and hydrologic components for the watershed, and restore and support habitat requirements for flora and fauna within the area.

This environmental assessment would analyze impacts associated with the methods and techniques available for meeting the intended objectives of this action within the district office, identify mitigation measures to minimize or eliminate impacts to affected resources and evaluate cumulative impacts in relation to threshold levels identified for the watershed as a whole.

C. Conformance With Land Use Planning

The proposed action conforms to and is tiered to the Carlsbad Resource Management Plan and Record of Decision (BLM 1988); the Roswell Approved Resource Management Plan (RMP) and Record of Decision (BLM 1997); the approved Carlsbad Resource Management Plan

Amendment and Record of Decision (BLM 1997); the Approved Special Status Species Resource Management Plan Amendment and Record of Decision (BLM 2008); and the 2007 Vegetation Treatments Using Herbicides on BLM Lands in Seventeen Western States Final Programmatic EIS (2007 Vegetation Treatment PEIS). The proposed action conforms to the 1994 Environmental Impact Statement for Rangeland Reform; the Federal Land Policy and Management Act of 1976 (FLPMA) (43 U.S.C. 1700 et seq.); the Taylor Grazing Act of 1934 (TGA) (43 U.S.C. 315 et seq.); the Public Rangelands Improvement Act of 1978 (PRIA) (43 U.S.C. 1901 et seq.); the Federal Noxious Weed Act of 1974 (7 U.S.C. 2801-2813), as amended by Section 15, Management of Undesirable Plants on Federal Lands, 1990; and the Carson-Foley Act of 1968 (P.L. 90-583) as required by 43 CFR 1610.5-3.

D. Relationships to Statutes, Regulations, or Other Plans

The Bureau of Land Management, Pecos District Office, has entered into Memoranda of Understanding (MOUs) with the following agencies and groups:

The USDA-Forest Service; USDA-Natural Resources Conservation Service; USDI-Bureau of Reclamation; USDI-National Park Service; USDOE-Carlsbad Area Office; Lincoln County; Eddy County Commission; Chaves County; Lea County Commissioners; Lea County Extension Service; the New Mexico Highway & Transportation Department (District 2); New Mexico Department of Game & Fish; New Mexico Department of Energy, Minerals, and Natural Resources; the New Mexico State Land Office, the Cooperative Extension Service of New Mexico State University; the Hagerman-Dexter Soil and Water Conservation District; the Chaves County Soil and Water Conservation District; the Soil and Water Conservation Districts in Eddy County; Lea Soil and Water Conservation District; the cities of Lovington, Hobbs, Tatum, Jal, Eunice, Artesia and Carlsbad; Carlsbad Irrigation District; and the Carlsbad Native Plant Society.

The MOUs include agreements to assist with the Voluntary Noxious Plant Control Program in an effort to foster Coordination, Cooperation and Implementation on Goals and Objectives, Education and Training, Action Plans and Implementation, Monitoring, Program Assessments, and Applying Eradication and/or Control Treatments. Under these MOUs, the BLM has agreed to cooperate by providing funding for and implementing noxious weed control. The other cooperators will also provide equipment, funding and labor.

II. PROPOSED ACTION AND ALTERNATIVES

A. Proposed Action

The proposed action is to eradicate or control the infestation of noxious weeds wherever found and prevent their spread. The Pecos District Office manages 3.687 million acres of public land. In the past the Pecos District has averaged treating 3,500 acres of noxious weeds with herbicides annually. See the attached maps for treatment locations. The scale of the proposed action does not call for aerial treatment. Instead, the primary control method for these plant species would be spot treatment with a BLM-approved herbicide using ground-based equipment, meaning, spray rigs mounted on motorized vehicles or backpack sprayers. Spot treatment, using the equipment described, allows the herbicide to be applied directly to the individual noxious weed plants.

The following measures would be applied to all herbicide applications within the district office:

1. All BLM-approved herbicides would be applied according to their label instructions. The instructions include effective application rates for specific noxious weed species, and non-treatment buffers around water bodies and water sources.
2. The Standard Operating Procedures (SOPs) found in Appendix B of the Record of Decision (ROD) for the 2007 Vegetation Treatment PEIS are incorporated into this EA. Spot treatment of noxious weeds with herbicides will follow the appropriate SOPs.
3. Applications in wetlands and riparian zones would use appropriate herbicide-free buffer zones for herbicides not labeled for aquatic use based on risk assessment guidance, with minimum widths of 25 feet for applications using vehicles and 10 feet for hand spray applications. See Table 2-5, Vegetation Treatment Methods Standard Operating Procedures and Guidelines (pp. 2-34 & 2-35) the 2007 Vegetation Treatment PEIS.
4. Applications areas containing sinkholes and known cave entrances would use herbicide-free buffers with minimum widths of 25 feet for applications using vehicles and 10 feet for hand spray applications around these features.
5. Open bodies of water (rivers, streams, ponds, stock watering facilities, water wells for example) would be buffered from treatment in accordance with herbicide label directions for the specific target species to minimize impacts. See Table 2-5, Vegetation Treatment Methods Standard Operating Procedures and Guidelines (pp. 2-34 & 2-35) the 2007 Vegetation Treatment PEIS.
6. Herbicides would be applied in accordance with the prescriptions and mitigation measures described in Appendix 9, Treating Vegetation with Herbicides, of the 1997 Roswell RMP.
7. Should discrepancies be discovered regarding buffer distances between the herbicide label directions, the 2007 Vegetation Treatment PEIS, or the 1997 Roswell RMP, the greater distance will be used for the buffer.
8. The mitigation measures listed in the ROD for the 2007 Vegetation Treatment PEIS will be used for the spot treatment of noxious weeds.
9. Areas occupied by special status plant species would be reviewed on a case-by case basis prior to chemical treatment. Chemical or other treatment methods may be used in these situations with the objective of eradication or controlling noxious and invasive weeds while avoiding impacts to adjacent individual special status plant species.
10. The potential for ground water contamination will be evaluated prior to treatment using the methods and techniques of the 2007 Vegetation Treatment PEIS.
11. Post-treatment monitoring would be conducted to evaluate the effectiveness of treatments.

The plant species targeted for treatment are listed in the following table along with the herbicides that could be used to treat them:

Table 1 Target Species and Approved Herbicides

Common Name	Scientific Name	Herbicides Approved for Use
African Rue	*Peganum harmala*	Imazapyr, glyphosate
Black henbane	*Hyoscyamus niger*	Metsulfuron, picloram
Camelthorn	*Alhagi psuedalhagi*	Duiron, imazapyr
Bull thistle	*Cirsium vulgare*	Clopyralid, 2,4-D, metsulfuron, picloram, chlorsufruon
Canadian thistle	*Cirsium arvense*	Clopyralid, 2,4-D, chlorsulfuron, dicamba, picloram, glyphosate
Musk thistle	*Carduus nutans*	Clopyralid, 2,4-D, metsulfuron, picloram, chlorsufruon
Scotch thistle	*Onopordum acanthium*	Clopyralid, 2,4-D, metsulfuron, picloram, chlorsufruon

Malta starthistle	*Centaurea melitensis*	Metsulfuron, clopyralid, picloram
Purple starthistle	*Centaurea calcitrapa*	Metsulfuron, clopyralid, picloram
Yellow starthistle	*Centaurea solstitialis*	Metsulfuron, clopyralid, picloram
Russian knapweed	*Acroptilon repens*	Picloram, glyphosate, clopyralid, 2,4-D, Chlorsulfuron, imazapic,
Spotted knapweed	*Centaurea biebersteinii*	Dicamba, 2,4-D, picloram, clopyralid, diflufenzopyr, triclopyr
Diffuse knapweed	*Centaurea diffusa*	Dicamba, 2,4-D, picloram, clopyralid diflufenzopyr, triclopyr
Leafy spurge	*Euphorbia esula*	Dicamba, picloram, 2,4-D, imazapic
Poison hemlock	*Conium maculatum*	Imazapyr, metsulfuron, diuron
Goldenrod	*Solidago Canadensis L.*	Dicamba, 2,4-D, hexazinone, triclopyr,metsulfuron, sulfometuron, diuron, imazapyr
Teasel	*Dipsacus fullonium*	Dicamba, metsulfuron, chlorsulfuron, imazapyr
Dalmation toadflax	*Linaria dalmatica*	Dicamba, picloram, imazapic
Yellow toadflax	*Linaria vulgaris*	Dicamba, picloram, imazapic
Dyer's woad	*Isatis tinctoria*	2,4-D, metsulfuron, imazapic, chlorsulfuron
Hoary cress	*Cardaria spp.*	2,4-D, imazapic, chlosulfuron, metsulfuron, imazapyr, glyphosate
Oxeye daisy	*Leucanthemum vulgare*	Clopyralid, picloram
Halogeton	*Halogeton glomeratus*	Metsulfuron, 2,4-D, imazapic
Perennial pepperweed	*Lepidium latifolium*	Metsulfuron, imazapic, chlorsulfuron
Cheatgrass	*Bromus tectorum*	Imazapic, glyphosate

If additional species of noxious and invasive weeds are found within the district office, these species would be added to this list and treated using the SOPs and mitigation measures described above.

The list of chemical compounds (herbicides) approved by BLM to treat these species can be accessed at http://www.blm.gov/wo/st/en/prog/more/veg_eis.html. These compounds are registered for use within the stated application rate on rights-of-way and rangelands for control of noxious weeds in the state of New Mexico and are addressed in the 2007 Vegetation Treatments PEIS. The application rate would be as described on the label. The total amount of herbicide will not exceed allowable rates. Application is normally scheduled during the active growing season of the target species.

Prescribed fire may be used as a secondary method of treatment after chemical application to meet the goals of the Desired Plant Community within the project area. The use of prescribed fire would be considered when:

- Fuel loading in a prospective treatment area is such that fire would effectively eradicate or control the spread of target species.
- Existing herbaceous vegetation in a prospective treatment area is adequate to effectively carry and support ignition attempts.
- A reasonable treatment window would result from the prescribed fire parameters for eradication or control of target species.
- The risk of an escaped prescribed fire is minimal.

All prescribed fires would be conducted under a site specific Prescribed Fire Burn Plan as per BLM Manual 9214. The impacts associated with prescribed fire were discussed in the 2007 Vegetation Treatment PEIS. Impacts from prescribed fire treatments are not expected to exceed those described in the 2007 Vegetation Treatment PEIS.

Manual treatment (hand pulling, or using hand tools) may be used as a primary or secondary treatment to eradicate or control the spread of target species to meet the goals of the Desired Plant Community (DPC). Manual treatment would be considered when:

a. The proximity of streams, arroyos, water wells, and livestock watering precludes the use of chemicals.
b. Fuel loading is such that prescribed fire treatment would be either ineffective at meeting the goals of the ESD/DPC or the treatment window is so narrow that the chances of successfully treating the area are negligible.

The following measures would apply to all manual treatments within the project area:

a. Surface disturbing treatments would avoid sites containing cultural resources and active prairie dog *(Cynomys ludovicianus)* towns.
b. Where appropriate, vegetative material would be piled for burning at a later date.

B. No Action Alternative

Under this alternative, treatment of noxious weeds within the district office would continue under the prescriptions and mitigation measures of the Noxious Weed Control Environmental Assessment, EA No. NM-066-98-044.

C. No Noxious Weed Treatment

Under this alternative no treatment of noxious weeds would occur.

D. Alternatives Considered but Not Analyzed

The following alternatives were considered but not analyzed:

- Prescribed Fire as Primary Noxious Weed Control - Research and anecdotal evidence indicates that many of the targeted noxious species resprout from the root crown after the top is killed by fire. Intense fires may kill the root crown, however the fuel loading necessary for such mortality rarely occurs in southeast New Mexico. Additionally, many sites where noxious weed control would be desirable do not support an adequate amount of herbaceous vegetation necessary to effectively carry a fire that would accomplish the objective of eradication or controlling noxious weed infestations. In those rare situations when these conditions occur, impacts on the native vegetation can be negative. Given the uncertainty of conditions necessary for weed control and lack of mortality from the application of prescribed fire, the use of prescribed fire as a primary control does not meet the purpose and need of this project and, therefore, will not be analyzed as the primary control method.

- Mechanical Methods as Primary Noxious Weed Control - Mechanical treatment is not target specific and research indicates these methods are not only ineffective but may also aid the spread of some species. Mechanical treatment would not meet the purpose and need for this project and, therefore, will not be analyzed as the primary control method.

- Modifying Grazing Systems as Primary Noxious Weed Control – Many of the species listed are unpalatable to livestock and wildlife. Some of the species listed are deadly to

livestock and wildlife. Monitoring data and anecdotal evidence from the district office indicates altering or modifying grazing systems is ineffective for weed control, especially when considering that cattle are the dominant class of livestock. In addition, there are locations within the district office where livestock grazing is absent and noxious weed species continue to spread. Because of these reasons modifying grazing systems would not meet the purpose and need for this project and therefore modifying grazing systems will not be analyzed.

- Biological Methods as Primary Noxious Weed Control – As biological control methods become available for use on public land, the appropriate environmental analyses would be conducted. Therefore, biological treatments as a primary control for these species will not be analyzed in this document.

- Eradicating or Controlling Salt Cedar (*Tamarix* spp.) – Treatment of salt cedar has been previously subjected to analyses in the context of the National Environmental Policy Act (NEPA). These environmental analyses are still adequate. Further, salt cedar tends to occur in large contiguous blocks, which does not lend itself to spot treatment. This EA analyzes the impacts of spot chemical treatment on small areas, usually less than 20 acres. Because of these reasons, treatment of salt cedar does not meet the purpose and need for this project. Therefore, treatment of salt cedar will not be analyzed in this document.

III. AFFECTED ENVIRONMENT AND ENVIRONMENTAL IMPACTS

A. General Setting

The Pecos District Office manages 3.687 million acres of public land in Quay, Curry, Roosevelt, De Baca, Guadalupe, Lincoln, Chaves, Eddy, and Lea Counties in southeast New Mexico. The affected environment of the district office is generally discussed in the 1994 Roswell Draft Resource Management Plan (RMP) and Carlsbad Resource Management Plan Amendment (RMPA). Refer to this plan (Chapter 2) for a complete description. Only those resources actually impacted by the proposed action would be addressed in this document.

B. Affected Resources

Prime or Unique Farmlands, Native American Religious Concerns, Hazardous or Solid Wastes, Wild and Scenic Rivers, and Wilderness are not present within the treatment area and would not be affected. (See Table 2-5, Vegetation Treatment Methods Standard Operating Procedures and Guidelines of the 2007 Vegetation Treatments on BLMS Lands in Western U.S. Final Programmatic EIS for a description of buffers around rivers, floodplains and riparian areas.)

No impacts have been identified that exceed those addressed in the 2007 Vegetation Treatments Using Herbicides on BLM Lands in Seventeen Western States Final Programmatic EIS (2007 Veg. Treatment EIS). The following are impacts of importance based upon site specific analysis of the proposal.

Air Quality

Affected Environment

The Pecos District Office public land is classified as a Class II air quality area. A Class II area allows a moderate amount of degradation of air quality. Within the boundary of the district office,

the Salt Creek Wilderness and the White Mountain Wilderness, which together contain 58,494 acres of land, are classified as Class I air quality areas. Adjacent to the district office boundary is Carlsbad Caverns National Park, also a Class I air quality area. Class I areas have air quality that is pristine.

Degradation of air quality in portions of the district office is the result of pollutants such as nitrogen dioxide, hydrocarbons, carbon monoxide, and particulate matter from motor vehicles, blowing dust, dirt roads, combustion at major industrial sites, and naturally occurring hydrogen sulfide(H2S) released by oil and gas activity. Automobile exhaust from the more densely populated areas contributes to air pollution. This is especially evident during the winter when temperature inversions prevent the escape and dispersion of polluted air to higher altitudes. These inversions are usually of short duration because of storm fronts and unstable cold air masses moving through the area.

Summer inversions last longer. Convective columns can occur at any time of the year when solar radiation stabilizes the air close to the ground and produces air turbulence that can disperse trapped auto emissions.

Wind action on exposed or disturbed soils is a primary source of air pollution in this area. The soil particles create dust storms of various magnitudes, depending on wind velocity. Early spring winds cause blowing dust which contributes to air pollution. Extensive preparation for spring planting is the source of much of the blowing dust.

Oil and gas extraction and storage activities also influence air quality in the resource area. Underground formations in southeastern New Mexico contain naturally occurring hydrogen sulfide (H2S) gas. Each oil or gas well varies in the amount of gases produced, but some concentrations of up to 100,000 parts per million can occur. Those wells or sites producing H2S are marked with signs and wind socks to warn of high levels of gases. High levels sometimes occur when weather inversions occur over the resource area.

Environmental Impacts

The greatest impacts from chemical spot treatment on air quality would be noise and dust from vehicles. Impacts would be temporary, small in scale, and quickly dispersed throughout the area. These factors, combined with standard operating procedures (SOPs), minimize the significance of potential impacts. Federal, State, and local air quality regulations would not be violated. Standard management practices for ground-based application of herbicides would limit the amount of drift into non-target areas.

Treatment with prescribed fire would have an immediate, but short term impact on air quality in the immediate area. The burn out time for grasses is usually less than 60 minutes. Using smoke emission models, the total suspended particulate would be approximately 0.41 tons.

Manual control methods would have no impacts on air quality.

Soil

Affected Environment

Alluvial soil varies in depth from shallow in the western portion of the district office to deep along the Pecos River. Shallow alluvial soil, found on rolling hills, is susceptible to water erosion, particularly in draws and drainages.

Soil in the eastern portion of the district office is primarily derived from limestone, gypsum and windblown sediments. This soil ranges from being nearly level to gently sloping, and is shallow to deep. Areas of steep, rocky soil occur along the breaks and ridges of the Pecos River and Mescalero Ridge.

Soil beyond the floodplain of the Pecos River, but still within the river's influence, is on level to moderately sloping topography and has varied textures. High concentrations of calcium and gypsum carbonates (caliche) occur in this substratum. Soil within the Pecos River floodplain consists of alluvial deposits with textures varying from clay to sand, and slopes that are nearly level.

Environmental Impacts

Vegetation treatments may directly affect the physical characteristics of soil, alter the abundance and types of vegetation that may shield it from erosion, or alter the presence and abundance of microorganisms or larger organisms that contribute to overall soil quality.

There would be no soil disturbance associated with the proposed action. It is expected that the increased basal ground cover of grasses and forbs would improve watershed conditions. Runoff and soil erosion would be slowed with greater on-site retention of precipitation. Non-point source pollution is expected to decrease in the short and long-term. Noxious weed treatments will reduce runoff, erosion, sedimentation, and improve water infiltration and retention in soil and increase herbaceous plant growth and understory vegetation and reduce sediment yield to rivers and streams.

Although herbicides would not alter a soil's physical properties, there may be indirect effects on 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 decomposition (Norris and Moore, 1981). However, certain herbicides may inhibit microorganism growth or may produce more toxic effects and increase mortality rates.

The positive effects of the proposed action on soil would be substantial. The increased organic matter caused initially by leaves, stems and roots of the treated plants and secondarily by the increased production of grasses and forbs would improve the fertility of the soil.

The competition for water and nutrients would be decreased as the treatment takes effect. Grasses and herbaceous plants may be affected by the treatment during the first year. An increase in ground cover (grasses and forbs) is expected by the second growing season. This ground cover would help minimize erosion and increase infiltration of the surface water. Some soil micro-organisms may be negatively impacted for the short term duration of the treatment. Microbial activity is expected to resume at present levels once dispersion of the chemical is complete.

Prescribed burning may increase the erosion potential until the perennial vegetation reestablishes. Extremely intense fires would cause a higher than desired mortality on all plant species, resulting in the exposure of excess amounts of bare ground over a longer period of time and, consequently, greater soil loss. However, extremely intense burning would be avoided by burning within favorable prescriptions. Because fibrous-rooted perennial grass species increase soil stability, soil erosion would be reduced below present levels when grasses become re-established.

Burning increases nutrient cycling by releasing nutrients that had been tied up in litter and plant material back into the soil. Soil temperatures of burned areas are usually higher than those of adjoining unburned areas. This is part of the reason that burned areas typically green-up earlier than unburned adjoining areas.

Manual treatments would have short term soil-disturbing impacts limited to the area once occupied by the target species. Removing the target species would have positive long term impacts to soils.

Watershed – Hydrology

Affected Environment
The Pecos District is comprised of two main watersheds, the Pecos River Basin and the Tularosa Basin, the latter being a closed watershed. Groundwater recharge is affected by the amount of precipitation occurring within each basin. Drainages, sinkholes, and other karst features aid in groundwater recharge. Activities occurring near these features may affect the quality and quantity of the groundwater.

Environmental Impacts
Vegetation treatments will reduce runoff, erosion, and sedimentation, improve water infiltration and retention in soil, increase herbaceous plant growth and understory vegetation, and reduce sediment yield to rivers and streams within the watershed. Non-point source pollution is expected to decrease in the short and long term within the watershed.

There would be no soil disturbance associated with the proposed action which will result in no long-term and short-term alterations to the hydrologic regime. It is expected that the increased basal ground cover of grasses and forbs would improve watershed conditions. Peak and low flow of perennial streams, ephemeral, and intermittent rivers and streams are not expected to be directly affected by vegetation treatments. Long term direct and indirect impacts to the watershed and hydrology are not expected to occur from vegetation treatments.

Prescribed burning may increase the erosion potential until the perennial vegetation reestablishes within the watershed. Extremely intense fires would cause a higher than desired mortality on all plant species, resulting in the exposure of excess amounts of bare ground over a longer period of time and, consequently, greater soil loss due to increased run-off. However, extremely intense burning would be avoided by burning within favorable prescriptions. Because fibrous-rooted perennial grass species increase soil stability, soil erosion would be reduced below present levels when grasses become re-established.

The short term impacts of increased water run-off would decrease the amount of recharge in the aquifers. Long term impacts, however, would be a greater opportunity for aquifer recharge because the removal of the target species would improve the overall health of the watershed.

Manual treatments would have short-term soil disturbing impacts limited to the area once occupied by the target species. Removing the target species would have positive long term impacts to soils within the watershed.

Vegetation

Affected Environment
Vegetation descriptions for the Roswell Field Office are described by the seven Community

Types, which were developed and described in the Roswell Resource Management Plan, October 10, 1997. Further information on those communities can be found in the Draft RMP, Appendix 11. The three most common plant communities are:

> The Grassland Community consists of the following grasses: Bluestem species *(Andropogon* spp.), sideoats grama *(Bouteloua curtipendula),* black grama *(Bouteloua eriopoda),* blue grama *(Bouteloua gracilis),* hairy grama *(Bouteloua hirsuta),* galleta *(Pleuraphis jamesii)* and tobosa *(Pleuraphis mutica),* sand dropseed *(Sporobolus cryptandrus)* and vine mesquite *(Panicum obtusum).* The shrub component would include such species as skunkbush sumac *(Rhus aromática),* yucca *(Yucca* spp.), cactus *(Opuntia* spp.), winterfat *(Ceratoides lanata),* four-wing saltbush *(Atriplex canescens)*, mormon tea *(Ephedra* spp.) and dalea *(Dalea* spp.). Forbs would include buckwheat *(Eriogonum* spp.), croton *(Croton* spp.), globemallow *(Sphaeralcea* spp.), and threadleaf groundsel *(Senecio douglassii).*
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> The Mixed Desert Shrub Community consists of such grasses as black grama, blue grama, sideoats grama, sand dropseed and bush muhly *(Muhlenberia porteri).* Four-wing saltbush, yucca, littleleaf sumac *(Rhus microphylla),* globemallow and buckwheat are also listed.
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> Piñon/Juniper Plant Community consists of Piñon *(Pinus edulis)* and juniper *(Juniperus* spp.). Oak *(Quercus* spp.) and skunkbush sumac are among the shrub species listed as part of the potential plant community in the Piñon/Juniper Community. The grass species include little bluestem *(Schizachyrium scoparium),* blue grama, black grama, sideoats grama and metcalf muhly *(Muhlenbergia metcalfii).* Forbs include yarrow *(Achillea* spp.), buckwheat, globemallow, and Indian paintbrush *(Castilleja* spp.).

Other shrubs which are potentially found on the range sites include catclaw mimosa (*Mimosa biuncifera*), apache plume (*Fallugia paradoxa*), cholla, sotol (*Dasylirion leiophyllum*), winterfat, wolfberry (*Lycium berlandieri*), threadleaf groundsel, sacahuista (*Nolina microcarpa*), lechuguilla (*Agave lechuguilla*), algerita (*Berberis trifoliolata*), mountain mahogany (*Cercocarpus montanus*), dalea species, sumac species (*Rhus spp*.), juniper, oak species, Bigelow sagebrush (*Artemisia bigelovii*), four-wing saltbush, yerba-de-pasmo (*Baccharis pteronioides*), ephedra species, range ratany (*Krameria glandulosa*),and javelinabush (*Condalia ericoides*); all contributing a total of approximately 2 to 10% of the vegetative production.

Vegetation descriptions for the Carlsbad Field Office include:

> Sandy
> Vegetation within this project area is dominated by warm season, short and midgrasses such as black grama, bush muhly, various dropseeds, and three-awns. Bluestems, bristlegrass, lovegrasses, and hooded windmillgrass make up some of the less common grasses. Shrubs include mesquite, shinnery oak, sand sagebrush, broom snakeweed, and yucca. A large variety of forbs occur and production fluctuates greatly from year to year, and season to season. Common forbs include bladderpod, dove weed, globemallow, annual buckwheat, and sunflower.
>
> Loamy
> This is a grassland site with warm season mid and short grass aspect. There is a fair scattering of shrubs and half-shrubs throughout the landscape. Forb production fluctuates greatly from season to season and year to year. Gramas, tridens, threeawns, muhlys, dropseeds, tobosa, and burrograss are the dominant grasses. The most

common shrubs in the area are tarbush, creosote, mesquite, cactus, and yucca. Forbs include filaree, croton, bladderpod, and globemallow.

Shallow
Warm season, short and midgrasses make up most of the understory in the proposed project area. These include gramas, tridens, curlyleaf muhly, wolftail, dropseeds, threeawn, and green sprangletop. The shrub overstory consists primarily of sotol, agaves, cactus, catclaw, sacahuista, yucca, skunkbush, piñon/juniper, and broom snakeweed. A large variety of forbs, including croton, bladderpod, buckwheat, and globemallow can be found, with large fluctuations from season to season based on rainfall.

Gypsum
The potential plant community of this category consists of gramas, gyp dropseed, and alkali sacaton. The shrub component is made up of four-wing saltbush, mormon tea, spiny althorn, javelin bush, and sumac. Forbs include gyp weed, scarlet guara, globemallow and croton. Shrubs and forbs are a minor component of the plant community.

Environmental Impacts
Noxious and invasive weed treatments would have both beneficial and adverse effects on terrestrial vegetation. Target species in treated areas would be directly affected. When using the spot treatment technique described in the proposed action, non-target species may be directly affected depending on their proximity to the target species and their susceptibility to the herbicides being used. Response of non-target plant species to herbicides depends not only on their susceptibility to the herbicide directly, but also on their response to a decrease of target plant species in the community.

The degree to which vegetation would be affected would depend on the number of acres treated. The overall effect of treating weeds would be to achieve the desired successional stage and to create a more stratified age structure for wildlife habitat improvement.

Annual plants are generally more sensitive than perennial plants to chemical treatments because they have limited food storage mechanisms and annual plant populations are greatly reduced if plants are killed before producing seed. Perennials are most sensitive when exposed to herbicides during periods of active growth. Exposure to herbicides during active growth and before plants become reproductive also would have the greatest negative effect on populations of many annuals. The ability of annual or perennial plants to maintain viable seeds in the soil for several years reduces their susceptibility to herbicides.

Plants that have the ability to re-sprout after aerial shoot damage are generally least sensitive to herbicides. These plants are damaged most when exposed to herbicides when translocation to meristematic areas and to roots occurs (Sosebee 1983). This generally occurs only when soil temperatures are adequate for root activity and soil water is available. These plants are generally less susceptible to foliar-applied herbicides with limited exposure periods, such as 2, 4-D.

Differences in active growth periods and phenology of non-target and target species that correspond to differences in sensitivity to herbicides can be used to minimize damage to non-target species.

Response of non-target species to broad-spectrum herbicides, such as glyphosate, may be

highly dependent on the method of application. Damage to non-target species is minimized with spot treatment on individual plants and if non-target species are tolerant of these herbicides applied at rate sufficient to reduce target species.

Effectiveness of herbicides may vary with different climatic and soil conditions. Soil-applied herbicides are less effective on fine textured soil relative to coarse-textured soil, because herbicide molecules may be adsorbed to clay colloids.

Prescribed fire typically does not kill southwestern grass species (Warren, et al 1999). This is because fires are usually fast moving and do not burn into the root crown. This allows the grass plants to re-sprout. Grass species recovery is dependent upon post-treatment precipitation, plant vigor prior to burning, relative humidity at time of burning, and post-treatment grazing pressure. Depending upon the amount of post-treatment precipitation, grasses can recover as quickly as the first growing season. Without sufficient post-treatment moisture, recovery could take several years to reach pre-treatment levels and support less desirable species during the interim.

Burning increases nutrient cycling by releasing nutrients that had been tied up in litter and plant material back into the soil. Soil temperatures of burned areas are usually higher than those of adjoining unburned areas. This is part of the reason that burned areas typically green-up earlier than unburned adjoining areas.

Manual treatment would have short term negative impacts on surrounding vegetation due to soil disturbance. Long-term positive impacts on vegetation will result as the area recovers from the removal of the target species.

Floodplains

Affected Environment

For administrative purposes, the 100-year floodplain serves as the basis for floodplain management on public lands. It is based on Flood Insurance Rate Maps prepared by the Federal Emergency Management Agency (1983) which describes a Zone A as the “Area of the 100-year flood”. The 100 year floodplain is associated with ephemeral lakes, playas, rivers and streams and perennial rivers and streams located within the Pecos District Office Area.

Environmental Impacts

Vegetation treatments will reduce runoff, erosion, and sedimentation, improve water infiltration and retention in soil, increase herbaceous plant growth and understory vegetation, and reduce sediment yield to rivers and streams within the 100 year floodplain. Non-point source pollution is expected to decrease in the short and long term.

Prescribed burning may increase the erosion potential by removing the vegetation temporarily until the perennial vegetation reestablishes within the floodplain. Extremely intense fires would cause a higher than desired mortality on all plant species, resulting in the exposure of excess amounts of bare ground over a longer period of time and, consequently, greater soil loss. However, extremely intense burning would be avoided by burning within favorable prescriptions. Because fibrous-rooted perennial grass species increase soil stability, soil erosion would be reduced below present levels when grasses become re-established within the floodplain.

Manual treatment would have short term negative impacts on the floodplain as soil disturbance will produce increased erosion. Long-term positive impacts on the floodplain will result as the

area recovers from the removal of the target species.

Water Quality

Affected Environment - Surface Water
The majority of BLM surface ownership lies within the Pecos River Basin. A portion of western Lincoln County drains into the Tularosa Basin. Major tributaries of the Pecos River with a high percentage of public land include the Rio Hondo (the Rio Bonito and Salado Creek watersheds), the Rio Felix, Salt Creek, Arroyo del Macho (including Cowboy Draw), Long Arroyo, Eagle Creek, Rio Penasco, Fourmile Draw, Seven Rivers, Rocky Arroyo, Dark Canyon, Brushy Draw, and Pierce Canyon as well as the Black and Delaware Rivers and their tributaries.

Environmental Impacts - Surface Water
Entry of herbicides into surface water is discussed in Appendix C, Ecological Risk Assessment of the 2007 Vegetation Treatments PEIS. Herbicides may enter surface water during treatment through accidental direct application or drift, or after treatment through surface or subsurface runoff. To pollute the water, herbicides must be present in the water at concentrations high enough to impair water quality at point of use.

Buffer zones reduce drift impacts on sensitive areas, while wind increases drift impacts. Mitigation requires buffers of 10 or 25 feet (depending on application method) around livestock watering locations and ranch houses. After treatment, herbicides may enter streams by subsurface flow or by movement in ephemeral channels. Key factors that would affect peak concentration include the presence of buffers, storm size, herbicide properties, soil properties and downstream mixing and dilution.

Large storms rarely produce high concentration because herbicides are diluted by large water volumes, while small storms may not produce enough flow to move herbicides into streams. Intermediate storms often produce higher concentrations of pesticides in streams relative to the other two situations because the resulting streamflow is sufficient to mobilize the herbicides but not large enough to substantially dilute the material.

The amount of herbicide available for movement from the site of application with surface or infiltrating water would be determined, in part by the herbicides persistence. Herbicide persistence is usually expressed in terms of “half-life”. This is the typical length of time needed for one-half of the total amount applied to break down to substances that are no longer of toxicological concern. While a herbicide’s soil half-life in practice is influenced by local conditions such as soil type and climate, it is useful for describing the relative rates at which various herbicides are broken down in the soil.

Sunlight, temperature, soil and water pH, microbial activity and other edaphic characteristics may affect the breakdown of herbicides. Soil organic matter and soil properties such as moisture, temperature, aeration, and pH all affect microbial degradation. Microbial activity increases in soil that is warm, and moist with a neutral pH. In addition to microbial action, chemical degradation of herbicides can occur by reaction with water, oxygen or other chemicals in the soil. As soil pH becomes extremely acidic or alkaline, microbial activity usually decreases, however these conditions may favor rapid chemical degradation.

Table 4-7 of the 2007 Vegetation Treatments Draft PEIS (Volume 1, page 4-13) gives field half-lives for the 18 herbicides proposed for use in the PEIS.

In addition to degradation, these herbicides may be unavailable for movement with surface or infiltration water due to volatilization and plant uptake. Volatilization is the loss of herbicide vapor to the atmosphere from plant and soil surfaces. The rate of volatilization is determined by the herbicide's vapor pressure and how strongly it is adsorbed.

Soil adsorption is also important in determining mobility in surface or infiltrating water. Adsorption of a herbicide varies with the properties of a chemical, as well as soil texture (relative proportions of sand, silt, and clay), moisture level, and amount of organic matter. Soil high in organic matter or clay tend to be the most adsorptive, and sandy soils low in organic matter least adsorptive. Therefore, the higher the organic matter content of the soil, the more adsorptive the soil and the less likely the herbicide is to move from the point of application.

The degree of herbicide adsorption is often represented by the ratio of the amount of herbicide in the soil water to the amount adsorbed. This ratio is called the adsorption coefficient or Kd. The degree of adsorption depends on both the herbicide and the soil properties. The Kd for a herbicide is soil specific and would vary with soil texture and organic matter content.

Another herbicide adsorption coefficient, which is less soil specific is called the Koc. The Koc is the Kd divided by the percent of organic carbon in the soil, a major component of soil organic matter. The higher the value for Kd or Koc, the greater the adsorption. Water solubility and Koc values for herbicides proposed for use in the 2007 Vegetation Treatments PEIS are given in Table 4-9 (page 4-28).

Non-point source pollution is expected to decrease in the short and long term. Vegetation treatments will reduce runoff, erosion, sedimentation, and improve water infiltration and retention in soil and increase herbaceous plant growth and understory vegetation and reduce sediment yield to rivers and streams.

Impacts to surface water as the result of prescribed burning would be short-term (less than 3 years) and would take the form of increased sediment loading due to storm run-off. Impacts would be expected to be less after the first full growing season and diminish over time.

Impacts from manual treatment are expected to be less that those resulting from prescribed burning.

Affected Environment - Ground Water

The New Mexico State Engineer has declared thirteen underground water basins within the district office: Upper Pecos, Fort Sumner, Tucumcari, Curry County, Portales, Roswell Artesian, Hondo, Tularosa, Carlsbad, Capitan, Jal, Lea County, and Penasco. Agriculture is the primary use of ground water within the district office with additional demands by municipalities, industry, livestock and wildlife.

Ground water is located in the shallow unconfined aquifer and the confined aquifer. The shallow unconfined aquifer consists of unconsolidated alluvium of Quaternary and Tertiary Age. The confined aquifer consists of consolidated carbonate and sandstone rocks of Permian Age. Depth to ground water typically ranges from less than 10 feet to 100 feet in the shallow unconfined aquifer and ranges from 300 to 1,000 feet or more in the confined aquifer.

Environmental Impacts - Ground Water

After treatment, herbicides may move through the soil and into underlying ground-water aquifers by leaching. Herbicide mobility and persistence greatly affect potential for leaching. To pollute ground water, they must then move laterally at concentrations high enough to impair water

quality at a point of use. Herbicides move most easily through sand, which is the most porous soil and has the least adsorption potential. The potential for ground-water contamination increases as the depth to the water table and distance to the point of use decrease. Applied at typical rates, herbicides should never occur in ground-water supplies at concentrations exceeding a small fraction of EPA's most stringent drinking-water standards.

Mobility depends on solubility and adsorption; persistence depends on degradation mode and rate. Herbicide properties which determine the likelihood of movement with infiltrating water and leaching index based upon the work of Goss (1988) are given in Table 4-9 of the 2007 Vegetation Treatments PEIS (page 4-28). The leaching index is a relative ranking of the 19 herbicides based upon their chemical properties only. The higher the value, the greater the potential that the herbicides would move through the soil profile with infiltrating water.

In response to the concern for ground water contamination, Record of Decision for the 2007 Vegetation Treatment PEIS lists mitigation measures for water resources in Table 2 (page 2-4). The mitigation measures direct BLM to identify potentially vulnerable areas by factoring depth to water, net recharge, aquifer media, soil media, topography, impact to unsaturated zone and gross hydraulic conductivity. In addition, herbicide-free buffers around sinkholes and known cave entrances would mitigate the possibility of ground water contamination.

Impacts to ground water as the result of prescribed burning would be negligible because of the vegetation recovery after application.

Impacts to ground water by manual treatment would be negligible because of the vegetation recovery.

Riparian/Wetland Areas

Affected Environment

Public land within the district office contains approximately 74 miles of streams comprising 5,200 acres of riparian/wetland habitat. The 100-year floodplains are mainly associated with the Pecos River and its drainages. Sinkholes, playas and alkali lakes dot the district office. The size of these features range from a few acres to hundreds of acres. Playas and alkali lakes are ephemeral water bodies while sinkhole might be conduits to ground water recharge. Additionally, there are more than 26 springs and seeps on public land, each about one acre in size. Each of these features contributes to the habitats associated with riparian and wetland areas.

Environmental Impacts

Short-term direct impacts would be similar to those described in the Vegetation Section of this EA. Non-target species would be affected by spot treatment depending on their proximity to the target species and their susceptibility to the herbicide being used. Non-target species would only be affected by soil disturbance from manual treatment if they are in the area directly surrounding the target species. Impacts of applying prescribed burning are similar to those described in the Vegetation Section.

Long-term and indirect impacts would be beneficial to habitat within riparian/wetland areas due to the removal or control of noxious weeds.

Wildlife

Affected Environment

The district office is comprised of several distinct community types based primarily on vegetation, soil and landform. The Sacramento, Capitan, and Guadalupe Mountains to the west, the Chihuahuan Desert to the south, and High Plains to the north and east greatly influence floral and faunal diversity. Federal, state and private land in the resource area provides habitat for approximately 500 species of wildlife. Public land provides important habitat for big game mammals and upland game birds, furbearers and non-game mammals, game and nongame fish, raptors or birds of prey, various songbirds, reptiles and amphibians and a variety of flora.

Projects could occur in the sand shinnery habitat type. Sand shinnery communities extend across the southern Great Plains occupying sandy soils in portions of north and west Texas, west Oklahoma, and southeast New Mexico. Portions of Eddy, Lea and Chaves counties consist largely of sand shinnery habitat and are intermixed with areas of mesquite to a lesser degree. The characteristic feature of these communities is co-dominance by shinnery oak and various species of grasses. In New Mexico Shinnery oak occurs in sandy soil areas, often including sand dunes.

Projects could occur in a transition zone from Chihuahuan Desert habitat type to the west to a sand shinnery habitat type to the east. This transition zone is primarily dominated by mesquite scrublands intermixed with various grasses. This mesquite scrubland community extends across the southern Great Plains, occupying portions of north and west Texas, western Oklahoma, and southeast New Mexico. Portions of Eddy and Lea counties consist of mesquite scrublands to a lesser degree. The characteristic feature of the mesquite scrubland community is co-dominance by various species of grasses and cacti.

Various bird, mammal, reptile and invertebrate species inhabit the sand shinnery ecosystem in New Mexico. Herbivorous mammals include mule deer, pronghorn, and numerous rodent species. Carnivores include coyote, bobcat, badger, striped skunk, and swift fox. Two upland game bird species, scaled quail and mourning dove, are prevalent throughout the sand shinnery in New Mexico. Many species of songbirds nest commonly, with a much larger number that use the habitat during migration or for non-nesting activities. Common avian predators include northern harrier, Swainson's hawk, red-tailed hawk, kestrel, burrowing owl, and Chihuahuan raven. Numerous snake and lizard species have been recorded, including the sand dune lizard, the only vertebrate species restricted entirely to sand shinnery habitat.

Projects could occur in the Chihuahuan Desert habitat type. The Chihuahuan desert is one of the four most biologically rich and diverse desert ecoregions in North America. Numerous plant species live in this desert. The Chihuahuan Desert stretches from the southeastern corner of Arizona across southern New Mexico and west Texas to the Edwards Plateau in the United States. It runs deep into central Mexico, including parts of the states of Chihuahua, northwest Coahuila, northeast Durango and several others. This Desert is bounded by the Sierra Madre Occidental to the west and the Sierra Madre Oriental to the east, extending as far south as San Luis Potosi and to the isolated islands of the Chihuahuan vegetation in the Mexico states of Queretaro and Hidalgo. In New Mexico, Chaves and Eddy Counties, west of the Pecos River, consist largely or entirely of Chihuahuan Desert habitat type. The dominant plant species throughout the Chihuahuan desert is creosote bush. Depending on diverse factors such as type of soil, altitude, and degree of slope, creosote bush can be found in association with other woody and grass species.

The Chihuahuan desert supports a large number of wide-ranging mammals, herpetofauna, and avian species. Mammals include but are not limited to: pronghorn antelope, mule deer, grey fox, collared peccary, bobcat, desert cottontail, black tailed jack rabbit, kangaroo rat, pocket mouse,

woodrat and deer mouse. Herpetofauna include but are not limited to: Texas horned lizard, greater earless lizard, several species of spiny and whip tail lizards, and several species of venomous and non-venomous snakes. Avian species include but are not limited to the following: greater roadrunner, curve-billed thrasher, scaled quail, Scott's oriole, black-throated sparrow, phainopepla, Worthen's sparrow, and cactus wren. In addition, numerous raptors inhabit the desert and include the great horned owl, burrowing owl, Aplomado falcon, and red-tailed hawk.

Environmental Impacts

Wildlife species depend directly on vegetation for habitat, so any change in the vegetation of a particular plant community is likely to affect the wildlife species associated with that community. Any change in community vegetation structure or composition is likely to be favorable to certain animal species and unfavorable to others (Maser and Thomas 1983).

The key to understanding the effects of vegetation manipulation on wildlife involves an understanding of the vegetation structure, production, flowering and fruiting of the desired plant community and an understanding of how the vegetation manipulation will affect this community. These characteristics relate to seasonal cover and food requirements for particular animal species and predators dependent on them.

Plant communities on many western rangelands are no longer pristine and therefore do not support pristine populations of wildlife species. Many rangeland plant communities have alien herbaceous weeds or a higher ratio of woody to herbaceous perennial vegetation than under pristine conditions. These vegetation conditions may harm species, such as pronghorn *(Antilocapra americana),* which require mixed-plant communities, rather than those dominated by only a few woody or herbaceous species (Yoakum 1975).

The presence of noxious or invasive weeds degrades habitat quality since many of these plants are, at the least, unpalatable to wildlife species, and in some cases, poisonous to wildlife species. The proposed action would remove undesirable plant species from the vegetative community alleviating stress and competition to desirable native plant communities in treated areas. Short-term (less than three years) impacts may be negative since some of the herbicides would affect non-target plant species. Long-term (greater than three years) impacts would be positive since the target species would no longer be part of the vegetation.

The application of prescribed fire would have immediate impacts in the form of displacement of many terrestrial species during the actual firing operations. If not conducted during a time period that considers migration, breeding, nesting, and fawning, prescribed fire could decrease the use of the area by wildlife. The impacts would still be short-term as there is similar adjacent habitat available.

Wildlife would be temporarily displaced from the area during the burning and for a short time afterwards. Larger mammals such as coyotes *(Canis latrans)* and mule deer typically leave the treatment area before burning starts as a result of the increase in human presence on the burn days. Direct kills of smaller mammals as a result of the proposed action would be low, although some could suffocate as a result of the smoke and heat. It may be possible that small mammal populations could decrease temporarily as a result of the loss of cover which would make them more susceptible to predation. The small mammal populations should recover to or above pre-treatment levels as the vegetation recovers.

Birds would be less directly affected by the proposed action, as they are more mobile. A burn that results in a mosaic of burned and unburned areas would benefit the greatest number of bird species by providing increased plant diversity and edge effect.

Prescribed fire can ultimately benefit most ground nesting birds by increasing cover for ground nests which reduces nest predation. The proposed action could improve forage habitat by removing litter, which improves forage areas, and by increasing the amount of forbs, which would increase the quantity and quality of the forage. A negative impact would occur if the timing of the proposed action coincidences with nesting activities. There is the potential that nests would be destroyed during the proposed action; however, the adult birds should be able to escape and nest again in unburned areas.

Manual treatment would have short-term negative impacts similar to prescribed burning. Wildlife, primarily larger mammals and birds, would be temporarily displaced as a result of human presence. This would be short-term effect as wildlife would most likely return afterwards. Positive long-term impacts would result from the removal of noxious and invasive plants from the landscape and the return of native vegetation.

Threatened and Endangered Species Including Special Status Species

Affected Environment

Several state and federal candidate species and other sensitive species may occur within the project area on a seasonal basis. Refer to the Biological Opinion (AP11-38) in the 1997 Roswell RMP for a detailed description of the range, habitats and potential threats as well as the Biological Opinion (AP4-137) in the 1997 Carlsbad RMPA. Also refer to Appendix 10, Biological Assessment, of the 2007 Proposed Special Status Species RMP Amendment/final Environmental Impact Statement. For a list of special status species, see the 1997 Roswell RMP, the 1997 Carlsbad RMPA, and the 2008 Special Status Species RMP Amendment.

Environmental Impacts

Under Section 7 of the Endangered Species Act of 1973 (as amended), the BLM is required to consult with the U.S. Fish and Wildlife Service on any proposed action which may affect Federal listed threatened or endangered species or species proposed for listing. When listed species are not present or when designated critical habitat is not present, there is no need to enter into consultation.

BLM staff reviewed and determined the proposed action is in compliance with listed species management guidelines outlined in Biological Assessments Cons. #2-22-96-F-102, Cons. #2-22-96-F-128, Cons. #22420-2006-I-0144, Cons. #22420-2007-TA-0033, and Appendix C, Endangered Species Act Section 7 Consultation with the US Fish and Wildlife Service and the National Marine Fisheries Service for the Record of Decision for the 2007 Vegetation Treatment PEIS. In addition, the SOPs and mitigation measures of the 2007 Vegetation Treatment PEIS require surveys for the presence of listed species prior to treatment. Impacts to listed species would be negligible. In the absence of occupancy by listed species, no further consultation with the Service is required.

Sites containing plant species listed as threatened or endangered by the U.S. Fish and Wildlife Service would be buffered out of treatment areas, or an alternate treatment method employed to control noxious weeds while preserving species and habitat. Therefore, impacts to listed plant species would be negligible. Those species are listed in Table 2.

Table 2 Listed Plant Species

Common Name	Scientific Name	Status
Kuenzler's hedgehog cactus	*Echinocereus fendleri*	Endangered
Sneed pincushion cactus	*Coryphantha sneedii var. sneedii*	Endangered

Pecos sunflower	*Helianthus paradoxus*	Threatened
Lee's pincushion cactus	*Coryphantha sneedii var. leei*	Endangered
Lloyd's hedgehog cactus	*Echinocereus lloydii*	Endangered
Gypsum wild buckwheat	*Friogonum gypsophilium*	Threatened

Areas of Critical Environmental Concern

Affected Environment

The 1988 Carlsbad RMP, the 1997 Roswell RMPA and the 2008 Special Status Species RMPA established areas of critical environmental concern (ACEC). See the following table for details of these ACECs:

Table 3 Areas of Critical Environmental Concern

ACEC Name	Public Land Acres	Management Objective
Fort Stanton	24,000	Provide quality recreation opportunities
Overflow Wetlands	3,000	Protect the biological and scenic values of the area – T&E species habitat
North Pecos River	3,400	Protect the biological and scenic values of the area – T&E species habitat
Mescalero Sands	7.900	Preserve a portion of the shinnery oak/sand dune plant community
Roswell Cave Complex	11,900	Protect the natural and scenic values of caves while providing limited scientific and educational use
Lesser Prairie Chicken *(Tympanuchus pallidicinctus)* Habitat Preservation	37,000	Protect and enhance habitat for the lesser prairie-chicken and sand dune lizard *(Sceloporous arenicola).*
Blue Springs ACEC	160 acres of Minerals	Protect and enhance Blue Spring and the Pecos gambusia *(Gambusia nobilis)* – Federally listed fish habitat
Chosa Draw ACEC	2,200	Protect sensitive karst resources and fragile surface to subsurface interactions of the hydrologic area. Enhance cave based recreation, education, and scientific uses.
Dark Canyon ACEC	1,480	Protect high visual and natural resource values and rare plant species while still providing other multiple resource uses.
Lonesome Ridge ACEC	2,990	Provide adequate protection of natural values in an unaltered condition.
Pecos River Canyons Complex ACEC	5,190	Protect sensitive and unique natural and cultural resources along with scenic qualities. Provide research opportunities while allowing other compatible resource uses.

Environmental Impacts

The presence of noxious or invasive species degrades many of the values these ACECs were established to protect. Eradicating or preventing the spread of these species would prevent further habitat degradation. Short-term impacts in treated areas would include the removal of the

target vegetation, altering the habitat in small areas. However, the long term impacts would be positive as the treated areas would transition to native vegetation.

Livestock Management

Affected Environment
There are 640 livestock grazing allotments within the district office with over 500,000 animal unit months (AUMs) of permitted use. Of the 3.627 million acres of public land within the district office, less than one percent is unsuitable for livestock grazing.

Environmental Impacts
The goals of rangeland treatment methods for livestock include suppressing plant species that are undesirable and/or toxic and improving forage production by controlling competing vegetation. Livestock could be affected directly by ingesting poisonous weeds and indirectly by changes in forage supply and herbicide exposure.

Chemical treatments are generally applied in a form or at such low rates that they do not affect livestock. Treatment would be applied when livestock are not in the project area.

Following chemical application and/or prescribed burning, the treated areas would be rested from livestock grazing to allow the forage species time to produce leaves, stems and leaders which would build up root reserves. This post-treatment rest could be considered a negative impact, as alternative grazing must be located for the livestock normally using the treated area.

Visual Resources Management

Affected Environment
The public land in the district office contains Class I, II, III, and IV Visual Resource Management Areas (VRM). In a Class I VRM, "The objective is to preserve the existing character of the landscape. This class provides for natural ecological changes; however, it does not preclude very limited management activity. The level of change to the characteristic landscape should be very low and must not attract attention."

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

In VRM Class III, the objective is to "partially retain the existing character of the landscape. The level of change to the characteristic landscape should be moderate. Management activities may attract attention but should not dominate the view of the casual observer. Changes should repeat the basic elements found in the predominant natural features of the characteristic landscape."

In a Class IV VRM, contrasts to the characteristic landscape can be high. These management activities may dominate the view and be the major focus of viewer attention. **However, every attempt should be made to minimize the impact of these activities through careful location, minimal disturbance, and repeating the basic landscape elements of color, form, line and texture."**

Environmental Impacts
The proposed action would have short term and long term impacts on visual resources. Short term impacts may include a change in line, form, color and texture as the result of dying vegetation. Long term impacts may include a change in line, form, color and texture by promoting growth of native vegetation in lieu of noxious weeds.

Recreation and Off-Highway Vehicles

Affected Environment
Recreational pursuits are considered to be either facility-based or dispersed and the Pecos District Office offers opportunities in both categories. Established recreation facilities are the Valley of Fires Recreation Area; the Fort Stanton Cave Campground and the Horse Trailhead in the Fort Stanton Area of Critical Environmental Concern (ACEC), Haystack Mountain OHV Area; the Mescalero Sands North Dune OHV Area, Hackberry Lake OHV Area, Black River Recreation Area, La Cueva Trails Recreation Area, Red Bluffs Recreation Area, and Alkali Lake OHV Area.

The Mescalero Sands North Dune OHV Area (approximately 560 acres) is the only location within the Roswell Field Office which is designated as open to OHV use. Seventeen areas within Field Office, totaling approximately 39,000 acres, are designated as closed to OHV use. See the 1997 Roswell RMP for a list of these areas. OHV use in the remainder of the field office is designated as limited to existing roads and trails.

Hackberry Lake (55,800 acres) and Alkali Lake (900 acres) OHV areas are the preferred areas for OHV use. Sixteen areas, covering 153,299 acres are designated for limited OHV use. A total of 5,943 acres is designated as closed to OHV use and 2,011,506 acres are designated open to OHV use. See 1988 Carlsbad RMP.

Environmental Impacts
The proposed action may cause short term negative impacts to the environment while noxious weeds are being replaced by native species. Recreationists may also experience short term negative visual impacts during the vegetative transition.

Cave and Karst

Affected Environment
The district office has cave/karst potential. See the 1997 Roswell RMP and the 1997 Carlsbad RMPA for a description of this potential and maps of High, Medium and Low.

Environmental Impacts
Because of the mitigation built into the proposed action there would be no direct or indirect impacts to cave and karst resources.

Human Health and Environment

Affected Environment
Approximately 93 percent of the public land managed by the Pecos District Office is located in Chaves, Lincoln, Eddy and Lea Counties. According to the Census Bureau, the population of Chaves County in 2000 was approximately 60,000 people. Approximately 45,000 people lived in Roswell while the remainder resided in the communities of Dexter, Hagerman, Lake Arthur and the unincorporated areas surrounding these communities.

The Census Bureau indicates approximately 20,000 people live in Lincoln County. The majority of these people reside in the Villages of Ruidoso, Ruidoso Downs, Capitan, Carrizozo, Lincoln, Nogal, and White Oaks or the surrounding unincorporated areas.

The Census Bureau indicates approximately 51,000 people live in Eddy County. The majority of

these people reside in the communities of Carlsbad, Artesia, Loving and the unincorporated areas surrounding these communities.

According to the Census Bureau, approximately 57,000 people live in Lea County. The majority of these people reside in the communities of Hobbs, Lovington, Tatum, Eunice, Jal, and the unincorporated areas surrounding these communities.

No one resides on the public land within any of the counties; however, the intermingled private land contains scattered residences. These residences are often the homes of those holding livestock grazing permits and allotments on public land. In addition to this situation, there are private lands, mainly used for agriculture, between US Highway 285 and the Pecos River, from Roswell south to the Texas border.

Environmental Impacts
Noxious weeds present hazards to the human environment such as:

- Leafy spurge can cause blindness and skin irritation or blisters
- Poison hemlock is extremely poisonous if eaten and may cause death in a short period of time
- Water hemlock, especially the root, is extremely poisonous if eaten, causing death in a short period of time
- Black henbane has hallucinogenic properties and can cause death
- African rue has hallucinogenic properties and is an aborticide.

This EA is tiered to the 2007 Vegetation Treatment PEIS. In the PEIS, Volume 2, Appendix B, Human Health Risk Assessment discloses the human health risk of using the herbicides described in the proposed action. Volume 2, Appendix C, Ecological Risk Assessment, discloses the risk to the environment, including wildlife, of using the herbicides described in the proposed action.

The proposed action reduces the risks caused by chemical drift by prescribing ground-based application. The no-treatment buffers around water bodies and water sources have proved effective in the past and would be used for prospective treatments. These and other mitigation measures should reduce risks to human health to undetectable levels.

The proposed action produces positive impacts by removing the hazards posed by noxious and invasive weeds from the environment.

No Action Alternative

Affected Environment
The affected environment is the same as previous discussed in this document.

Environmental Impacts
Under this alternative the impacts would be similar to those of the proposed action.

No Noxious Weed Treatment Alternative

Affected Environment
The affected environment is the same as previous discussed in this document.

Environmental Impacts

Under the no action alternative, noxious weeds, non-native plants would continue to flourish and spread. This would result in degraded wildlife habitat, reduced forage availability for livestock and wildlife, reduced biological diversity, and watersheds not capable of functioning at their full potential.

IV. CUMULATIVE IMPACTS

A cumulative impact is defined as "the impact on the environment which results from the incremental impact of the action when added to other past, present, and reasonably foreseeable future actions regardless of what agency (Federal or non-Federal) or person undertakes such other actions. Cumulative impacts can result from individually minor but collectively significant actions taking place over a period of time" (40 CFR 1508.7).

Cumulative impacts from the proposed action and the no action alternative would be minimal. The cumulative impacts of no treatment would be much more drastic. Using the estimated rate of noxious weed spread of 2,300 acres per day (the national average spread rate), the public land within the district office would be infested by noxious weeds in four years, four months. The aggressive nature of noxious weeds prevents other plants form surviving which creates pure stands of noxious weeds. Pure stands of noxious weeds are not useable as forage by wildlife or livestock.

Past noxious weed treatments within the district office have occurred. BLM records show approximately 14,500 acres of chemical treatment projects and approximately 3,000 acres of manual treatment projects for a total of 17,500 acres in the past five years. Collectively, these treatments account for less than one percent of federal land within the district office.

Currently areas with noxious weed infestations within the district office are generally located along roads and from there, spread into the adjacent rangelands. The most common vector for expansion of noxious weeds is vehicle traffic. That is, the tires, wheels and the vehicle undercarriage pick up seeds from noxious weeds and transport those seeds to other areas. Activities permitted by BLM, such as oil and gas development, contain conditions of approval that require permit holders to eradicate or control noxious weeds that occur as result of the permit holder's actions.

Averaged over the past 30 years, approximately 340 oil or gas wells are drilled annually within the district office. Currently there are approximately 30,000 active oil and gas wells within the district office. Surface disturbance as a result of that development is approximately 150,000 acres. This represents an area at risk from noxious weed infestation due to vehicle traffic. As described in the above paragraph, permit holders are responsible for noxious weed control.

Monitoring information within the district office indicates spread of noxious weeds by off-highway vehicles (OHVs) is a minor vector. The designated OHV areas do not have noxious weed infestations at this time. The OHV areas will, however, continue to be monitored for the presence of noxious weeds and would be treated should infestations occur.

Monitoring information and anecdotal evidence indicates livestock and wildlife are minor vectors in the spread of noxious weeds. If livestock and wildlife were major vectors, an observer would note weed infestations distinctly separate from existing infestations along roadsides and separated by some distance. BLM staff and others have not seen that kind of movement.

In addition to the proposed action for treating noxious weeds, there are project areas in which

vegetation manipulation uses or would use herbicides to enhance current vegetation conditions. These are mentioned here in the context of cumulative impacts of grassland restoration efforts on a large scale. The goal of these projects is not eradication of woody shrub species but the goal is to reduce the amount of these woody shrub species so that their presence is in amounts more approximate to the natural condition. As a matter of disclosure, since 2004, there have been approximately 169 herbicide projects totaling approximately 650,000 acres in the Pecos District. This represents approximately 18 percent of all public land with the district office.

V. MITIGATION MEASURES

Any project involving herbicides would follow the policies, standards and practices listed in the proposed action. In addition to the mitigation measures listed in the Proposed Action, the following measures would also apply:

1. Livestock numbers would not increase as a result of any of the treatments covered in this analysis. The livestock operator must demonstrate to BLM staff that any net increase in animal unit months (AUM's) is the direct result of the livestock operator's ability to manage livestock in balance with watershed capacity to provide forage, maintain livestock distribution and proper grazing use to restore rangeland health prior to any increases in authorized increases in animal numbers.

2. BLM would ensure that the agreed upon level of cultural inventory is completed prior to implementation, and would protect sensitive areas using buffer zones, hand treatment of vegetation, removal of heavy fuels or other actions agreed to under the provisions of the Protocol Agreement between the New Mexico Bureau of Land Management and New Mexico State Historic Preservation Officer. These procedures would ensure compliance with the National Historic Preservation Act. The appropriate mitigation measures may be implemented after consultation with New Mexico State Historic Preservation Officer.

3. Monitoring studies would be conducted to determine those areas containing noxious weed infestations. Post-treatment monitoring would be conducted to evaluate the effectiveness of treatments,

Residual Impacts: Implementation of the proposed action or of the alternatives would all have the same potential for unavoidable adverse environmental impacts. They are as follows:

- Short-term reduction in air quality from dust and engine emissions resulting from the equipment being used in the application of herbicides

- Short-term change in chemical composition of the uppermost soil layers due to the change in organic matter.

-Short-term decrease in habitat for wildlife species.

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VII. LITERATURE CITED

Aller, L., T. Bennett, J.H. Lehr, and R.J Petty, 1985 DRASTIC: A standardized system for evaluating ground water pollution potential using hydrogeologic settings. EPA/600/2-85/018. Ada, Okla., 130 pp.

Arnold, W. R., and P. W. Santelmann, 1966. The response of native grasses and forbs to picloram. Weeds 14: 74-76.

Bauer, J. K. 1976. Effects of picloram and tebuthiuron on establishment of rye grass winter pasture. Journal of Range Management 31:450-455.

Davison, J., and M. Wargo. Recognition and control of African rue in Nevada. Extension Service Fact Sheet FS-01-45.

Evans , R.A., and J. A. Young. 1985. Plant succession following control of western juniper *(Juniperus occidentalis)* with picloram. *Weed Science* 33: 63-68.

Gibbens, R. P., C. H. Herbel, and J. M. Lenz. 1987. Field scale tebuthiuron application on brush–infested rangeland. Weed Technology 1: 323-327.

Goss, D. 1988. Pesticide-soil interaction: Potentials for loss. In: Integrating water quality and quantity into conservation planning. Soil Conservation Service and Cooperative Extension Service Joint Water Quality Workshops. October-November, 1988.

Gysel, L. W., and L. J. Lyon. 1980. Habitat analysis and evaluation. In Wildlife Technical manual, ed. S. D. Schemnitz, 305-327. Washington, DC: The Wildlife Society.

Martin, S. C. 1975 Ecology and management of southwestern semidesert grass-shrub ranges: The status of our knowledge. Research Paper RM-156. Ft. Collins, CO: U.S. Department of Agriculture, Forest Service, Rocky Mountain Station

Maser, C., and J. W. Thomas. 1983. Wildlife habitats in managed rangelands – The Great Basin of southeastern Oregon. Introduction. U.S. Department of Agriculture, Forest Service,

General Technical Report PNW-160- United States, Pacific Northwest Forest and Range Experiment Station.

Norris, L.A., and D.G. Moore. 1981. Introduced chemicals and water quality. In Interior, west watershed management symposium: 1980 April 8-10, Spokane, WA, ed. D.M. Baumgartner. 203-220. Pullman, WA: Washington State University, Cooperative Extension.

Parker D., and M.H. Reiser. 1997 Low-Impact, Selective Herbicide Application for Control of African Rue. A preliminary Field Guide. United States Department of Agriculture, Forest Service Southwestern Region publication.4 pp.

Smith, B. H. 1984. Avian habitat selection in a mixed creosotebush-grassland community. Master's thesis, University of Arizona, Tucson.

Sosebee, R. E. 1983. Physiological, phonological and environmental consideration in brush and weed control. In Proceedings of brush management symposium, ed. K.C. McDaniel 27-34. Denver, Co: Society for Range Management.

Warren, Yvonne; Britton, Carlton M.; Mitchell, Robert B. 1999. Redberry juniper seed germination after prescribed fire. In: Wester, David B.; Britton, Carlton M., eds. Research highlights – 1999: Noxious brush and weed control: Range, wildlife, and fisheries management. Volume 30. Lubbock, TX: Texas Tech University, College of Agricultural Sciences and Natural Resources: 22-23.

Yoakum, J. D. 1975. Antelope and livestock on rangelands. Journal of Animal Science 40: 985-988.