Department of the Interior
Bureau of Land Management
Carlsbad Field Office
Carlsbad, NM

FINDING OF NO SIGNIFICANT IMPACT AND DECISION RECORD (FONSI/DR)

Native Invasive Woody Species Mechanical Treatment EA
DOI-BLM-NM-P020-2009-0982-EA

FINDING OF NO SIGNIFICANT IMPACT (FONSI) AND RATIONALE

I have reviewed this environmental assessment (NEPA No. DOI-BLM-NM-P020-2009-0982-EA) including the explanation and resolution of any potentially significant environmental impacts. I have determined the proposed action with the mitigation measures described would not have significant impacts on the human environment and that the preparation of an Environmental Impact Statement (EIS) is not required. The proposed action would not result in any undue or unnecessary environmental degradation. The proposed action would meet the objectives of the 1988 Carlsbad Resource Management Plan.

DECISION AND RATIONALE

It is my decision to implement the proposed action as described in the attached environmental assessment (NEPA No. DOI-BLM-NM-P020-2009-0982-EA) to use mechanical and manual treatment methods as a means to reduce densities of juniper, cholla or other targeted species on sites where these shrubs are, or are becoming, dominant and are out-competing the desirable shrub and understory vegetation in the western portion of the Carlsbad Field Office. In all treatment areas, prescribed fire and hand application of chemicals could be used as a follow up maintenance tool.

Implementation of the proposed action will restore and stabilize the ecosystem dynamics of the Upper Pecos River watershed, restore and support habitat requirements for flora and fauna within it, and reduce soil erosion that could eventually contribute to a decline in ecosystem sustainability. Watershed functions, soil stabilization, wildlife habitat and livestock management will be improved.

This alternative is approved, subject to the mitigation and safeguard measures identified in this environmental assessment (NEPA No. DOI-BLM-NM-P020-2009-0982-EA) and the Final EIS for Vegetation Treatment on BLM Lands in Thirteen Western States (1991). The proposed action is in conformance with the New Mexico Standards for

Public Land Health and Guidelines for Livestock and Grazing Management (BLM/NM/PL-00-001-1020), the 1988 Carlsbad Resource Management Plan and the 2004 Fire and Fuels Management Plan Amendment for Public Lands in New Mexico and Texas.

With these mitigations and safeguard measures as described in the attached environmental assessment (NEPA No. DOI-BLM-NM-P020-2009-0982-EA), the potential environmental impacts from implementing the proposed action are expected to be minimal.

If you wish to protest this decision in accordance with 43 CFR 4160.2, you are allowed 15 days from receipt of this notice within which to file a protest with the Assistant Field Manager for Lands and Renewable Resources, Bureau of Land Management, 620 East Greene Street, Carlsbad, NM 88220. This protest should specify, clearly and concisely, why you think the proposed action is in error.

In the absence of a protest within the time allowed, the above decision shall constitute my final decision. Should this notice become the final decision, you are allowed an additional 30 days within which to file an appeal for the purpose of a hearing before an Administrative Law Judge, and to petition for stay of the decision pending final determination on the appeal (43 CFR 4.21, 4.410 and 4160.3 (c)). If a petition for stay is not requested and granted, the decision will be put into effect following the 30-day appeal period. The appeal should specify, clearly and concisely, why you think the decision is in error. The petition for stay should specify how you will be harmed if the stay is not granted.

Approved by:

/s/ David D. Evans 11 December 2009
Carlsbad Field Office Associate Field Manager Date

Environmental Assessment
Native Invasive Woody Species Mechanical Treatment
Bureau of Land Management - Carlsbad Field Office
NEPA#: DOI-BLM-NM-P020-2009-0982-EA

1. INTRODUCTION

1.1 Purpose and Need for the Proposed Action

The purpose of the Native Invasive Woody Species Treatment Project is to restore and stabilize the ecosystem dynamics of the Upper Pecos River watershed, restore and support habitat requirements for flora and fauna within it, and reduce soil erosion that could eventually contribute to a decline in ecosystem sustainability. The proposed action would serve to meet the goals and objectives as described in the 1988 Carlsbad Resource Management Plan (RMP).

Over time, land management practices caused the rangeland ecosystem of the Upper Pecos River Watershed and the Guadalupe Escarpment to shift from a piñon-juniper woodland and desert grassland with scattered native shrubs to a vegetation community dominated by invasive native shrubs, with a corresponding decrease in the herbaceous component and increase in exposed bare ground. Beginning in the 1880s, excessive livestock stocking rates resulted in an overgrazed range, thereby reducing the fuel necessary to support fire. Settlement brought an increasing concern over the risks and hazards of wildfires resulting in deliberate measures to prevent fire from occurring. The result was reduced fire frequency, intensity, and area burned. The opportunity was created for expansion of the range of juniper (Miller and Rose 1995) and increasing density of juniper stands.

A marked encroachment by invasive native brush species has resulted in a decrease in vegetative biodiversity, a heightened susceptibility to the effects of drought, accelerated erosion, and a decline in the quality of wildlife habitats. Project goals include restoring rangeland ecosystems to more closely match their historical structure, function, diversity and dynamics.

A programmatic environmental assessment (EA), Upper Pecos River Watershed Restoration Project – West (NM-520-07-0367) was prepared in 2007 for aerial herbicide treatment of mesquite, acacia, tarbush and creosote. The EA failed to address treatment of woody species such as juniper. Therefore, a second programmatic EA was written in January of 2009 (NM-520-08-1225) to analyze woody species treatment using aerial herbicidal treatment methods and prescribed fire maintenance. In that EA, several alternatives were also analyzed including treatment by mechanical means, treatment by manual means and a combination of treatment by both mechanical and manual means. The proposed action and decision record for that EA only addressed aerial herbicide treatment and prescribed fire maintenance. This

EA will analyze impacts from woody species treatment projects using mechanical and manual methods.

1.2 Conformance with Land Use Plans

The proposed activity is addressed as part of the 1979 East Roswell Grazing Environmental Impact Statement (EIS). The 1988 Carlsbad RMP has been reviewed and the proposed action is in conformance.

1.3 Relationship to Statutes, Regulations or Other Plans

The proposal to implement mechanical and manual treatments on juniper *(Juniperus spp.)*, cholla *(Cylindropuntia imbricata)* and other targeted species is tiered to the New Mexico Record of Decision dated July 1991, for the Vegetation Treatment on BLM Lands in Thirteen States Final EIS (FEIS) of May 1991, the Upper Pecos River Watershed Restoration - West EA (NM-520-07-0367) and the Native Woody Species Treatment EA (NM-520-08-1225).

This project is consistent with and conforms to the 1994 EIS 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; the New Mexico Standards for Public Land Health and Guidelines for Livestock and Grazing Management (BLM/NM/PL-00-001-1020), the 1979 East Roswell Grazing EIS, the 1988 Carlsbad RMP, , and the Carson-Foley Act of 1968 (P.L. 90-583).

The critical elements subject to requirements specified in statute, regulation, or executive order listed below are either not present or not affected by the proposed action or alternative.

Areas of Critical Environmental Concern
Floodplains
Hazardous/Solid Wastes
Prime/Unique Farmlands
Wild & Scenic Rivers
Wilderness
Wetlands/Riparian

The impact of the proposed action and alternatives to minority or low income populations or communities has been considered and no significant impact is anticipated. These allotments have no river/stream reach as identified in the *2002-2004 State of New Mexico 303(d) List for Assessed River/Stream Reaches Requiring Total Maximum Daily Loads (TMDLs): Final Record of Decision (ROD) for River/Stream Listings.*

2. PROPOSED ACTION AND ALTERNATIVES

2.1 Proposed Action

The Carlsbad Field Office (CFO) of the Bureau of Land Management (BLM) proposes to use mechanical and manual methods or any combination of these methods as a means to reduce the dense monocultures of juniper, cholla and other targeted species such as sacahusista (as deemed crucial) on sites where these species have encroached, or are becoming dominant and out-competing the native desirable shrub and understory vegetation in the western portion of the CFO.

The mechanical treatment method involves reducing the target species, by chaining, grubbing, or other mechanical methods. Mechanical control of the target species would clear the dense brush. The cut material could either be left to lay scattered (allowing decomposition to return nutrients to the soil) or could be removed and stacked in piles. The manual treatment method involves the use of chainsaws and hand tools to clear the treatment area of juniper, cholla or other targeted species. Workers would cut plants at ground level. Tools to be used would include hand saws, axes and chain saws. The cut material could either be left to lay scattered (allowing decomposition to return nutrients to the soil) or could be removed and stacked in piles. In all treatment areas, prescribed fire and hand application of chemicals could be used as a follow up maintenance tool. If site specific situations warrant it, the cut material may also be used as a stabilization material in head cuts or gullies.

By reducing juniper and cholla, overall ecological condition, plant diversity and wildlife habitat is expected to improve. Improved watershed stability in the form of increased ground cover, would decrease wind and water erosion and improve water infiltration. The reduction of these species would free available water and nutrients for the herbaceous plant community. As a result of the increased available moisture and nutrients, herbaceous plants would become re-established. This would serve as an indicator of the ecosystem's recovery and eventual return to its historical structure and function.

The target is the CFO resource area roughly north of the Lincoln National Forest, Guadalupe Ranger District, east of the Sacramento Ranger District, south of the Felix River and west of the Chaves/Eddy county line. Portions of the treatment area are subject to a "checkerboard" effect relevant to surface ownership (see map, Appendix B). The treatment area would occur mostly on public lands.

All follow-up prescribed fires would be conducted under a site specific Prescribed Fire Burn Plan as per the Interagency Prescribed Fire Planning and Implementation Guide and the BLM Supplement to the Interagency Prescribed Fire Planning and Implementation Guide, described in Upper Pecos River Watershed Restoration Project – West EA (NM-520-07-0367).

<u>Mitigation Measures:</u> The treated pastures within the allotments would be deferred from grazing during the growing season (June through September) for one year following treatment. The permitted livestock numbers would not be increased after treatment. The permittees have established rotational grazing systems on their allotments; pastures are allowed seasonal rest periods. Annual monitoring would be conducted to ensure the treated area is not being over utilized and that no noxious weeds have invaded the area. Either

Kuenzler's hedgehog cactussurveys will be conducted within the project boundary by qualified personnel or wildlife biologists will be onsite during treatment to clear area for slash piles. All located Kuenzler's hedgehog cactuswill be temporarily marked with flagging or other similar material before treatments. During mechanical treatments, these cacti will be avoided by at least 50 feet.

2.2 Description of Alternatives

Alternative A: No Action Alternative

No treatment would be conducted to reduce the amount of juniper or cholla in the treatment area. This alternative would result in no change to current activities for the treatment of invasive brush species. Distribution and spread of invasive native species would be governed by natural processes. Under the No Action Alternative, invasive native species would continue to spread, intensifying adverse impacts to the natural environment. Elements of the environment potentially affected include biota (including rare flora and fauna), sedimentation rates, water flows and economies of private and public sectors.

Alternative B: Chemical Treatment

Herbicide would be aerially applied by helicopter or fixed-wing aircraft. The herbicide tebuthiuron (Spike 20P®) would be applied aerially to areas infested with juniper. To control cholla, the herbicide picloram in the form of Tordon 22K® would be aerially applied. The active ingredient in both herbicides would be applied at the manufacturer's recommended rates. Other targeted species, such as sacahuista, would be treated with the appropriate chemical and rate recommended by the manufacturer. All areas treated by herbicide would be rested for at least one growing season following application. Water sources including perennial streams, rivers, playas and riparian areas would be excluded from treatment. Buffer zones would be imposed and no herbicide applications would be made within 100 yards of livestock water developments and within 300 yards of perennial streams, rivers, playas, drainages or riparian zones.

Alternative C: Alternatives Considered But Not Analyzed

1. Biological Treatment - Currently BLM is not aware of any specific effective biological control for juniper other than defoliation by goats. Maintenance control of juniper with goats is not an economically sustainable element for juniper management systems on public lands in Southeast New Mexico. Goats must be carefully managed to prevent the destruction of desirable browse plants. Secondary treatments, such as prescribed burning, individual-plant herbicide treatments, or hand cutting or grubbing may then be necessary to further reduce the densities of live juniper so that a high goat: juniper ratio can be achieved for the number of goats available. No effective biological control for cactus exists. *C. cactorum* prefers to lay its eggs and feed on prickly pear cacti. Other related cacti are not thought to be preferred hosts. Therefore, biological treatments as a primary control for these brush species will not be analyzed.

2. Livestock Exclusion - This alternative was previously analyzed in the 1994 Range Reform EIS. The 1988 RMP determined the public land within the project area as

suitable for livestock grazing. Use of livestock exclusion as a management tool would not result in a decrease of the target shrub species. Therefore, a livestock exclusion alternative will not be analyzed.

3. AFFECTED ENVIRONMENT

Description of the Project Area

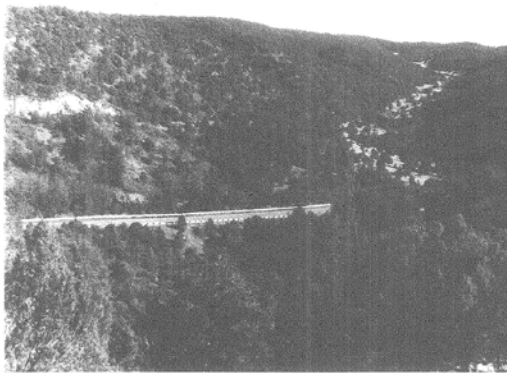
The project area lies within Eddy, Chaves and Otero Counties in Southeast New Mexico bounded roughly on the north by the Lincoln/Chavez County line and the Felix River; on the east by the Eddy/Chaves county line; on the west by the Sacramento Ranger District; and on the south by the Guadalupe Ranger District. The communities of Hope, Elk and Dunken lie within the analysis area. Portions of the treatment area are subject to a "checkerboard" effect relevant to surface ownership (see map, Appendix B).

The topography of the project area, known locally as the Guadalupe Escarpment, is defined by its large sedimentary basins and mountain uplifts. Of these, the most important are the Guadalupe Mountains to the south and west.

The affected environment of the area is generally discussed in the 1988 Carlsbad RMP. The Upper Pecos River Watershed Restoration –West Project EA (NM-520-07-0367) and the Native Invasive Woody Species Treatment EA (NM-520-2008-1225), addresses all affected resources not discussed in detail here. Refer to those EAs (Chapter 3) for complete resource descriptions for Air, Water, Soil, Recreation, Cave-Karst, Visual Resource Management, Vegetation, Invasive, Non-native Species, Wildlife, Threatened or Endangered Species, Range, Environmental Justice and Cultural Resources. Only specific variations to the resource descriptions in EA, NM-520-07-0367 and EA, NM-520-2008-1225 are addressed in this section of this document.

3.1 Vegetation: The project area is potentially a piñon/juniper woodland and grassland mosaic with warm season mid- and short-grass aspect, with an increasingly unbalanced proportion of juniper, cholla and sacahuista throughout the landscape, and in places these species have invaded to the point of dominating the vegetative component. Forb production fluctuates greatly from season to season and year to year. Invasive species such as three-awns, burro grass, snakeweed, mesquite, creosote, catclaw, tarbush and cholla cactus increase as ecological condition decreases. Invasive native species readily encroach upon desirable grassland sites. Roots of the target species are generally more extensive than those of herbaceous species. Some shrubs, such as juniper have deep taproots that allow the plants to tap soil water sources at great depths. Juniper also has a spreading root system. Over time, the plants exploit water sources for extensive areas in the soil surface around the plant. These tactics restrict healthy competition of and by desirable species, consequently altering the surrounding landscape, a once diverse grassland community, into a monoculture. This exploit results in increased bare ground between plants, increasing the likelihood of accelerated soil erosion and runoff. Rephotography in Figures 1 and 2 shows a dramatic, yet common increasing density of juniper over time (Fuchs, E Hollis 2002).

27A. Date: 1900. Credit: Robert Leslie, Harmon Collection, White Oaks Historical Association.
Indian Divide switchback. In 1900 there was a grassy, open stand of scattered Ponderosa Pine, Pinon, and Juniper, with Wavyleaf Oak and Gambel Oak. Ponderosa Pine and many Pinons had no low branches.



27B. Date: August, 1999. Credit: E. Hollis Fuchs.
Pinon and Juniper dominate the site. Ponderosa Pines appear to have increased somewhat, along with Gambel Oak and Wavyleaf Oak. I
tion is about 8,500 feet.

Figure 1 Indian Divide Switchback, NM 1900

Figure 2 Indian Divide Switchback, NM 1999

3.2 Wildlife: The analysis area includes habitat suitable for a variety of wildlife species. Appendix D of this document lists mammals potentially found in the analysis area. A discussion of herptofauna and avian species (including migratory birds) is found in the Upper Pecos River Watershed Restoration Project – West EA (NM-520-07-0367). Executive order #13186 titled "Responsibilities of Federal Agencies to Protect Migratory Birds" signed 1/10/01 requires that the BLM evaluate the effects of federal actions on migratory birds. A migratory bird inventory has not been completed for this area. These higher elevation woodland habitats support a large number of wide-ranging mammals, herpetofauna, and avian species. Mammals include but are not limited to: mule deer, gray fox, collared peccary, bobcat, Myotis spps, desert cottontail, black tailed jack rabbit, mountain lion, kangaroo rat, pocket mice, striped skunk, woodrats and deer mice. 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: curve-billed thrasher, Scott's oriole, black-throated sparrow, phainopepla, gray vireo, and cactus wren. In addition, numerous raptors inhabit the desert and include the great horned owl, burrowing owl, Aplomado falcon, and red-tailed hawk.

The woodland savanna habitat types provides habitat for approximately 151 species of birds, 38 species of mammals and 9 species of fish. Several bird species associated with the piñon-juniper woodlands are the common flicker, ladderbacked woodpecker, acorn woodpecker, piñon jay, scrub jay, mountain chickadee, common bushtit, plain titmouse, white-breasted nuthatch, blue-gray gnatcatcher, gray vireo, rock wren, and Montezuma quail. The blue grama grassland habitat supports such species as scaled quail, roadrunner, western meadowlark, Northern harrier, brown-headed cowbird, vesper sparrow, lark bunting, rufous-

crowned sparrow, and horned lark. In addition, the bald eagle winters throughout the area. The diversity of small mammals provide for an excellent prey base for carnivores such as the coyote, gray fox, bobcat, raccoon, badger, striped skunk, long-tailed weasel, and occasionally black bear and mountain lion. Blue grama grassland mammal species include the spotted ground squirrel, pocket gopher, silky pocket mouse, Ord's kangaroo rat, bannertail kangaroo rat, northern grasshopper mouse, southern plains woodrat, and the pronghorn antelope. Other mammals use the piñon-juniper woodland habitat to some extent. Mule deer occur throughout the Fort Stanton area. During winter, some deer migrate from the higher elevations of the Sierra Blanca Mountains to the Fort Stanton area. Since 1990, a number of Rocky Mountain elk have used the area on a yearlong basis. A list of aquatic insects and reptiles can be found in the Fort Stanton Habitat Management Plan on file at the Roswell Field Office.

3.3 Threatened or Endangered Species

Northern Aplomado falcon, *Falco femoralis septentrionalis*- Endangered (10j)
The aplomado falcon (*Falco femoralis*) once inhabited desert grasslands and coastal prairies from Trans-Pecos and coastal Texas, southern New Mexico, and southeastern Arizona to Chiapas and the northern Yucatan along the gulf coast of Mexico, and along the pacific slope of Central America north of Nicaragua (Howell 1972). The historical distribution map of 1900, contained in the recovery plan for the northern aplomado falcon, indicates the falcon once inhabited the southeastern 1/4 and the western mountains of the Carlsbad Field Office.

The northern aplomado falcon (*Falco femoralis septentrionalis*) was mostly extirpated from the US by 1940 (Hector 1987). Probable causes of their decline include brush encroachment and agricultural development, which have deteriorated much of the desert grasslands and coastal prairies within the former range of the falcon (Hector 1987), and pesticide contamination. Brush encroachment within the portion of CFO in the historic range (Map, P.6-Northern Aplomado Falcon Recovery Plan, 1990), is due to historical overgrazing and wildfire suppression. Based on a lack of population and the deteriorating habitat conditions at the time, the northern aplomado falcon was designated endangered under the Endangered Species Act in March 1986.

On July 26, 2006, a new ruling concerning the northern aplomado falcon was published in the Federal Register (Vol. 71, No. 143, Pg. 42298). “The falcon is being re-established under section 10(j) of the Endangered Species Act of 1973, as amended (Act), and would be classified as a nonessential experimental population (NEP). The geographic boundary of the NEP includes all of New Mexico and Arizona.” The notice also defines the aplomado falcon status on BLM managed lands as “threatened” under the Endangered Species Act for the purposes of Section 9 (Prohibited Acts) and “proposed” for the purposes of Section 7 interagency consultation.

Aplomado falcon habitat is composed of open grasslands that support a variety of small birds, such as meadowlark and lark bunting, along with a variety of rodents and insects. Suitable nesting structures such as trees or sturdy yuccas are also important and within the CFO, soaptree yucca (*Yucca elata*) provides such a structure. Falcons do not build their own

nests and rely on other birds like Swainson's hawks and Chihuahuan ravens to provide them. Breeding usually occurs between March and May with an average clutch size of 2-3 eggs.

The northern alpomodo falcon is endemic to the Guadalupe Mountain grasslands. In September of 2002, the habitat suitability model was released by the New Mexico State University Cooperative Unit. The model identified many areas throughout the CFO as suitable habitat for the aplomado falcon. Primarily, the habitat was centered around Hope, NM, and in the Indian Basin and Bogle flats south of Hope.

A large percentage of the brush control projects conducted within the Upper Pecos River Watershed - West analysis area (NM-520-07-0367) falls within the historical range of the falcon based on the map in the recovery plan. These brush control efforts have returned shrub-dominated habitats to their historic makeup of grasslands with an intermingled brush component. These efforts potentially have improved habitat conditions for reestablishment of the species within the CFO. For a detailed discussion, see Upper Pecos River Watershed Restoration Project – West EA (NM-520-07-0367).

Kuenzler's hedgehog cactus, *Echinocereous fendleri var. kuenzleri* – Endangered
Kuenzler's hedgehog cactus [*Echinocereus fendleri* (Engelmann) Engelmann ex Rümper var. *kuenzleri* (Castetter, Pierce, & Schwerin) L. Benson] is designated endangered under the Endangered Species Act of 1973 (50 CFR 17.12; P.L. 93-205, 87 Stat. 884; 16 U.S.C. 1531 - 1540). The state of New Mexico has designated the cactus as a state endangered species (NM Executive Order 83-85 and New Mexico Endangered Plant Species Act, NMSA 1978, 9-10-10). Collection, private and commercial, appears to be the most imminent threat to Kuenzler's hedgehog cactus. Road construction, habitat development and livestock grazing have also been cited as potentially having impacts on the plant (Fletcher 1985). The Listing Report for the species (USFWS 1979) listed the species as endangered because of impacts from road construction and over collection. It also named 5 potential threats to the species:

1. The present or threatened destruction, modification, or curtailment of its habitat or range, from road construction and maintenance and real estate development.
2. Overutilization for commercial, sporting, scientific, or educational purposes, from over collection by cactus enthusiasts.
3. Disease or predation, from probable trampling by cattle.
4. The inadequacy of existing regulatory mechanisms
5. Other natural or manmade factors affecting its existence

Kuenzler's hedgehog cactus was first listed as a federal endangered species on October 26, 1979 and the recovery plan was drafted in 1985. At the time of the plant's listing, there were less than 250 known plants. The cactus was first discovered in the Sacramento and Capitan Mountains in Otero, Chaves and Lincoln counties. The cactus was found in the Guadalupe Mountains in Eddy County in 1992. As of 1999, 1,611 plants had been located (Chauvin et al. 1999). The 5-year Review Determination of the species by the United States Fish & Wildlife Service (USFWS) in 2005 estimated that there were 3,300 plants observed during surveys. Then, based on the amount of suitable habitat surveyed and difficulty in surveying

the habitat, the review estimated that the entire population could range from 6,600 up to 13,200 plants.

Kuenzler's hedgehog cactus has been found to range from 5,200 feet to 6,900 feet on ridge tops and limestone benches where slopes are less than 5 percent. Habitat for the species is described as occurring on the lower fringes of the piñon - juniper woodland on skeletal soils of limestone outcrop. It is found primarily on gentle, south-facing or nearly flat ridge tops and limestone ledges, in grass and juniper woodland habitats. It is not known from the southern portion of the Sacramento Mountains or limestone hills to the south. The cactus is found on limestone soils in the eastern Guadalupe and eastern Sacramento Mountains, and is found on igneous soils at Fort Stanton but not on limestone soils in the same area (DeBruin 1996). Soil associations were identified in the CFO based on known Kuenzler's cactus locations in the Guadalupe Mountains. Soils conducive for Kuenzler's habitat include Deama-rock outcrop and Ector stony loam soil associations. The Deama soil is a very dark grayish brown of limestone origin, with a weak granular structure, non-plastic, strongly calcareous and moderately alkaline, which occurs in the action area, as do other limestone rock outcrop soil types.

Kuenzler's hedgehog cactus is a long-lived perennial (Benson 1982). The plant grows to 30 cm tall and has stems that are either solitary or few-clustered which support few, thick, angular and often twisted spines. The cactus appears to only reproduce sexually as there is no documentation showing reproduction by tubers, stolons, rhizomes or by fragmentation. It also appears to be incapable of self pollination. The cactus normally flowers in mid May, although it may flower earlier if sufficient moisture occurs. Seed dispersal is primarily by rodents who eat the fruit and also by wind and water. It takes about 4 to 5 years for a plant to reach reproductive capability following germination.

Kuenzler's hedgehog cactus is typically found growing wedged against rocks, within grass clumps or beneath shrub canopies. It has been theorized that this association provides thermal and physical protection to the plant (Knight and Cully 1988 and Chauvin et al. 1999). The New Mexico Natural Heritage Program (NMNHP) conducted surveys on BLM lands adjacent to the Lincoln National Forest boundary from 1998-2000. During the surveys, NMNHP determined that a certain percentage of ground cover and biomass is required for healthy plants. In their study, a 24 percent vegetative ground cover was reported as an average cover surrounding healthy plants (DeBruin 1996). NMNHP conducted research at Fort Stanton, NM and reported that the amount of biomass surrounding a plant correlated to the condition of the plant (DeBruin 1996). The report further surmised that clipping the surrounding grass and other vegetation causes a significant decrease in cactus condition. There has been some conjecture that thermal cover may be important to Kuenzler's cactus, particularly for winter survival, but it is known to occur both in densely and sparsely vegetated habitats. De Bruin (1996) found seedlings and juvenile plants in ground cover ranging from 3% to 38% at Fort Stanton, which is toward the colder, northern end of the cactus' range. She found that mean vegetation cover and health of cactus recruits were correlated, and that drought was the main mortality factor for Kuenzler's cactus. She did not discuss whether the lower mean vegetative cover and poorer cactus health were correlated to drought. In a sample of 60 Kuenzler's cactus plants on BLM land in the Carlsbad area in

2004, 32 were found in conjunction with another type of plant, all but one of the 32 Kuenzler's plants were associated with either grama grass or bunch grasses (BLM unpublished data).

A hypothesis has been presented that suggests the population patterns for Kuenzler's hedgehog cactus and other cacti are cyclic. Populations appear to fluctuate in cycles that last for ten or more years. A possible factor in the cycle is insect larval infestations that seem to occur when the cactus populations become very dense (DeBruin, 1996).

The recovery plan criterion for down listing Kuenzler's hedgehog cactus is "an increase in the numbers of the cactus to approximately 5,000 individuals and maintenance of that population level for a period of 5 consecutive years" (Fletcher 1985). Additional criteria may be found in the Kuenzler's Hedgehog Cactus Recovery Plan in the Project Record Index. In November 2003, Dr. David Wester estimated there to be 4,148 Kuenzler's cactus in the Fort Stanton area alone (USFWS Consultation #2-22-03-F-0078.2). Combined with an estimated 200 plants near Elk (DeBruin 1991) and approximately 200 plants known from the east side of the Guadalupe Mountains, plus additional populations near Hope and Carrizozo, it is likely that there are over 5,000 plants alive.

There are photographs and drawings of Kuenzler's hedgehog cactus available for public use from the New Mexico Department of Natural Resources.

Description of Critical Habitat

Critical habitat has not been designated for Kuenzler's cactus or the northern aplomado falcon.

3.4 Range: In general, an average rating of the range land within this area is eight acres/AUM (Animal Unit Months). In order to support one cow, for one year, about 96 acres are needed. This equals about seven cows per section.

3.6 Cultural Resources: The project falls within the Southeastern New Mexico Archaeological Region. This region contains the following cultural/temporal periods: Paleoindian (ca. 12,000 – 6,200 B.C.), Archaic (ca. 6,200 B.C. – A.D. 500), Ceramic (ca. A.D. 500 – 1540), Protohistoric and Spanish Colonial (ca. A.D. 1400 – 1821), and Mexican and American Historical (ca. A.D. 1822 to early 20th century). Sites representing any or all of these periods are known to occur within the region. A more complete discussion can be found in *Living on the Land: 11,000 Years of Human Adaptation in Southeastern New Mexico; An Overview of Cultural Resources in the Roswell District, Bureau of Land Management* published in 1989 by the U.S. Department of Interior, Bureau of Land Management.

Native American Religious Concerns

The BLM conducts Native American consultation regarding Traditional Cultural Places (TCP) and Sacred Sites during land-use planning and its associated environmental impact review. With regard toTCPs, the BLM has very little knowledge of tribal sacred or

traditional use sites, and these sites may not be apparent to archaeologists performing surveys.

4. ENVIRONMENTAL IMPACTS

This section is a discussion, by relevant resources, of the potential impacts of each alternative. The resources affected by actions described in Section 2 of this assessment that could cause environmental impacts are presented in Chapter 3 and summarized in Table 1-9 (Alternative 1) of the 1991Vegetation Treatment FEIS as well as in Chapter 4 of the Upper Pecos River Watershed Restoration Project – West EA (NM-520-07-0367) and the Native Woody Species Treatment EA (NM-520-08-1225). Impacts to topography, minerals, utilities, communication sites and energy use are not analyzed in the FEIS nor are they relevant to this EA. No impacts have been identified that exceed those addressed in the FEIS. The following are impacts of importance based upon site specific analysis of the proposal.

4.1 Vegetation:

Impacts of the Proposed Action

The overall effect of treating vegetation would be to achieve the desired successional stage, to create a more stratified age structure for wildlife habitat improvement and hazard fuel reduction, to accelerate succession for range management, and to reduce or eliminate populations of undesirable species. Mechanical and manual treatments would potentially impact target and non-target vegetation through compaction by vehicles and foot traffic. However, the adverse impact on non-target species due to mechanical means would be less than the adverse impact of widespread aerial chemical application.

Mitigation Measures: The treated area would be rested (deferred from grazing) as outlined in the affected environment. Following deferment, vegetation within the proposed project area would be grazed by domestic livestock as well as other herbivores such as mule deer, rabbits, rodents and insects.

Impacts of Alternative A: No Action

Movement toward the goals of Desired Plant Community or improvement in public land health would not occur.

Mitigation Measures: None

Impacts of Alternative B: Chemical Treatment

Target and non-target vegetation in treated areas would be directly affected by herbicide application. The degree to which vegetation would be affected would depend on the types of treatment used and the number of acres treated. The overall effect of treating vegetation would be to achieve the desired successional stage, to create a more stratified age structure for wildlife habitat improvement and fuel hazard reduction, to accelerate succession for range management, and to reduce or eliminate populations of undesirable species.

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. 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. Control of some woody plants on some sites may open the community to dominance by annuals (Evans and Young 1985).

Susceptibility of perennial plants to herbicides depends largely on their ability to resprout after aerial shoots are damaged (Table 3-3 of the 1991 Vegetation Treatment FEIS, page 3-23). A more detailed analysis of impacts and mitigation measures may be found in the Upper Pecos River Restoration Project – West EA (NM-520-07-0367).

Mitigation Measures: The treated area would be rested (deferred from grazing) as outlined in the affected environment. Following deferment, vegetation within the proposed project area would be grazed by domestic livestock as well as other herbivores such as mule deer, rabbits, rodents and insects.

4.2 Wildlife:

Impacts of the Proposed Action

Wildlife species depend directly on vegetation, space and cover for habitat and life cycle needs. Therefore, any change in plant community dynamics 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).

Wildlife uses and impacts of management activities in juniper woodlands are poorly documented and little researched has been conducted. Exceptions to research are mule deer and some bird species such as Townsend's solitaire where a reasonably good database exists. Key unresolved questions relative to wildlife in regards to western juniper habitat interactions are: what is the level of importance of the woodlands, what structural components of woodlands are important, what landscape level vegetation patterns are important and what will be the effect of successional changes in these woodlands since they are in transition to different serial stage communities. Management guidelines for species using western juniper woodlands have largely been derived from observation and information gleaned from other vegetation types.

In areas lacking natural occurrences of loafing, thermo regulation, nesting or escape cover, some periodic provision of human-made cover (e.g., brush piles) for terrestrial mammals and avian species, as verified through quantitative vegetation monitoring and determined by CFO biologists, may enhance habitat for some species. Leaving brush scattered throughout the treatment area would provide escape, loafing, nesting, and thermo regulation cover for some smaller species in the area. Natural revegetation after treatment would encourage occupation by native wildlife species. Some species that require thick stands of woody species may vacate the area, however other species that prefer open woodland savannas would occupy the area and treated areas could potentially increase species diversity. Overall, populations of

species that do require thick wood land habitats may not be impacted due to proximity to areas that will not be treated.

Wildlife may be temporarily displaced from the area during the treatment period and for a short time afterwards. Quality, quantity, and availability of forage are expected to increase as areas that are treated revegetate to a natural serial state.

Birds are most vulnerable to mechanical treatments during nesting and fledgling periods. However considering the time of year that treatments would take place, late fall through late winter, nesting and fledging periods would not be impacted. Ground nesting birds can be positively affected by a mechanical treatment by releasing under story grass and shrub species for nesting, escape, and brood rearing.

Mitigation Measures: Appropriate precautions and buffers would be applied for raptor nests (200 meter avoidance), fawning grounds (leaving woody species as appropriate) and other special or unique habitat features.

Impacts of Alternative A: No Action
Wildlife habitat would continue to deteriorate. The area would primarily remain in a declining condition with the areas dominated by shrub species and their associated effects. Shrub species would continue to encroach and increase to the detriment of the native habitat and the species that rely on that habitat. Due to continued encroachment of native invasive vegetation, habitat diversity would be lost and wildlife utilization in the project area would slowly decline.

Mitigation measures: Existing wildlife management strategies would continue.

Impacts of Alternative B: Chemical Treatment

Treatment would be conducted to avoid the nesting season and other times of the year when loss of cover would be critical to wildlife; for example, reproductive periods of native birds. Further, the major reproductive period of native birds often coincides with the closing stages of the monsoon season, that is, mid-August through late September (US Forest Service, 2005). Further impacts and mitigation measures are discussed in detail in the Upper Pecos River Watershed Restoration Project – West EA (NM-520-07-0367) and the Native Woody Species Treatment EA (NM-520-08-1225).

Mitigation Measures: Existing wildlife management strategies would continue. Additional mitigation measures are discussed in the Upper Pecos River Watershed Restoration Project – West EA (NM-520-07-0367).

4.3 Threatened or Endangered Species: Impacts of the Proposed Action

Northern Aplomado falcon, *Falco femoralis septentrionalis* - Threatened

Effects of activities associated with mechanical and manual treatment would be beneficial to this grassland species. Long term effects would include benefits such as an increased amount of available habitat, especially for breeding falcons. Short term effects may also be beneficial to this species as grasslands are restored to their natural state. Prey base species of the Aplomado falcon is expected to increase; this would include insects, and small rodents. Reducing invasive brush species would benefit the Aplomado falcon overall by allowing longer flight corridors for hunting and feeding once prey is acquired.

The fact that falcons are located in intact, productive grasslands with low human activity levels in core population areas in Chihuahua suggests that they have limited tolerance for modification to their habitat. However, by reducing the invasive brush species, plant diversity within the Northern Aplomado falcon habitat and its associated ecological condition is expected to improve.

Mitigation Measures: A 200-meter radial buffer will be imposed to avoid known raptor nests.

Kuenzler's hedgehog cactus, *Echinocereous fendleri var. kuenzleri* – Endangered
The proposed action would be carried out in known Kuenzler's hedgehog cactus habitat, as identified in the CFO Geographic Information System database. Impacts are not expected from the proposed action as conservation measures are in place.

Mitigation Measures:

- A survey for Kuenzler's cactus will be conducted in areas to be treated.
- Kuenzler's locations will be mapped and flagged to be avoided by juniper treatment personnel by a minimum of 50 feet.
- Slash piles would be located a minimum of 50 feet from known or newly found locations of Kuenzler's cactus.

Impacts of Alternative A: No Action
This alternative eliminates the potential impacts from the Proposed Action. Habitat for the Northern Aplomado falcon would continue to deteriorate. The area would primarily remain in a declining condition with possible encroachment of non-native species onto habitat currently occupied by cacti species, increasing detrimental effects to the native habitat and the species that rely on that habitat. Due to continued encroachment of invasive vegetation, habitat diversity would be lost and wildlife utilization in the project area would slowly decline.

Mitigation Measures: None

Impacts of Alternative B: Chemical Treatment
The herbicide application could take place in possible Kuenzler's habitat and would not impact the cactus. Conservation measures have been established for protection of the Kuenzler's hedgehog cactus.

Mitigation Measures: None

4.4 Range:

Impacts of the Proposed Action

Following mechanical and manual treatment or prescribed burning, the treated areas would be rested from livestock grazing to allow the herbaceous 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.

The impact from the rest period could be offset by the improved herbaceous component, both in pounds per acre of production and species composition. As the herbaceous species recover following the mechanical and manual treatment, forage quality would improve. This improvement in production and composition of forage species is expected to lower utilization as additional forage will be available to the same number of livestock. The expected increase in grass production and decrease in shrub densities should result in increased weight gains and reduced labor costs associated with handling livestock over the life of the proposed action.

Mitigation Measures: No livestock grazing would be permitted for one growing season following herbicide application. Proper grazing management needs to be flexible and adaptive in accounting for variables of ecological site, season and year. Livestock numbers would not increase as a result of any of the treatments covered in this analysis. Any net increase in animal unit months (AUMs) 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 animal numbers, these conditions would be verified through quantitative vegetation monitoring over several years.

Impacts of Alternative A: No Action

Livestock grazing potential would suffer due to the continued degradation of the site, including the loss of herbaceous feed.

Mitigation Measures: None

Impacts of Alternative B: Chemical Treatment

Suppressing undesirable or toxic plant species improves forage production. Chemical treatments are generally applied 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, 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.

Mitigation Measures: No livestock grazing would be permitted for one growing season following herbicide application.

4.5 Cultural Resources: Impacts of the Proposed Action

Before authorizing vegetation treatment actions that could affect cultural resources, cultural properties eligible for inclusion in the National Register of Historic Places would be identified and considered through the process outlined in the National Historic Preservation Act of 1966 and implemented in 36 C.F.R. 800 and the BLM 8100 Manual series. Mechanical and manual treatment could damage or disturb archaeological and historic sites. Buried sites discovered by mechanical treatment may also increase the possibility of artifact theft due to site exposure.

Mitigation Measures: In order to avoid damaging sites, cultural inventory surveys would need to be conducted prior to project implementation in order to locate, flag and avoid any potentially eligible sites.

Impacts of Alternative A: No Action

The area would primarily remain in a status quo condition with the areas dominated by shrub species and their present effects on cultural resources.

Mitigation Measures: None

Impacts of Alternative B: Chemical Treatment

It is unlikely that cultural artifacts protected by soil or plant cover would be adversely affected by chemical treatments. Detailed discussions of impacts of the Proposed Action are discussed in detail in Upper Pecos River Watershed Restoration Project – West EA (NM-520-07-0367) and the Native Woody Species Treatment EA (NM-520-08-1225).

Mitigation Measures: None

4.6 Air:

Impacts of the Proposed Action

Short-term air quality disturbance such as dust and exhaust would occur from equipment operation. Drifting smoke from burning slash piles would be a temporary concern.

Mitigation Measures: Smoke and dust would be short-term in nature. Since the CFO is an attainment area, burn permits would be issued only when smoke dispersal conditions were favorable as determined by National Oceanic & Atmospheric Administration. No other mitigation is necessary.

Impacts of Alternative A: No Action

Since no action would take place, a No Action Alternative would negate any impact on air quality.

Mitigation Measures: None

Impacts of Alternative B: Chemical Treatment

The majority of impacts on air quality would be moderate and include noise from aircraft and the potential for minimal chemical drift from aerial application of the herbicide. Impacts

would be temporary. A detailed analysis of impacts and mitigation, including those from any subsequent prescribed fire, is presented in the Upper Pecos River Watershed Restoration Project – West EA (NM-520-07-0367).

Mitigation Measures: A detailed analysis of measures to mitigate impacts on air quality, including those from any subsequent prescribed fire, is presented in the Upper Pecos River Watershed Restoration Project – West EA (NM-520-07-0367).

4.7 Water:

Impacts of the Proposed Action

In the event of a heavy thunderstorm, shortly after treatment and prior to herbaceous vegetative recovery, short-term impacts on surface water runoff in the form of increased sediment load would likely take place should mechanical treatment be imposed. Long term impacts in terms of surface infiltration, runoff, and sediment yield are expected to be positive. As bare ground around targeted woody species is replaced by herbaceous cover, increased root mass, less bare ground, and increased cover to reduce raindrop impact will improve soil permeability and infiltration, while reducing erosion and sediment yield.

Mitigation Measures: Scattering slash would provide cover to reduce the potential of raindrop impact and surface water runoff. Use of rubber-tired equipment rather than cleated steel would reduce soil disturbance, thereby reducing runoff. Given adequate precipitation, natural revegetation would take place within three years, further reducing runoff.

Impacts of Alternative A: No Action

The chance for surface water infiltration would not be improved. In fact, continued encroachment by native invasive species may worsen water infiltration and percolation effects.

Mitigation Measures: None

Impacts of Alternative B: Chemical Treatment

Herbicides applied to the land may enter surface or ground water. Herbicide use also may produce minor increases in stream nutrients, storm flows, and sediment yields.

Surface Water Impacts: Entry of herbicides into surface water is discussed in the risk assessment (Appendix E of the 1991 Vegetation Treatment FEIS). Impacts and mitigation measures are described in the Upper Pecos River Watershed Restoration Project – West EA (NM-520-07-0367).

Table 3-6 of the 1991 Vegetation Treatment FEIS (page 3-45) gives field half-lives for the 19 herbicides proposed for use in the FEIS. Picloram has a soil half-life of 46 days (with a range of reported half-life of 30 to 90 days). These values are considered most representative of the values reported in the literature, as the rate of degradation by natural processes is not only dependent on the herbicide chemistry, but also environmental factors. Information regarding tebuthiuron is discussed in the aforementioned EA.

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

Ground Water Impacts: Impacts to ground water are identical to those described in the Upper Pecos River Watershed Restoration Project – West EA (NM-520-07-0367). Herbicide properties which determine the likelihood of movement with infiltrating water and leaching index are given in Table 3-6 of the 1991 Vegetation Treatment FEIS (page 3-45).

Mitigation Measures: Key factors that would affect peak concentration include the presence of buffers, storm size, herbicide properties, soil properties, and downstream mixing and dilution. Treatment limitations based on conditions such as air and soil temperatures, wind speed and direction, plant phenology, and chance for significant rainfall post-treatment are designed to mitigate impacts to both surface and ground water.

Water sources within the proposed project area are important habitat for wildlife and no chemical treatments are proposed in these areas. The primary practice shall be for riparian areas to be buffered and protected from any impacts. Buffer zones reduce drift impacts on sensitive areas, while wind increases drift impacts. Mitigation requires aerial buffers of 100 feet.

4.8 Soil:

Impacts of the Proposed Action

Vegetation treatments may affect the physical characteristics of soil directly; 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.

In the short term, mechanical and manual treatment could intensify soil compaction, advancing erosion potential. In the long term, there are beneficial effects of the proposed action on soil fertility that would be substantial. The increased organic matter, caused initially by juniper leaves, stems and roots and secondarily by the increased production of grasses and forbs would improve the fertility of the soil.

Mitigation Measures: Scattering slash would reduce the potential of surface water runoff. Use of rubber-tired equipment rather than cleated steel would reduce soil disturbance thereby reducing runoff and erosion potential. Natural revegetation would take place within three years given adequate precipitation.

Impacts of Alternative A: No Action

The chance for soil erosion would not be minimized and surface water infiltration would not be improved.

Mitigation Measures: None

Impacts of Alternative B: Chemical Treatment

Vegetation treatments may affect the physical characteristics of soil directly; 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.

Granular formulations of herbicides such as tebuthiuron release the herbicide into the soil plant root zone with subsequent chemical uptake and absorption by the targeted plants. Management of invasive vegetation by chemical treatment may result in short-term, insignificant increases in surface erosion that would diminish as herbaceous vegetation reoccupies the treated site. The speed of site revegetation and the plant composition of the new vegetation depend on the persistence and selectivity of the herbicide. Table 3-3 of the 1991 Vegetation Treatment FEIS (page 3-23) gives a general description of vegetation susceptibility of herbicides. Picloram in liquid formulation applied on to the foliage of the targeted vegetation, although soil also may be a major receptor for these chemicals, because whether applied aerially or by truck–mounted and backpack units, some of the applied herbicide is deposited onto the soil. Management of invasive vegetation by chemical treatment may result in short-term, insignificant increases in surface erosion that would diminish as herbaceous vegetation reoccupies the treated sites.

A discussion of impacts and mitigation measures regarding soil properties is discussed in the Upper Pecos River Watershed Restoration Project – West EA (NM-520-07-0367).

4.9 Recreation:

Impacts of the Proposed Action

Mechanical and manual treatment would temporarily reduce quality of the recreation experience under this alternative. It is anticipated that improved habitat conditions would result in increased wildlife numbers and additional use by the public for hunting activities.

Mitigation Measures: Affected publics utilizing treatment areas at time of vegetation treatment and prescribed burns would be notified via appropriate channels such as signage and public notices.

Impacts of Alternative A: No Action

The quality of recreation activity (specifically hunting) may be decreased by continued piñon-juniper encroachment.

Impacts of Alternative B: Chemical Treatment

Hunters, hikers and off highway vehicle riders could be adversely affected during treatment of this project. Noise generated from chainsaws and vehicles could impact the recreation experience of these individuals. Access to the treatment areas would be temporarily limited.

Mitigation Measures: Affected publics utilizing treatment areas at time of herbicide application, mechanical thinning and prescribed burns would be notified via appropriate channels such as signage and public notices.

4.10 Cave-Karst:

Impacts of the Proposed Action

Impacts for mechanical and manual treatment include possible disturbance of cave/karst features by heavy equipment or vehicular traffic. Treatment with follow-up prescribed burns could potentially lead to the discovery of previously unknown features.

Mitigation Measures: Reasonable measures to reduce impacts to cave or karst resources would be applied. If cave/karst features are found during vegetation treatment or follow-up prescribed burns, vehicles would not be used within these areas and surface disturbance would be kept to a minimum within these areas.

Impacts of Alternative A: No Action
Due to the complexity of cave/karst morphology and ecology, it is difficult to determine with certainty the impacts of a no action alternative. However, due to the stifling nature of continued encroachment of invasive vegetation, surface water infiltration into karst groundwater systems would not be improved and would possibly be reduced long-term.

Mitigation Measures: None

Impacts of Alternative B: Chemical Treatment
Chemical treatment may increase the likelihood of surface runoff into karst features, such as in the case of unexpected heavy precipitation.

Mitigation Measures: Reasonable measures, such as delineating no chemical treatment zones surrounding known cave and karst features, may be imposed to mitigate impacts to cave or karst resources. In areas of Medium to High cave/karst potential the area would be reviewed by the CFO for presence of cave or karst features.

4.11 Visual Resource Management (VRM):

Impacts of the Proposed Action
A visual impact is any modification in landforms, water bodies, or vegetation or any introduction of structures that disrupt negatively the visual character of the landscape and the harmony of the basic elements (that is, form, line, color, and texture). In brush control treatment areas, visual contrast (quality) and short-term impacts on visual resources would occur. However, based on standard operating procedures and long range plans, the long-term effects would be beneficial. The intensity would depend on the treatment method and the area where it was implemented.

Surface disturbance from mechanical treatment, such as scarring of bare earth, would impact visual quality. The aesthetic and visual quality of the site could be impaired due to the nature of vehicular operations and foot traffic along with the highly visible results of manual treatment. Follow-up prescribed burning would have an effect until the new vegetation emerges and the area “greens up.”

Mitigation Measures: To mitigate potential visual impacts, lines between treated and untreated areas should be irregular with no straight edges - the boundary should appear natural. Scattering slash and hydro-mulching would reduce visual impact of scarring. Use of rubber-tired equipment rather than cleated steel tracks would reduce soil disturbance thereby

reducing impairment to visual quality. Natural re-vegetation would take place within three years given adequate precipitation.

Impacts of Alternative A: No Action
Continued encroachment of invasive vegetation would dominate the landscape and further diminish the visual quality.

Mitigation Measures: None

Impacts of Alternative B: Chemical Treatment

Areas treated with herbicides would contrast with surrounding vegetation for a short period of time.
The proposed action would change the line, form color and texture of the landscape by replacing the juniper cover with grasses and forbs. Long term benefits of treatment would result in restoration of native vegetative species and a more natural environment that would blend in with surrounding landscape of native species, enhancing line, form, color and texture.

Mitigation Measures: Irregular treatment lines would be used to minimize stark contrast between treated and untreated areas.

4.12 Invasive, Non-native Species:
Impacts of the Proposed Action
Invasive and non-native species may be introduced or spread by mechanical or manual treatment if normal care is not taken to clean all equipment being used in and around the project sites.

Mitigation Measures: Appropriate precautions to thoroughly clean wheeled equipment prior to use on the project area would be implemented.

Impacts of Alternative A: No Action
Deterioration of these sites, caused by past livestock management or cyclic drought periods, would lead to increased invasive, non-native shrub composition and decreased grass and forb production.

Mitigation Measures: None

Impacts of Alternative B: Chemical Treatment
As the proposed action is to apply these herbicides by aerial application, no new populations of invasive or non native species should be introduced. Implementation of prescribed fire may introduce invasive species if precautions are not taken to thoroughly clean the equipment prior to use on the project area.

Mitigation Measures: Appropriate precautions to thoroughly clean wheeled equipment prior to use on the project area would be implemented.

4.13 Environmental Justice: Impacts of the Proposed Action

The treatment of invasive brush species in the project area would have no impact on Environmental Justice values. No displacements are anticipated as a result of this project. In accordance with Executive Order 12898 on Environmental Justice, no disproportionately high or adverse human health or environmental impacts upon minority populations is anticipated as a result of the project. The proposed project would not permanently disrupt any existing or proposed neighborhood, or adversely affect community cohesion.

Mitigation Measures: None

Impacts of Alternative A: No Action

There would be no disproportionately high or adverse human health or environmental impacts upon minority populations from the No Action Alternative.

Mitigation Measures: None

Impacts of Alternative B: Chemical Treatment

There would be no disproportionately high or adverse human health or environmental impacts upon minority populations from the No Action Alternative.

Mitigation Measures: None

5. CUMULATIVE IMPACTS

The health, viability and sustainability of grassland resources within the project area has been impacted by land use activities that have occurred over the last 150 years. Impacts from open-range livestock grazing in the last century are still being addressed by BLM. The impacts of such past practices coupled with climatic conditions such as long-term drought periods has encouraged the encroachment of brush species such as juniper, mesquite, salt cedar and other invasive plant species that increase when rangeland conditions deteriorate. The suppression of range fires has also contributed to the increase in brushy species and deterioration of rangeland health. Left untreated, these rangelands cannot revert back to the grassland ecosystems of the past. Resource management actions are needed to improve soil and vegetation resources. Livestock grazing is expected to continue in the project area but allocation of forage resources above current use is not expected to occur.

All authorized activities which occur on federal land can also take place on private and state land. It is expected that additional land treatments would occur on other private and state land through either private funding or through programs administered by the National Resource Conservation Service. The amount of specific treatments that may be proposed on other lands within the project area is not known.

Improving the grass and woodland communities within the project area has the effect of sustaining the viability and health of the ecosystem in the long term, and countering other ongoing and foreseeable impacts generated by activities such as oil and gas development and rights-of-way which tend to fragment habitat.

As pointed out, site conditions differ and are the reason for the development of additional environmental assessments covering proposed vegetation manipulation projects in their respective areas.

Overall, the cumulative impacts associated with the proposed action are not expected to be an additive negative impact to the environment but rather a beneficial additive impact to various resources over the entire landscape, given the mitigation, standard operating procedures and case-by-case project design and implementation. As mentioned, the degree of cumulative impacts may vary based on the size of individual treatments.

The Proposed Action would restore overall rangeland health and watershed functionality consistent with the mission of the Restore New Mexico Initiative. Through the use of mechanical and manual treatments and the subsequent maintenance with prescribed fire, rangelands and watersheds would be restored to more closely match their historical structure, function, diversity and dynamics.

The results of the proposed action would change the plant and animal communities of the treatment area. The proposed action would result in beneficial effects to the soil, water, and animal life. The treatment of a small area as proposed would not affect the environment as a whole, but effects would be site specific.

In general, long term vegetation and soil health would benefit the grassland ecosystem. Wildlife species dependent on this habitat type, custom and culture would be sustainable from enhanced rangeland conditions. Other land use impacts would be buffered, or balanced with grassland restoration efforts. Sustaining the projects would require monitoring efforts to detect appropriate livestock utilization levels, modification of future projects to reach objectives, and other resource use restrictions as needed to ensure the longevity of the restoration efforts.

6. CONSULTATION AND COORDINATION

In 2008, the USFWS concurred with BLM's determination that the use of Tebuthiuron to treat native invasive woody species within portions of Eddy, Chaves, Otero, and Lincoln Counties, New Mexico "may affect, but is not likely to adversely affect" the Kuenzler's hedgehog cactus and northern aplomado falcon (Consultation #22420-2009-I-006). In 2009, the USFWS concurred with BLM's determination that the use of mechanical means to treat native invasive woody species within portions of Eddy, and Chaves Counties, New Mexico "may affect, but is not likely to adversely affect" the Kuenzler's hedgehog cactus and northern aplomado falcon (Consultation #22420-2010-I-0011). The following BLM-CFO staff members were consulted and their comments included in regard to the proposed action.

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9. APPENDICES

APPENDIX A. Project Area Map

APPENDIX B. Special Management Areas & Hillshade Map

APPENDIX C. Partial List of Flora of Upper Pecos River Watershed – West

APPENDIX D. Partial List of Mammals of Upper Pecos River Watershed - West

APPENDIX A
Project Area Map
Upper Pecos River Watershed Restoration – West

On File at the BLM-CFO, Carlsbad, NM

APPENDIX B
Special Management Areas & Hillshade Map
Upper Pecos River Watershed Restoration – West
On File at the BLM-CFO, Carlsbad, NM

APPENDIX C

Partial List of Potential Plant Communities of Upper Pecos River – West Project Area

I. Rocky slopes (Limestone Hills); shallow rocky soils, much of ground cover is rock although there are pockets of deeper soils.

Grasses

Hairy grama	*Bouteloua hirsuta*
Black grama	*Bouteloua eriopoda*
Sideoats grama	*Bouteloua curtipendula*
Green sprangletop	*Leptochloa dubia*
Plains lovegrass	*Eragrostis intermedia*
Curlyleaf muhly	*Muhlenbergia setifolia*

Shrubs

Spicebush	*Aloysia wrightii*
Wavyleaf oak	*Quercus undulata*
Sacahuista	*Nolina microcarpa*
Algerita	*Berberis trifoliolata*
Mountain mahogany	*Cercocarpus montanus*

Forbs

Mariola	*Partenium incanum*
Common goldeneye	*Viguiera stenoloba*
Wild buckwheat	*Eriogonum harvardii*
Wooly Indianwheat	*Plantago patagonia*
Fetid dogweed	*Dyssodia papposa*
Twin-leaf senna	*Cassia bauhinoides*
Indian paintbrush	*Castilleja latebracteata*
Greenthread (Hopi tea)	*Thelesperma longipes*

II. Canyon bottoms - rocky canyon but with deeper loamy floodplains.

Grasses

Sideoats grama	*Bouteloua curtipendula*
Giant sacaton	*Sporobolus giganteus*
Indiangrass	*Sorgastrum nutans*
Switchgrass	*Panicum virgatum*
Silver bluestem	*Bothriochloa saccaroides*
Cane bluestem	*Bothriochloa barbinoides*
Little bluestem	*Schizachyrium scoparium*

Shrubs

New Mexico walnut	*Juglans microcarpa*
Desert willow	*Chilopsis linearis*
Desert hackberry	*Celtis reticulate*
Apacheplume	*Fallugia paradoxa* (vine)
Litteleaf sumac	*Rhus microphylla*
Skunkbush sumac	*Rhus trilobata*
Yerba de Pasmo	*Baccahris pteronoides*
Bricklebush	*Brickellia spp.*
Wavyleaf oak	*Quercus undulata*
Virgins' bower	*Clematis filifera* (vine)

Forbs

Flannel mullin	*Verbascum thapsus*
Wooly loco	*Astragalus mollissimus*
Threadleaf groundsel	*Senecio longilobus*
Whorled milkweed	*Asclepias subverticillata*
Thistle	*Cirsium spp.*
Verbena	*Verbena neomexicana*

III. Grassy flats, deeper loamy soil on floodplains.

Grasses

Blue grama	*Bouteloua gracilis*
Sideoats grama	*Bouteloua curtipendula*
Tobosa	*Hilaria mutica*
Vine mesquite	*Panicum obtusum*
Sand dropseed	*Sporobolus cryptandrus*
Black grama	*Bouteloua eriopoda*
Plains bristlegrass	*Setaria leucopila*

Shrubs (Few shrubs, usually widely scattered)

Soaptree yucca	*Yucca elata*
Torrey yucca	*Yucca torreyi*
Littleleaf sumac	*Rhus microphylla*
Pricklypear	*Opuntia engelmannii*
Apache plume	*Fallugia paradoxa*
Winterfat	*Eurotia lanata*

Forbs

Verbena	*Verbena neomexicana*
Desert holly	*Perezia nana*
Globemallow	*Sphaeralcea coccinea*
Doveweed	*Croton texensis*
Bladderpod	*Lesquerella fendlerii*
Wooly loco	*Astragalus mollissimus*

Thistles	*Cirsium spp.*
Annual sunflower	*Helianthus annus*

Source: Susan Britt, Range Specialist, Bureau of Land Management, Carlsbad Field Office

APPENDIX D
Partial List of Fauna of Upper Pecos River Watershed - West

Common Name	Scientific Name	Common Name	Scientific Name
Pallid bat	*Antrozous pallidus*	Southern plains woodrat	*Neotoma micropus*
Townsend's big-eared bat	*Corynorhinus townsendii*	Hispid cotton rat	*Sigmodon hispidus*
Big brown bat	*Eptesicus fuscus*	Crawford's desert shrew	*Notiosorex crawfordi*
Silver-haired bat	*Lasionycteris noctivagans*	Jones's pocket gopher	*Geomys knoxjonesi*
Hoary bat	*Lasiurus cinereus*	Yellow-faced pocket gopher	*Cratogeomys castanops*
Western small-footed myotis	*Myotis ciliolabrum*	Mexican ground squirrel	*Spermophilus mexicanus*
Fringed myotis	*Myotis thysanodes*	Spotted ground squirrel	*Spermophilus spilosoma*
Cave myotis	*Myotis velifer*	Thirteen-lined ground squirrel	*Spermophilus tridecemlineatus*
Long-legged myotis	*Myotis volans*	Rock squirrel	*Spermophilus variegatus*
Yuma myotis	*Myotis yumanensis*	Black-tailed prairie dog	*Cynomys ludovicianus*
Big free-tailed bat	*Nyctinomops macrotis*	Black-tailed jackrabbit	*Lepus californicus*
Western pipistrelle	*Pipistrellus hesperus*	Desert cottontail	*Sylvilagus audubonii*
Brazilian free-tailed bat	*Tadarida brasiliensis*	North American porcupine	*Erethizon dorsatum*
Plains pocket mouse	*Perognathus flavescens*	Northern raccoon	*Procyon lotor*
Silky pocket mouse	*Perognathus flavus*	Ringtail	*Bassariscus astutus*
Merriam's pocket mouse	*Perognathus merriami*	Striped skunk	*Mephitis mephitis*
Hispid pocket mouse	*Chaetodipus hispidus*	White-backed hog-nosed skunk	*Conepatus leuconotus*
House mouse	*Mus musculus*	Western spotted skunk	*Spilogale gracilis*
Northern grasshopper mouse	*Onychomys leucogaster*	Long-tailed weasel	*Mustela frenata*
Mearn's grasshopper mouse	*Onychomys arenicola*	American badger	*Taxidea taxus*
Cactus mouse	*Peromyscus eremicus*	Coyote	*Canis latrans*
White-footed mouse	*Peromyscus leucopus*	Common gray fox	*Urocyon cinereoargenteus*
Deer mouse	*Peromyscus maniculatus*	Swift fox	*Vulpes velox*
Western harvest mouse	*Reithrodontomys megalotis*	Mountain lion	*Felis concolor*
Plains harvest mouse	*Reithrodontomys montanus*	Bobcat	*Lynx rufus*
Merriam's kangaroo rat	*Dipodomys merriami*	Collared peccary	*Pecari tajacu*
Ord's kangaroo rat	*Dipodomys ordii*	Mule deer	*Odocoileus hemionus*
Banner-tailed kangaroo rat	*Dipodomys spectabilis*		
Eastern white-throated woodrat	*Neotoma leucodon*		
Source: Frey, J.K. 2004. Taxonomy and distribution of the mammals of New Mexico: an annotated checklist. Occasional Papers, Museum, Texas Tech University 240: 1-32.			