North Lincoln Grassland Restoration
DOI-BLM-NM-P010-2009-059-EA
Decision Record

The Bureau of Land Management received one protest to the finding of no significant impact (FONSI) and Proposed Decision. BLM has reviewed the protest and considered the comments contained in that protest. BLM made no changes in this environmental assessment

The protest states the project may impact potential or occupied habitat of the Lesser Prairie-Chicken and is concerned about impacts of herbicide application on these species, both in terms of direct toxic impacts, but also harm from non-target kill or reduction of shinnery oak habitat. BLM disagrees and notes the authors of the protest have access to lesser prairie-chicken data from BLM, the New Mexico Department of Game & Fish and the New Mexico Natural Heritage program. This data show the project area is contains no potential habitat nor is it near occupied chicken habitat.

The protest states BLM fails to disclose the environmental and human health harms from tebuthiuron use. BLM disagrees. Appendix A of this EA includes the label information for the chemicals proposed for use as well as the MSDS sheets for each chemical. This information includes both the environmental and human health information. In addition, Chapter 4 of the Vegetation Treatments Using Herbicides on BLM Lands in Seventeen Western States Final Programmatic EIS includes a discussion of Human Health and Safety (pps 4-174 through 4-197). Appendix B of the PEIS is the Human Health Risk Assessment. Therefore, BLM believes it has disclosed this information.

The protest states it is concerned by the proposed application rate of 0.75 pounds of active ingredient per acre in the proposal because the rate is more than twice the rate proposed just two years ago for treating shinnery oak. BLM notes the proposed application rate is well within the label prescription for the target species (acacia catclaw) which does not occur in conjunction with shinnery-oak. BLM also notes the Roswell Field Office has not proposed to treat shinnery-oak with tebuthiuron since 1994.

The protest states that BLM failed to consider an important aspect of the problem because it did not consider whether leaving woody brush, such as catclaw acacia and creosote, would actually benefit the allotments in the project area and supports this argument with the declaration of Dr. Walter G. Whitford. BLM disagrees and maintains it considered the desirability of woody brush in prior decisions. This EA is in conformance with and tiered to the 1997 Roswell Resource Management Plan which contains a discussion of vegetation management. This EA also sets thresholds for treatment of target species in the proposed action. In addition, this EA's no action alternative considered the effects of leaving woody brush. While the opinion of Dr. Whitford commands respect, the Interior Board of Land Appeals has held that a difference of opinion cannot overcome the reasoned opinions of BLM's technical staff. Further, BLM has monitoring data showing grass species replacing brush species after treatment described in the proposed action.

The protest cites 40 C.F.R. § 1502.23 and states the National Environmental Policy Act (NEPA) requires a "cost-benefit analysis" if it is "relevant to the choice among environmentally different alternatives being considered." The protest goes on to state BLM has itself previously stated that "[l]and treatments proposed for livestock forage improvement will be subject to a cost benefit analysis to ensure total benefits gained will equal or exceed the cost of the treatments. The economic analysis will identify the most economical treatment practice." *Record of*

Decision, Vegetation Treatment on BLM Lands in Thirteen Western States (July, 1991). BLM notes the purpose of the EA is not tied to improving livestock forage nor is the EA tiered to the 1991 Vegetation Treatment EIS. Instead the EA conforms with and is tiered to the 2007 Vegetation Treatments Using Herbicides on BLM Lands in Seventeen Western States Final Programmatic EIS (2007 Veg Treatment PEIS). This newer PEIS does not require a cost-benefit analysis.

The National Environmental Policy Act (NEPA) itself does not require a cost-benefit analysis. The citation of 40 C.F.R. § 1502.23 refers cost-benefit analysis in the preparation of an environmental impact statement (EIS) and, since there is a finding of no significant impact, preparation of an EIS is not necessary. Therefore, a cost-benefit analysis is not required.

The protest states the EA must discuss the cumulative impacts from land uses such as oil and gas development, livestock grazing, and off-road vehicle use, given the purpose and need for this project. BLM disagrees. The cumulative impacts of the issues listed in the protest were analyzed in the 1997 Roswell Proposed RMP/Final EIS. At this time there are no specific proposals involving these proposals within the project area and the analyses contained in the Proposed RMP/Final EIS is still valid. Therefore, BLM believes it has met its obligations to discuss cumulative impacts at the appropriate level in this EA.

The protest states the EA does not consider long-term reduction or elimination of cattle grazing from these allotments as a way to mitigate proliferation of woody shrubs. BLM disagrees. In this EA BLM considered a no grazing alternative but did not analyze its impacts. BLM also considered a no grazing alternative in the development of the 1997 Roswell RMP but did not analyze the impacts of this alternative. There reasons for doing so can be found in the 1994 Roswell Draft RMP/EIS. BLM notes the 1997 Roswell RMPA states the allotments in the project area are suitable for livestock grazing. BLM also analyzed a no grazing alternative in the 1994 Range Reform EIS. Resource conditions within the project area do not warrant prohibition of livestock grazing.

The protest states the EA did not consider encouragement of prairie dog colony expansion or the restoration of prairie dogs as a means of controlling shrub proliferation. BLM disagrees. The EA considered biological control of shrubs but did not analyze the impacts of this alternative. Given the scale of treatment needed within the field office, biological control methods would be ineffective.

The protest states an EIS should be developed because an EIS would allow for closer scrutiny of the native plant community restoration issue in the Roswell Field Office. BLM disagrees and believes the public has been afforded opportunity for review. The 1997 Roswell RMP discusses vegetation management as a whole for the field office and describes the various desired plant communities (DPCs) that are the management goal. The 2007 Veg Treatment PEIS discusses using the chemicals described in the proposed action. This EA discusses the impacts of proposed treatment on areas in common drainages, similar soils similar topography, and similar habitats. Offering the proposed decision of this EA for public review and protest affords the public the opportunity to scrutinize BLM's proposed plans.

The protest states BLM inappropriately limits its analysis to the analysis area and does not consider endangered species which may occasionally visit the project area. BLM disagrees. As stated previously, the EA conforms with and is tiered to the 2007 Veg Treatment PEIS. The record of decision (ROD) for the PEIS includes a biological opinion from the US Fish & Wildlife Service (FWS). The biological opinion contains standard operating procedures (SOPs) and

mitigation measures, which are, in turn, included in the ROD. Because this EA is tiered to the 2007 Veg Treatment PEIS, the SOPs and mitigation measure of the PEIS, the SOPS and mitigation measures are incorporated into this EA. Among the SOPs is a requirement to survey for threatened or endangered species prior to treating a particular area.

The protest states BLM must consult at the site-specific level; it cannot rely on programmatic consultation and a new consultation is required for this project. BLM disagrees. In the absence of designated critical habitat or evidence of more than transitory use of an area by a listed species, BLM is not compelled to consult with FWS under the Endangered Species Act. The project area contains no designated critical habitat nor does the protest offer any information that BLM has made an error. As stated above, a proposed area would be surveyed for listed species prior to treatment.

The protest repeats its statement that herbicide applications are being considered for RFO lands adjacent to Bitter Lake NWR and critical habitat is being considered for four species that inhabit the refuge (the Roswell Springsnail, Koster's Springsnail, Noel's amphipod and Pecos assiminea). BLM disagrees. This EA does not propose herbicide treatments near the refuge nor does this EA propose to treat proposed critical habitat for these or any other species.

The protest states BLM violated Section 7 of the ESA by failing to use the best scientific information currently available and relied on information from the now-outdated 1997 consultation conducted for the Roswell RMP. BLM disagrees. The consultations cited in the protest and the EA (Cons. #2-22-96-F-102, Cons. #22420-2006-I-0144, and Cons. #22420-2007-TA-0033) are evidence that BLM has not relied on internal review. The consultation numbers are assigned by FWS, not BLM, and the year of the consultation is included in the consultation number. As conditions have changed or new species have been listed, BLM has returned to FWS in consultation process.

The protest states BLM has violated the Federal Land Policy and Management Act (FLPMA) multiple use provision by favoring short-term livestock grazing goals while sacrificing long-term ecosystem health needs. BLM disagrees. The EA states:

> "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 (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 increases in animal numbers."

As stated previously, the purpose of the proposed action is to meet the goals and objectives of the desired plant community as described in the 1997 Roswell RMP.

The protest states BLM has violated FLPMA's undue and unnecessary degradation provision by failing to look at viable alternatives through a too narrowly tailored EA. BLM disagrees. BLM contends the EA is not narrowly tailored and analyzes an adequate range of alternatives. BLM points out the purpose of the project is to meet the goals and objectives of the desired plant communities (DPCs) as described in the 1997 Roswell RMP. The proposed action in this EA describes the methods to be used to accomplish those goals and objectives. These methods include a combination of herbicide application, manual/mechanical methods, and the application of prescribed fire. The EA also analyzed a mechanical only treatment alternative, a manual only treatment alternative, and a no action alternative. In addition to these four alternatives there are

three alternatives considered but not analyzed – biological treatment, treatment with other chemicals, and a no grazing alternative.

The protest states this project violates the 1997 Roswell RMP because the proposed action includes the following statement:

> "The requirement that no new treatments completed adjacent to an existing treatment until five years have passed (see page 33, 1997 Roswell RMP) would be dropped in order to offer more management flexibility on a landscape and watershed scale."

The protest continues by stating "RFO will need to amend the 1997 RMP if it wants to "drop" a requirement as significant as this." Amending the 1997 Roswell RMP is precisely the purpose of including this statement in the proposed action of this EA. Amending the RMP with an EA such as this one is permissible if the EA concludes with a finding of no significant impact (FONSI). A FONSI can be reached if the mitigation measures included in the EA reduce the expected impacts to a level of insignificant. BLM believes this EA has accomplished that task by the mitigation measures built into the proposed action, the mitigation measures described in the 1997 Roswell RMP, and the mitigation measures as well as the SOPs of the 2007 Veg Treatment PEIS.

Decision: It is my decision to approve the North Lincoln Grassland Restoration project as described in the Proposed Action in the attached environmental assessment (DOI-BLM-NM-P010-2009-059-EA). The mitigation measures identified in the attached EA along with specific project design features relative to vegetation treatments on public lands have been formulated into stipulations. This decision incorporates, by reference, those stipulations identified in the attached Environmental Assessment.

Rationale for Decision: Approval of the Proposed Action is the most economical and environmentally acceptable method of treating vegetation to restore native grasslands in field office area. Consequently, watershed functions, soil stabilization, wildlife habitat and livestock management will be enhanced. This action will authorize vegetation treatments described in the Proposed Action.

The Proposed Action is in conformance with the Roswell Resource Management Plan and the Fire and Fuels Management Plan Amendment for Public Lands in New Mexico and Texas. The treatments will be conducted when the windows are appropriate to safely meet treatment objectives.

If you wish to appeal this decision, you are allowed 30 days from receipt of this notice within which to file an appeal for the purpose of a hearing before the Interior Board of Land Appeals, and to petition for stay of the decision pending final determination on the appeal (43 CFR 4.21 and 4.410). 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 and petition for stay should be filed with the Field Manager, Bureau of Land Management, 2909 West 2nd, Roswell, NM 88201. 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.

_____ _____

Brad Pendley Date
Assistant Field Manager, Resources

North Lincoln Grassland Restoration Project
DOI-BLM-NM-P010-2009-059-EA

FINDING OF NO SIGNIFICANT IMPACT: I have reviewed this environmental assessment including the explanation and resolution of environmental impacts. I have determined the proposed action would not have significant impact on the human environment because the mitigation measures that will be applied during treatment. Therefore, preparation of an Environmental Impact Statement (EIS) is not required.

Rationale for Recommendations: The proposed action would not result in any undue or unnecessary environmental degradation. The proposed action would meet the objectives of the Roswell Resource Management Plan.

/s/J H Parman 4/29/09

J H Parman Date
Acting Assistant Field Office Manager, Resources

Proposed Decision: It is my decision to approve the North Lincoln Grassland Restoration Project as described in the Proposed Action in the attached environmental assessment. The mitigation measures identified in the attached EA (section IV, E. Mitigation Measures) along with specific project design features relative to vegetative treatments on public land have been formulated into stipulations. This decision incorporates, by reference, those stipulations identified in the attached Environmental Assessment.

Rationale for Decision: Approval of the Proposed Action is the most economical and environmentally acceptable method of restoring the desired desert grassland communities, reducing dead and decadent fuel loadings, and reducing desert brush encroachment in the North Lincoln Grassland Restoration Project area. Consequently, watershed functions, soil stabilization, wildlife habitat and livestock management will be improved. This action will authorize treatment of public land by the use of prescribed fire, mechanical methods, manual methods, and/or herbicides in the project area for the purpose of meeting specific desired plant community objectives and improving vegetative composition for rangeland health considerations. The proposed action is limited to sites where targeted brush species have exceeded the threshold of desired density and composition. Floodplains, as well as wetlands and riparian zones would not be treated and would be buffered out of treatment areas.

The Proposed Action is in conformance with the Roswell Resource Management Plan and the Fire and Fuels Management Plan Amendment for Public Lands in New Mexico and Texas. The treatments will be conducted when the windows are appropriate to safely meet treatment objectives. These types of treatments are expected to benefit many wildlife species, as well as restore and promote watershed functionality.

If you wish to protest this proposed decision, you are allowed 15 days from receipt of this notice within which to file a protest with the Field Manager, Bureau of Land Management, 2909 West 2nd, Roswell, NM 88201. 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 15 days

within which to file an appeal for the purpose of a hearing before the Interior Board of Land Appeals, and to petition for stay of the decision pending final decision.

Bureau of Land Management, Roswell Field Office
Environmental Assessment Checklist, DOI-BLM-NM-P010-2009-59-EA

Resources	Not Present on Site	No Impacts	May Be Impacts	Mitigation Included	BLM Reviewer	Date
Air Quality			X	X		
Soil			X	X		
Watershed Hydrology			X	X		
Floodplains	X				/s/ Michael McGee	2/23/09
Water Quality - Surface			X	X	SWA Spec/Hydro.	
Water Quality - Ground			X	X	/s/ Michael McGee Geologist/Hydrologist	2/23/09
Cultural Resources			X	X	/s/Rebecca L. Hill	12Feb2009
Native American Religious Concerns			X	X		
Paleontology		X			Archaeologist	
Areas of Critical Environmental Concern		X			/s/J H Parman Plan & Env. Coord.	2/24/09
Farmlands, Prime or Unique		X				2/18/09
Rights-of-Way		X			Realty /s/ Sanderford	
Invasive, Non-native Species			X	X		2/18/09
Vegetation			X	X	*/s/ Joseph M. Navarro*	
Livestock Grazing			X	X	Range Mgmt. Spec.	
Wastes, Hazardous or Solid					HMS/ EPS	
Threatened or Endangered Species	X	X				
Special Status Species			X	X		
Wildlife			X	X	/s/ D Baggao	2/20/09
Wetlands/Riparian Zones			X	X	Biologist	
Wild and Scenic Rivers	X					
Wilderness	X					
Recreation		X			/s/ Bill Murry	2/3/09
Visual Resources			X			
Cave/Karst		X			Outdoor Rec. Plnr.	
Environmental Justice						
Public Health and Safety					Env .Prot. Spec.	
Solid Mineral Resources		X			/s/ Jerry Dutchover Geo/SPS	02/12/09
Fluid Mineral Resources		X			/s/ John S. Simitz Geologist	03/2/09

Environmental Analysis

North Lincoln Grassland Restoration Project

DOI-BLM-NM-P010-2009-59-EA

Bureau of Land Management
Roswell Field Office
Roswell, New Mexico

March 2009

Environmental Analysis
North Lincoln Grassland Restoration Project

DOI-BLM-NM-P010-2009-59-EA

Bureau of Land Management
Roswell Field Office
Roswell, New Mexico

I. INTRODUCTION

Purpose and Need for the Proposed Action

The purpose of the North Lincoln Grassland Restoration Project is to meet the goals and objectives of the desired plant community as described in the 1997 Roswell Resource Management Plan. The desired plant community would provide for the stabilization of both the biotic and hydrologic components of the watershed, restore and support habitat requirements for flora and fauna within the area and serve to reduce hazardous fuel loads that could eventually contribute to an uncontrollable catastrophic wild land fire event.

Within portions of the North Lincoln Grassland Project area, the vegetative composition has shifted from a desert grassland dominated community, with scattered shrubs, to a shrub dominated landscape characterized by a lack of herbaceous ground cover and an increase in bare ground. The increase in shrubs has resulted in an increase in dead and down fuel loadings, as well as a decrease in the values of an under-story component. This vegetative modification has a negative affect on the watersheds ability to withstand periodic drought events, accelerated erosion impacts, sustain a healthy biodiversity and ability to provide for quality habitat.

This environmental assessment would analyze impacts associated with various methods and techniques available for meeting the intended objectives of this action within the project area (see map), 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.

Conformance with Land Use Plans: The proposed activity is addressed as part of the Roswell Resource Management Plan (October, 1997).

Relationship to Statues, Regulations or Other Plans: The proposal to implement a vegetation treatments on mesquite *(Prosopis glandulosa* and *P. jugans*), creosote *(Larrea tridentata*), cholla (*Opuntia imbricata),* catclaw acacia *(Acacia* spp.) and juniper (*Juniperus sp*.) is consistent with and tiered to the 2007 Vegetation Treatments Using Herbicides on BLM Lands in Seventeen Western States Final Programmatic EIS; 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).

II. PROPOSED ACTION AND ALTERNATIVES

A. Proposed Action

The proposed treatment area is located in western Chaves County, northeastern Lincoln County, and southwest De Baca County, New Mexico (see attached map). Acres proposed for treatment in the North Lincoln Grassland Restoration Project can be found in Table 1.

The goal of the proposed action is to restore overall rangeland health and watershed functionality through the use of chemical, prescribed fire, and mechanical treatments in those areas where the vegetative composition and production levels are no longer meeting desired plant community objectives. To accomplish this goal, the proposed action would concentrate treatments on areas that possess one or more of the following characteristics:

1. the vegetative community is at a level of 60 percent or greater departure from potential for the site based on monitoring data or invasive plants fall into the Moderate or greater (Moderate to Extreme and Extreme) categories of Rangeland Health Assessments (RHAs),
2. the mesquite component of shrubs meets or exceeds one-third of the total percent of shrub cover within an ecological site,
3. the amount of cholla falls into the Moderate category or greater of an (RHA) for invasive plants,
4. the catclaw acacia component of shrubs meets or exceeds 20 percent of the vegetative canopy
5. the creosote bush component of shrubs meets or exceeds 20 percent of the vegetative canopy,
6. the amount of juniper meets or exceeds 50 percent of the total woody component for the ecological site,
7. the specific upland community is not currently meeting one or more rangeland health standards,
8. the treatment would have no negative impact on non-target plant or animal components of the community.

Table 1. Ownership Acres Within the North Lincoln Grassland Restoration Project

Acres Within North Lincoln (all owners)	Acres of Public Land Within North Lincoln	Percent of Field Office Public Land
817,000	294,000	20%

To reduce catclaw acacia within the project area, herbicide treatment would consist of the application of pelletized tebuthiuron or an approved alternate herbicide by aerial application. Application rates for the herbicide would be 0.75 pounds of active ingredient per acre of tebuthiuron. See Appendix A for the label information and appropriate application requirements for tebuthiuron. Application of the herbicide would occur between the first of June and the end of following February; avoiding the nesting season for local quail *(Callipepla* spp).

To reduce creosote within the project area, herbicide treatment would consist of the application of pelletized tebuthiuron or an approved alternate herbicide by aerial

application. Application rates for the herbicide would be 0.5 pounds of active ingredient per acre of tebuthiuron. See Appendix A. for the label information and appropriate application requirements for tebuthiuron. Application of the herbicide would occur between the first of June and the end of following February; avoiding the nesting season for local quail.

Where catclaw acacia and creosote occur together, the higher of the two application rates would be used for effective control. Where either species occur alone, the respective application rates would be used.

To reduce mesquite within the project area, herbicide treatments would consist of an application of triclopyr and clopyralid or an approved alternate herbicide by aerial application. The liquid herbicides triclopyr (Reclaim) and clopyralid (Remedy) would be applied at a rate of about 0.25 pound of active ingredient each per acre to the areas that are dominated by mesquite or meet the criteria listed above. See Appendix A. for label information and appropriate application requirements for triclopyr and clopyralid. The herbicides would be aerially applied in spring and early summer (April through July). The occurrence of mesquite in the project area does not overlap the occurrences of other target species. Therefore, triclopyr and clopyralid would be applied at the above rate to reduce only mesquite and not other target species.

To reduce the amount of cholla within the project area, a combination of mechanical and prescribed fire treatments would be used.

To reduce the amount of juniper within the project area, a combination of chemical, mechanical, and prescribed fire treatments would be used. Herbicide treatments would be hand application of herbicide by either injection into individual trees or scattering pelletized herbicide under individual trees. Injection would apply glyphosate or imazapyr or other approved herbicide. The pelletized herbicide would be tebuthiuron or other approved herbicide. See Appendix A. for the label information and appropriate application requirements for glyphosate, imazapyr, and tebuthiuron.

The following measures would be applied to all aerial herbicide applications within the project area:

a. Irregular boundaries for maximizing edge effect would be incorporated into all methods of treatment. Undisturbed islands of natural vegetation would be left, where appropriate, to minimize negative impacts to wildlife. Additional islands of untreated vegetation would be left as needed to create or maintain the mosaic pattern that provides suitable habitat for such species as scaled quail and loggerhead shrike. The leave out areas would be equal to or greater than 15% of the total proposed treatment area.
b. All livestock would be removed from treated pastures prior to aerial spraying or ground applications involving foliar spray. Livestock should be removed after the first 1/2 inch of moisture following pellet treatment. Herbicide label requirements would be met prior to allowing livestock grazing to resume. Growing season rest for a minimum of two consecutive growing seasons after treatment will be required, unless earlier grazing use or a longer deferment is needed to make progress towards meeting the vegetative standard. The growing season usually begins at the onset of the summer rains (July 1) and continues until first frost (October 31). Livestock numbers would not increase as a result of treatment.

c. Livestock grazing management, using the best management practices associated with the New Mexico Guidelines, would follow all treatments to ensure that the objectives for Healthy Public Lands are not compromised.
d. Floodplains as well as wetlands and riparian zones would not be treated and would be buffered out of treatment areas. All buffers would conform to the guidance of the 2007 Vegetation Treatments on BLM Lands in Western U.S. Final Programmatic EIS (2007 Vegetation Treatment PEIS).
e. Monitoring studies would be conducted to determine those areas that meet or exceed the treatment threshold. Post-treatment monitoring would be conducted to evaluate the effectiveness of treatments.

Management treatments and project design features relating to vegetation treatment activities are presented in the 2007 Vegetation Treatment PEIS. All mitigation measures adopted in the Record of Decision for the PEIS are incorporated as additional project design features.

The requirement that no new treatments completed adjacent to an existing treatment until five years have passed (see page 33, 1997 Roswell RMP) would be dropped in order to offer more management flexibility on a landscape and watershed scale.

Prescribed fire may be used as a primary treatment or 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:

a. Fuel loading in a prospective treatment area is such that fire would effectively reduce the amount of mesquite, creosote, cholla, or juniper to less than treatment thresholds described above.
b. Existing herbaceous vegetation in a prospective treatment area is adequate to effectively carry and support ignition attempts.
c. A reasonable treatment window would result from the prescribed fire parameters for effective mesquite treatment.
d. 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 Prescribed Fire Burn Plan would specify the weather and fuel conditions, fire behavior, holding resources, and prep work (i.e. sites to be protected, line construction) needed to safely and efficiently meet the objectives for the project. The Prescribed Fire Burn Plan would identify any persons and agencies to be notified concerning the prescribed fire project. The Prescribed Fire Burn Plan would also identify any potential receptor sites and smoke management mitigation measures necessary to minimize impacts to the airshed and receptor sites.

Prescribed fire control lines would utilize natural barriers (i.e. rock outcrops, bare ground), bladed roads and two-tracks when possible to avoid creating new surface disturbance. There would possibly be areas where control lines would have to be constructed using heavy equipment. Before implementing this phase of the proposed action, the appropriate level of cultural resources inventory would be determined by following the procedures described in the “Protocol Agreement between the New Mexico Bureau of Land Management and New Mexico State Historic Preservation Officer” (June 2004) or successor documents (the Protocol Agreement).

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

a. Range improvement projects (pipelines, fences) would be excluded from fire when possible. Oil and gas related infrastructure would also be protected from fire. Power lines and communication lines would be excluded as well.
b. Grazing deferment would be necessary prior to prescribed treatment, each project area would be evaluated and the proper deferment would be applied. A minimum of two growing seasons would occur prior to areas being augmented with prescribed fire.
c. Burning operations would be conducted with techniques to avoid smoke impacting traffic on U.S. Highway 70/380.
d. Treatment areas would be deferred from livestock grazing for at least two consecutive growing seasons following treatment. The growing season usually begins at the onset of the summer rains (July 1) and continues until first frost (October 31). Livestock numbers would not increase as a result of treatment.

Mechanical treatment (wheeled or crawler tractors, chainsaws) may be used as a primary treatment to reduce the amount of cholla or juniper to meet the goals of the Desired Plant Community (DPC) within the project area. Mechanical treatment would be considered when:

a. The proximity of streams, arroyos, water wells, and livestock watering proximity precludes the use of chemicals.
b. Fuel loading is such that prescribed fire treatment would be either ineffective at meeting the goals of the 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 mechanical treatments within the project area:

a. Treatment using tracked or wheeled vehicles would be confined to slopes of 30 percent or less.
b. Surface disturbing treatments would avoid sites containing cultural resources and active prairie dog towns.
c. All material would be piled for burning at a later date, with some piles left for wildlife habitat.
d. Treatment areas would be deferred from livestock grazing for at least two consecutive growing seasons following treatment. The growing season usually begins at the onset of the summer rains (July 1) and continues until first frost (October 31). Livestock numbers would not increase as a result of treatment.

B. Alternative A – Manual Treatment

Under this alternative hand-operated power tools and hand tools would be used to cut and clear the treatment area of mesquite, creosote bush, cholla, juniper, or catclaw acacia. Workers would cut plants at ground level and pull, grub or dig out root systems to prevent sprouting and re growth. Tools to be used would include hand saws, axes, and grub hoes, hand pruners.

C. Alternative B – Mechanical Treatment

Under this alternative wheeled or crawler-type tractors, or chainsaws would be the only treatment used to grub out mesquite, creosote bush, cholla, juniper, or catclaw acacia in the project area. Tractors would be confided to working on slopes of less than 30 percent. Rest periods from livestock grazing would also apply to these types of treatments

D. No Action Alternative

No treatment would be conducted to reduce the amount of catclaw acacia, mesquite, cholla, juniper, and creosote bush in the treatment area.

E. Alternatives Considered But Not Analyzed

Biological Treatment –
Currently BLM is not aware of any specific effective biological control for catclaw acacia, mesquite, cholla or creosote. Therefore, biological treatments as a primary control for these brush species will not be analyzed.

Treatment with Other Chemicals –
There are other chemicals on BLM's list of approved herbicides that could be used to control catclaw, creosote, mesquite, cholla or jumiper. A partial list of these chemicals include 2,4-D, dicamba, glyphosate, and hexazinone. BLM rejected their use due to impacts to non-target vegetation and/or increased impacts to soil or water resources. Therefore, the use of these chemicals as a primary control for catclaw, creosote, mesquite, cholla or juniper will not be analyzed.

No Livestock Grazing –
This alternative was previously analyzed in the 1994 Range Reform EIS. The 1997 Roswell RMP determined the public land within the project area as suitable for livestock grazing. Therefore, a no-livestock grazing alternative will not be analyzed.

III. AFFECTED ENVIRONMENT

A. General Setting

The proposed treatment areas are located within the northwestern Chaves County, northeastern Lincoln County and southwestern De Baca County, New Mexico. The area is physically located approximately 50 miles northwest of Roswell. These allotments total 917,000 acres of which 329,000 is public land, 118,000 is State Land, and 467,000 is private land.

The affected environment of the area is generally discussed in the Roswell Resource Management Plan (RMP). Refer to this plan and the following for a complete description (Chapter 2). Only those resources actually impacted by the proposed action would be addressed in this document.

Both the surface and mineral estates are in public ownership. An inspection of the Master Title Plats revealed the following title information:

Oil and Gas Leases: There are 46 Oil/Gas leases filed with BLM in the area proposed for this project, as of August 31, 2006.

There are no existing mining claims filed with BLM in the area proposed for this project, as of August 31, 2006.

The regional uses are ranching, along with seasonal hunting and recreation.

The critical elements of Area of Critical Environmental Concern's, Prime or Unique Farmlands, Floodplains, Native American Religious Concerns, Noxious and Invasive Species, Hazardous or Solid Wastes, Wetland and Riparian Zones, Wild and Scenic Rivers, and Wilderness are no present within the treatment area and would not be affected. (See Appendix 9, Treating Vegetation with Herbicides, of the 1997 Roswell RMP, for a description of buffers around rivers, floodplains and riparian areas.)

B. Affected Resources:

Air Quality: The project area is rated as a Class II air quality area, which allows for moderate development within the standards of the State of New Mexico and the Federal Air Standards.

Soil:

The Soil Survey of Chaves County, New Mexico, Northern Part (USDA Soil Conservation Service 1980) was used to describe and analyze impacts to soil from the proposed action. The soil map units represented in the project area are:

Hollomex-Reeves-Milner: Deep, well-drained, nearly level to undulating soil; on terraces.

Poquita-Alama-Hodgins: Deep, well-drained, nearly level to sloping soil; on alluvial side slopes.

Threadgill-Asparas-Gabaldon: Deep, well-drained, nearly level to gently sloping soil; on alluvial side slopes and in depressional areas and drainage-ways.

Darvey-Deama-Pastura: Shallow and deep, well-drained, nearly level to hill soil; on alluvial side slopes, valley floors, ridges, back slopes and foot slopes.

The Soil Survey of De Baca County, New Mexico, (USDA Soil Conservation Service 1986) was used to describe and analyze impacts to soil from the proposed action. The soil map units represented in the project area are:

Redona-Tucumcari-Armesa: Deep, nearly level to gently sloping, well-drained soil; in broad valleys and on uplands and basin floors.

Galen-Chispa-Ima: Deep, gently sloping to steep, well-drained soil; on alluvial terraces, hillslopes, and breaks.

Holloman-Reeves-Poquita: Very shallow to deep, nearly level to steep, well-drained soil; on uplands and alluvial flats.

The Soil Survey of Guadalupe County, New Mexico, (USDA Soil Conservation Service 1973) was used to describe and analyze impacts to soil from the proposed action. The soil map units represented in the project area are:

Harvey-Pastura: Shallow to deep, gently to strongly sloping soil; on sloping valley side slopes and upland ridges and valley side slopes.

Deama-Pastura-Manzano: Shallow to deep, nearly level to gently sloping to strongly sloping soil; on gently rolling landscapes.

Tapla-Dean-Pastura: Shallow nearly level to gently sloping soil; on undulating uplands.

The Soil Survey of Lincoln County, New Mexico, (USDA Soil Conservation Service 1983) was used to describe and analyze impacts to soil from the proposed action. The soil map units represented in the project area are:

Deama-Rock outcrop: Very shallow and shallow, well-drained, nearly level to very steep soil, and Rock outcrop; on hills, mesa sides, and breaks.

Pastura-Deama-Darvey: Very shallow, shallow, and very deep, well-drained, nearly level to moderately sloping soil; on hills, mesa sides, piedmonts, and valley sides.

Penistaja-Plack-Travessilla: Very shallow, shallow, and very deep, well-drained, nearly level to moderately sloping soils; on valley sides, ridges, hills, mesas, and piedmonts.

Tortugas-Rock outcrop-Asparas: Very shallow, shallow, and very deep, well drained, nearly level to extremely steep soil, and Rock outcrop; in valleys and hills, piedmonts, ridges, and mountainsides.

Water Quality:

Surface Water: There are no perennial streams, rivers or riparian areas in the area proposed for treatment.

Ground Water: The project area is in the New Mexico Office of the State Engineer Declared Underground Water Estancia Basin, Tularosa Basin, Fort Sumner Basin, and the Roswell Artesian Basin. The approximate depth to ground water ranges from 0 to 1,000 feet in shallow unconfined aquifers and confined artesian aquifers.

Recreation: There would be no direct or indirect impacts to recreation.

Off Highway Vehicle designation for public land within this allotment are classified as "Limited" to existing roads and trails.

Cave/Karst: The project area is located in an area of medium cave/karst potential and no karst features or significant caves are found in the vicinity of the proposed treatment area.

Visual Resource Management (VRM): The area is considered to contain both Class III and IV Visual Resource Management Areas (VRM). In a Class III VRM, contrasts to the basic elements caused by a management activity may be evident and begin to attract

attention in the landscape. The changes should remain subordinate to the existing landscape. In a Class IV VRM, contrasts may attract attention and be a dominant feature in the landscape in terms of scale, however, the changes should repeat the basic elements of the landscape.

Vegetation: Vegetation descriptions for this management area 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.

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)*, tobosa *(Pleuraphis mutica),* sand dropseed *(Sporobolus cryptandrus)* and vine mesquite *(Panicum obtusum).* The shrub component includes 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).*

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.

Shinnery Oak-*(Quercus havardii)* Dune Community consists of the following grasses: sand bluestem *(Andropogon hallii),* little bluestem *(Schizachyrium scoparium),* hairy grama, sand dropseed, blue grama, sideoats grama. Shrubs include shinnery oak, yucca, mesquite and sand sage *(Artemesia filifolia).* Forbs include annual sunflower *(Helianthus annuus)* and buckwheat.

Mixed Shrub Malpais Community consists of grasses blue grama black grama, hairy grama, sand dropseed and annual grama *(Bouteloua barbata).* Shrubs include Christmas cholla *(Cholla leptocaulis),* cane cholla *(Opuntia spinosior)* and tarbush *(Flourensia cernua)* and forbs bladderpod *(Lesquerella* spp.) and globemallow.

Piñon/Juniper Grassland Community. Consists of the following shrubs and/or trees: Piñon *(Pinus edulis),* juniper *(Juniperus* spp.), oak *(Quercus* spp.) and skunkbush sumac are among the shrub species listed as part of the potential plant community. The grass species include little bluestem, blue grama, black grama, sideoats grama and metcalf muhly *(Muhlenbergia metcalfii).* The forbs include yarrow *(Achillea* spp.), buckwheat, globemallow, and indian paintbrush *(Castilleja* spp.).

Drainages, Draws and Canyons Community consists of grasses alkali sacaton *(Sporobolus airoides),* giant sacaton (*Sporobolus giganteus),* vine mesquite, tobosa and burrograss *(Scleropogon brevifolius).*Shrubs or trees present are saltcedar (Tamarix spp.), cottonwood (Populus spp.), and mesquite.

Riparian-Wetlands Community consists of grasses alkali sacaton giant sacaton, and trees saltcedar, cottonwood and willow *(Salix* 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 (*Senecio longilobus*), 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.

Invasive, Non-native Species: There are no known populations of invasive or non-native species within the project area. If new populations of these species are found, the infested areas would be treated to remove or control these populations.

Wildlife: The project area provides habitat for desert mule deer (*Odocoileus hemionus*), scaled quail *(Callipepla squamata),* mourning dove (*Zenaida macroura*), raptor species and various non-game species.

Special Status Species: 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. RFO 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. #22420-2006-I-0144, and Cons. #22420-2007-TA-0033. No further consultation with the Service is required.

It should be understood that sometimes a species may occur in the larger regional area such as Lincoln County, but the habitat necessary to support the species is not in the area of analysis. Based on current knowledge and familiarity of the particular species and the area of analysis, species presented in Table 2 are not known to occur in the project area.

Table 2. Listed Plant Species

Common Name	Scientific Name	Status
Kuenzler's hedgehog cactus	*Echinocereus fendleri*	Endangered
Pecos sunflower	*Helianthus paradoxus*	Threatened

Livestock: The following allotments fall within the proposed project area:

Table 3. Grazing Allotment in North Lincoln Grassland Restoration Project

Allotment Number	Allotment Name	Public Land Acres	Permitted AUMs
62049	Tri Country Ranch	29,863	8,198
62070	Devils Well	5,860	1,476
62071	Wire Lake	6,842	1,968
62072	Rock Canyon	4,499	1,104
63003	Boggie Well	2,596	720
63005	Salley Bench Mark	1,960	540
63006	Rooster Tail	1,629	420

63007	North Hackberry	661	204
63008	Bonita Canyon	1,500	348
63009	Red Bluff Draw	560	132
63010	Hackberry Draw	299	84
63011	Hays-Byrd	6,752	1,874
63012	Mile Hi Place	6,986	1,980
63014	Buzzard Tank	600	168
63015	Corona Well	5,534	1,560
63016	Nester/Ball/Buck	7,079	1,737
63017	Buck Draw	6,717	1,881
63517	Buck Draw 15	960	276
63018	Cola Del Gallo	6,586	1,740
63020	X-Bar	48,117	12,465
63021	Hasperos Canyon 03	15,491	3,528
63521	Hasperos Canyon 15	2,164	456
63022	Jack's Peak	720	135
63033	Cooper's Gallo	4,463	1,304
63034	Cowboy Mill Ranch	28,408	5,111
63035	Circle F Ranch	21,485	5,806
63036	Juan Largo	13,516	3,720
63037	Richards Ranch	6,508	1,448
63088	NW Jack's Peak	120	24
63098	Dipping Vat	54	12
63102	Line Camp	4,654	1,190
63104	Round Mountain	465	96
64001	Little Cowboy Draw	4,855	1,575
64002	15 Mile Draw	11,469	3,694
64003	Mesa	12,646	3,195
64004	Buck Springs	6,023	1,368
64005	The Y	633	180
64006	Buck Springs-East	2,987	684
64016	Gallo Ranch	11,905	3,402
Total		**294,166**	**75,803**

IV. ENVIRONMENTAL IMPACTS

A. Impacts of the Proposed Action

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: Impacts on air quality would be moderate noise and the potential for minimal chemical drift from aerial application of the herbicide. Impacts would be temporary, small in scale, and quickly dispersed throughout the area. These factors, combined with standard management practices (stipulations), minimize the potential impacts. Federal, State, and local air quality regulations would not be violated. Standard management

practices for aerial application of herbicides would limit the amount of drift into non-target areas.

As tebuthiuron is pelletized, droplet size and drift of liquid herbicide is not a factor. The use of aircraft to apply the herbicides could temporarily cause noise levels to reach 90 dbA; however, no long-term effects are anticipated. The chemical nature of the herbicide is such that no residue would be left in the soil or atmosphere after approximately 3 years.

The use of aircraft to apply the herbicides triclopyr, and clopyralid to control mesquite, or picloram to control cholla could temporarily cause noise levels to reach 90 dbA; however, no long-term effects are anticipated. Standard management practices include using spray equipment designed to produce 200 to 800 micron diameter droplets and prohibiting spraying when the wind speed exceeds 6 miles per hour or blows in the wrong direction. The chemical nature of the herbicide is such that no residue would be left in the soil or atmosphere after approximately 3 years.

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.

Soil: None of the herbicides commonly used by the BLM appear to result in adverse impacts to soil. Treatments would benefit soil by restoring natural fire regimes and slowing the spread of weeds, which should reduce soil erosion and improve soil productivity.

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.

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. Removal of solid stands of vegetation by chemical treatment may result in short-term, insignificant increases in surface erosion that would diminish as vegetation reoccupies the treated site. The speed of site revegetation and the plant composition of the new vegetation depends on the persistence and selectivity of the herbicide.

Triclopyr, clopyralid and picloram are liquid formulations that are 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. Removal of solid stands of vegetation by chemical treatment may result in short-term, insignificant increases in surface erosion that would diminish as vegetation reoccupies the treated sites.

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

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.

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.

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

Surface Water Impacts: 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 buffer of 100 feet (aerial). 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 of 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. Tebuthiuron has a soil half-life of 360 days (with a range of reported half-life of 13 to 450 days) and is considered to be a "persistent herbicide". Persistent herbicides are those with typical half-lives in excess of 100 days**.** Moderately persistent herbicides are those with typical half-lives of 30 to 100 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.

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.

The vapor pressure for tebuthiuron is 2.0 x 10-6 mm HG\g. The vapor pressure for picloram is 0. The higher the vapor pressure the greater the potential for loss due to volatilization. Also, higher temperature usually results in increased volatilization. The degree of plant uptake is partially determined by the herbicide's water solubility. The more water soluble an herbicide is, the greater the possibility for plant uptake.

Soil adsorption is also important in determining mobility in surface or infiltrating water. Adsorption of a herbicide varies with the properties of the chemical, as well as the soil's texture (relative proportions of sand, silt, and clay), moisture level, and amount of organic matter. Soil high in organic matter of 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). The Koc for tebuthiuron is 80 ml/g (pH=7); the Koc for triclopyr is 780 ml/g, and clopyralid is 6. The Koc for tebuthiuron is 80 ml/g (pH=7).

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.

Ground Water Impacts: 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.

Tebuthiuron has a leaching index of 5.36. The leaching index for triclopyr is1.84; and the index for clopyralid is 5.46. Prediction of actual amounts of these herbicides that may reach groundwater must also consider the method and rate of application, as well as the soil characteristics and other environmental and climactic factors described above.

In response to the concern for ground water contamination, the 2007 Vegetation Treatments PEIS lists standard operating procedures (SOP) for water resources in Table 2-8 (page 2-31). The SOP is repeated on page 4-25. The SOP directs 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.

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

Vegetation: Vegetation treatments would have both beneficial and adverse effects on terrestrial vegetation within the project area. Target and non-target vegetation in treated areas would be directly affected. 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 forest management, and to reduce or eliminate populations of undesirable species in noxious weed eradication programs.

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. 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 re-sprout after aerial shoots are damaged. 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 (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, than to soil-active herbicides, such as tebuthiuron, that persist in the soil long enough to be taken up when optimum translocation conditions occur.

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 and tebuthiuron, may be highly dependent on the rate of application. Damage to non-target species is minimized if they are tolerant of these herbicides applied at rate sufficient to reduce target species.

Plants may vary greatly in their sensitivity to different herbicides (Sosebee 1983). 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. 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.

Herbicides are mainly used to control woody species, such as mesquite, creosote bush, and snakeweed *(Gutierrezia sarothrae),* in the southwest grassland (Martin 1975, McDaniel 1984). When these plants are successfully controlled, production of herbaceous vegetation may greatly increase (Cable 1976, McDaniel et al. 1982, Gibbens et al. 1987).

Tebuthiuron is more effective than other herbicides in controlling creosotebush, and tarbush *(Flourensia cernua)* (Jacoby et al 1982, Cox et al. 1986, Gibbens et al. 1987). However, tebuthiuron is injurious to many grasses and forbs, especially if applied during active growth (Baur 1976). Tebuthiuron treatments (0.4 lb a.e./acre) in New Mexico reduced woody vegetation and greatly increased perennial grass and annual forb production (Gibbens et al. 1987) Tebuthiuron significantly reduced brush species, including creosotebush, tarbush, wolfberry, fourwing saltbush, snakeweed, and mariola *(Parthenium incanum).* Perennial grass basal areas were initially reduced by treatment, but total grass production of bush muhly *(Muhlenbergia porteri),* threeawn *(Aristida* spp.), bristle grass *(Setaria* spp.), alkali sacaton *(Sporobolus airoides),* spike dropseed *(Sporobolus contractus),* and fluffgrass *(Dasyochloa pulchella)* combined was 11 times greater on the treated than untreated areas after 4 years. Perennial forbs, such as desert holly *(Perezia nana)* and hairyseed balia *(Baileya* spp.), were decreased slightly by tebuthiuron treatment. Production of annual forbs, mainly desert marigold *(Baileya multiradiata),* round leaf wild buckwheat *(Eriogonum jamesii)*, and Russian thistle *(Salsola iberica),* was seven times higher on the treated than the untreated area.

Control of creosotebush by tebuthiuron (0.4 to 1.3 lb. a.e./acre) allowed seeded grasses to persist and native grasses to increase on sites in Arizona and Mexico (Cox et al. 1986). Southwestern grasslands treated with moderate rates of tebuthiuron (less than 1.0 lb a.i/acre) should generally have decreased woody plant production and increased herbaceous production. Certain sensitive grass, forb and shrub species would be replaced by more tolerant species. Moderate application rates and strip treatments are recommended to minimize damage to desirable sensitive species.

Triclopyr is an auxin-type selective herbicide effective against woody plants and broadleaf weeds. The herbicide is particularly effective against root sprouting species, including ash *(Flaxinus* spp.) and oaks *(Quercus* spp.) and is used for brush and weed control on rangelands, industrial sites, permanent grass pasture and broadleaf and aquatic weed control in rice. However, most grass species are tolerant to triclopyr.

Clopyralid is a systemic, postemergent herbicide that is effective against many species of Compositae, Fabacease, Solanaceae, and Apiaceae. It has auxin-like activity, inducing severe epinasty (downward bending of the plants parts, caused by excessive growth of the upper side) and hypertropy (a nontumorous increase in the size of the plants parts due to the enlargement without increase in number of constituent cells) of the crown and leaves.

Triclopyr and clopyralid significantly reduced brush species, including creosote bush, tarbush, wolfberry, fourwing saltbush, snakeweed, and mariola. Perennial grass basal areas were initially reduced by treatment, but total grass production of bush muhly,

threeawn, bristle grass, alkali sacaton, spike dropseed, and fluffgrass combined was 11 times greater on the treated than untreated areas after 4 years. Perennial forbs, such as desert holly and hairyseed balia, were decreased slightly by tebuthiuron treatment. Production of annual forbs, mainly desert marigold, round leaf wild buckwheat, and Russian thistle, was seven times higher on the treated than the untreated area.

Control of mesquite by triclopyr and clopyralid allowed seeded grasses to persist and native grasses to increase on sites in Arizona and Mexico (Cox et al. 1986). Certain sensitive grass, forb and shrub species would be replaced by more tolerant species. Moderate application rates and strip treatments are recommended to minimize damage to desirable sensitive species.

Injection is performed by injecting a herbicide shell (either glyphosate or imazapyr) into the bark of a juniper tree stump or brush using a EZ-Ject Lance system. Once in the cambium layer the herbicide is absorbed by the tree's sap effectively killing roots, trunk and foliage. This system selectively kills undesirable trees with no off-target herbicide effects, while managing vegetation in sensitive sites without drift or spill risks. This would allow for slower canopy opening and allows crop trees to adapt and has less fire hazards than mechanical options. Thinning stands without felling of trees results in no slash to impede wildlife movement and also creates habitat trees such as snags for perching birds. This retains beneficial foraging vegetation while controlling unwanted trees. More information is available at www.ezject.com.

In summary, many species are sensitive to the rates and types of herbicides that are effective in controlling woody plants in the southwestern shrubsteppe. However, herbicidal treatment usually decreases woody plant growth and increases growth of grasses. Herbaceous production initially decreases then increases after a few years as woody species die and herbaceous species recover and respond to reduced competition.

An even application of the pelletized tebuthiuron at the proposed 0.75 pounds of active ingredients would reduce the present composition of creosote bush to an estimated 5 to 10 percent by the second year after application. This reduction of creosotebush eliminates the competition for soil water, which is critical in sandy soil where the moisture holding capacity is quite low. The lack of competition would readily allow grass and forbs to flourish, increasing the amount of ground cover, reducing the amount of soil erosion as well as producing an abundance of livestock and wildlife forage.

The change in composition of the vegetative community would have the effect of changing the entire area of treatment from a desert shrubland habitat to a grassland habitat in a very short period of time (approximately 2 to 3 years). A change from shrubland to grassland would change the animal community to one that is representative of grassland habitats.

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. Prescribed fires top kill sprouting shrubs such as mesquite and seedlings, which maintains the area as a grassland with scattered shrubs. 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.

Some sensitive grasses, broadleaves and non-target shrub species may be damaged by the application of the herbicides. It is expected that these species would recover rapidly and would increase in production. An increase in grass production would allow for prescribed fire to be used to maintain the herbicide treated areas in their desired condition.

Livestock: 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.

Using herbicides is the most efficient and effective way to control some competing vegetation and noxious weeds. However, some aerially applied herbicides also may eliminate some shrubs and trees that livestock need for shelter.

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.

Invasive, Non-native Species: 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.

Wildlife: 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 community; these characteristics relate to seasonal cover and food requirements for particular animal species and predators dependent on them. These characteristics also respond to a particular vegetation manipulation.

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 high ratio of woody to herbaceous perennial vegetation than under pristine conditions. In general, the greater the diversity of the plant community, the greater the diversity of the associated animal community (Gysel

and Lyon 1980). Therefore, any change in vegetation community structure or composition affects resident fish and wildlife populations.

The effects of vegetation manipulation on wildlife depend on vegetation structure, production, and phenology of the community. Because these characteristics relate to seasonal cover and food requirements for particular animal species- and the predators that depend on them- and because these characteristics respond differently to different vegetation manipulations, effects on fish and wildlife from vegetation management would be both positive and negative, depending on the species affected and the type of treatment used. Treatments that reduce runoff and sedimentation would have positive benefits for fish and aquatic wildlife and there would be shifts or changes in forage and habitat for wildlife, depending on the species.

Chemical treatments, like mechanical methods traditionally have been applied most frequently to decrease woody plant cover and increase the production of grasses. The control of broad-leafed woody plants, especially by selective herbicides, often results in the control of associated broadleaf forbs, both categories of plants contain species which may be important food for many different wildlife species.

Although most documented cases consider the effects on wildlife of vegetation treatments designed to increase grass production, chemical treatments can be selected and structured to increase and decrease other vegetation components for the benefit or exclusion of different wildlife species. These treatments can be considered tools for wildlife habitat management when vegetative responses and habitat requirements are understood. All treatments would affect some change in the existing wildlife communities, including amphibians, reptiles, and invertebrates. The end result of the treatment should be more beneficial to wildlife in general than the community and/or populations foregone by the treatment.

Aerial herbicide applications have the most potential for affecting wildlife. When determining the timing of herbicide applications, considerations should be given to the potential for humans to consume wildlife that have fed on herbicide-contaminated forage. The treated area could be posted to notify the public of the possible contamination, if herbicides pose any risk. Also the effect of herbicide consumption of lactating mammals or the feeding of contaminated foods to offspring must be considered. Some negative impacts can be lessened if the period of treatment avoids the bird nesting season and other critical seasons when loss of cover would be critical to wildlife; for example, during critical reproductive periods and prior to severe winter weather conditions.

Most riparian areas are crucial habitat for wildlife and no chemical treatments are proposed in these areas. The primary practice would be for riparian areas to be buffered and protected from any impacts.

The BLM Pest Control Handbook, H-9011-1, requires buffering of domestic waters, perennial marsh areas, important fishing and recreational waters, and/or significant fish spawning, rearing and migration streams. Recommended buffers are the larger of the herbicide label recommendation or 25 horizontal feet for vehicle spraying and 100 horizontal feet for aerial spraying. The Roswell RMP (Appendix 9, Treating Vegetation with Herbicides) also states buffers for herbicide applications: aerial spraying 100 feet, 25 feet for vehicle spraying and 10 feet for hand application for projects adjacent to the

Pecos River, any livestock watering locations, ranch houses, or known locations of threatened or endangered plants. The RMP also includes requirements for protective buffer zones to be provided around important riparian or wetland habitats along streams, rivers, lakes that are not designed to be treated, and around xeroriparian areas along important dry water courses. Each of these buffering requirements has been included in the project stipulations and designs.

Chemical treatments have most frequently been applied to reduce the cover of woody species, such as mesquite (Martin 1975). Although research has described the life history and habitat requirements of many wildlife species, only limited research has addressed the effects of vegetation manipulations on wildlife in southern Arizona and New Mexico.

Expanding the structural diversity of vegetation by controlling shrubs and increasing understory species in strips and patches should increase bird diversity and density. However, such control could decrease deer use by reducing food and cover. Smith (1984) compared bird use of undisturbed, crushed and tebuthiuron-treated creosotebush in Arizona. Black-throated *(Amphispiza bilineata)* and Brewer's sparrows *(Spizella breweri)* foraged opportunistically, which verdins *(Auriparus flaviceps)* avoided crushed plots and vesper sparrows *(Pooecetes gramineus)* avoided control plots. In the catclaw acacia and creosote community, chemical treatments opened up small areas, which were used as nesting sites for Cassin's sparrows *(Aimophila cassinii)* and feeding sites for grass-eating flocks.

After treatment of catclaw acacia the increase of forb and grass species would most likely lead to an increase in use of the treated areas by wildlife species such as pronghorn, mule deer, quail, and dove, which in turn could lead to an increase in the number of hunters using the area. The recreational value would correspond to the availability of animals for hunting or viewing.

The primary recreational activity occurring in the project area is hunting. Mule deer and game birds such as quail and dove are taken during hunting seasons set by New Mexico Department of Game and Fish. A secondary activity occurring in the area is observing nature or watching wildlife. No unique natural features are present.

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 and 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 in 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 composition 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 renest in unburned areas.

Special Status Species: 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 Roswell RMP for a detailed description of the range, habitats and potential threats.

The Baird's sparrow *(Ammódramus baírdii)* and burrowing owl *(Athéne cuniculária),* may utilize the area on a periodic basis, but due their habitat requirements and the amount of surrounding habitat that would remain like the existing situation, no negative impacts are anticipated.

No impacts to plants that are considered special status species would occur as they do not occur in treatment areas.

Cultural: 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 outline in the National Historic Preservation Act of 1966 and implemented in 36 CFR 800 and the BLM 8100 Manual series. It is unlikely that cultural artifacts protected by soil or plant cover would be adversely affected by chemical treatments.

Wherever bladed firelines are to be built, a cultural survey would occur prior to blading. Archeological and historic sites would be avoided. Should cultural material be discovered during blading, fireline work would cease until the cultural resource issue is resolved. Cultural resources would be protected from further disturbance.

Recreation: Hunting and hiking, off highway vehicle activity and other actions would still occur within propose area. It is anticipated that improved habitat conditions would result in increased wildlife numbers and additional use by the public for hunting activities. There should not be any adverse actions by the proposed action.

Visual Resource Management: Public land has many different visual values. Visual values are identified through the Visual Resource Management (VRM) inventory and are grouped into four visual resource inventory classes, which represent the relative value of the visual resources. Classes I & II are the most valued, Class III is moderately valued, Class IV is the least valued. The criteria for determining the classes are scenic quality, sensitivity level, and distance zone. Landform, vegetation, water, color adjacent scenery, scarcity and cultural modification area used in determining an area's scenic quality (BLM 1986).

An adverse 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).

Where areas are treated by methods that could change visual contrast (quality), short-term adverse impacts on visual resources would occur. However, based on standard operating procedures and long range plans, the long-term impacts would be beneficial. The intensity of the impacts would depend on the treatment method and the area where it was implemented. Most of the land considered for the vegetation treatment program in the FEIS is Class IV; therefore, the impacts that might occur from any of the treatment methods would not be as important as in a Class I or II area. Factors that effect the degree of visual contrast area: distance, angle or observation, length of time in view, relative size or scale, season of use, light conditions, recovery time, atmosphere conditions and motion.

Herbicide use reduces the variety of vegetation and may prevent the manifestation of seasonal changes such as spring flowers and fall color in a treated area. Areas treated with herbicides turn brown and contrast with surround vegetation for a short period of time. However, applying herbicides could have the positive visual impact of allowing regrowth of more aesthetically desirable vegetation.

The proposed action would change the color and texture of the landscape by replacing the cholla cover with grasses and forbs. However, it can be argued whether the visual change is positive or negative. The resulting landscape, as seen from Highway 70/380, would still appear natural to the casual observer. To mitigate potential visual impacts, lines between treated and untreated areas should be irregular with no straight edges.

There are no unique natural or man-made features which would interfere with the proposed action or the alternatives. The area has been placed in Visual Resources Management Class III or IV. Both of these Classes allow change in the scenery to occur. The sensitivity of the area is low.

Prescribed burning would have an effect for approximately one growing season while the area is in a blackened condition. After one year the area should return to a normal looking condition.

Social and Economic: A description of the social and economic impacts are discussed on pages 3-75 through 3-80 of the 2007 Vegetation Treatments PEIS. Site specific conclusions would be essentially the same.

Social Resources: Many of the social effects of vegetation treatment programs occur as a result of changes in jobs or personal income. Compared with total employment or personal income, employment or income changes resulting from the implementation vegetation treatment may seem small. However, these changes may be important when considered on a local or a site specific basis to individuals who rely on the continued productivity of public lands and employment in vegetation treatment activities for their livelihood.

Direct impacts would occur if an individual's sense of well-being or economic security were affected by BLM's decision on the use or restriction of particular vegetation treatment methods. Indirect effects would occur as a result of economic outcomes of BLM policies and in response to gains or losses of recreational opportunities or access to subsistence activities. All of these impacts, direct or indirect, could affect lifestyles and community stability.

Economic Resources: The direct economic impacts of all of the vegetation program alternatives include increases in both employment and sales of treatment materials. The subsequent increase in personal incomes and revenues would benefit the economy of the area if the employees and equipment needed are acquired within the area.

Indirect Economic Impacts: Indirect economic impacts occur as a result of other actions, such as other vegetation treatments, outside the project area. They are generally difficult to quantify and the incidence of the sort of these impacts is not always clear. Poor range management may result in the death of livestock and wildlife because of ingestion of noxious weeds and poisonous plants.

Human Health: A detailed hazard analysis was conducted for clopyralid, tebuthiuron and triclopyr as proposed here for use in the 2007 Vegetation Treatments PEIS. (See Table 3-25). Additionally, a worst-case analysis was conducted for each of the herbicides proposed for use. It has been determined that the worst-case is that someone would get cancer from exposure to herbicides used in the Bureau of Land Management (BLM) Vegetation Treatment Program. The probability of occurrence was projected for two basic populations considered at risk (occupational and general public). The highest probability of cancer for workers in the extreme-case is on the order of one out of 10,000 workers exposed under the lifetime exposure scenario. The highest probability for the general public in on the order of one out of 10 million individuals exposed in the extreme case scenario presented.

B. Impacts of Alternative A – Manual Treatment

Air: This alternative eliminates the potential impacts from herbicides of the Proposed Action.

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

The effects of this alternative on the soil would be substantial. The increased organic material, caused initially by the acacia and creosote leaves, stems and roots and secondarily by the increased production of grasses and forbs would improve the fertility of the fine sandy loam soil.

Water: This alternative eliminates the potential impacts from herbicides of the Proposed Action. This alternative would not increase peak flows because plant water use would be little affected. Stream nutrients and sediment loads would not increase because litter and duff would be left intact.

Vegetation: Vegetation treatments would have beneficial and adverse effects on terrestrial vegetation within the treatment area. Target vegetation in treated areas would be directly affected. Non-target vegetation would not be affected.

Livestock: This alternative eliminates the potential impacts from herbicides of the Proposed Action. Impacts to livestock grazing management would be the same as the Proposed Action.

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

Wildlife: This alternative eliminates the potential impacts from herbicides of the Proposed Action. Manual treatment, however, would negatively affect those species that depend on the target plants for food or cover.

Special Status Species: Impacts would be similar to those in the Proposed Action.

Cultural: 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 outline in the National Historic Preservation Act of 1966 and implemented in 36 CFR 800 and the BLM 8100 Manual series. A cultural survey will be completed prior to ground disturbing activities.

Recreation: Hunting and hiking, off highway vehicle activity and other actions would still occur within propose area. There should not be any adverse actions by the proposed action.

Cave/Karst: Some of the area is in Medium Karst potential. Within these areas vehicles traveling over cave/karst areas should be careful not to drive over cave entrances as well as highly developed karst areas that may collapse under the vehicle.

Visual Resource Management: Impacts would be similar to those in the Proposed Action.

Social and Economic: The direct and indirect social and economic impacts of manual treatment would be essentially the same as the Proposed Action.

Human Health: Under this alternative, risks of public and worker health effects from herbicides would be eliminated. Risks to workers, however, from manual or mechanical treatment would increase.

C. Impacts of Alternative B – Mechanical Treatment

Air: This alternative eliminates the potential impacts from herbicides of the Proposed Action. The impacts of this alternative, however, would be increased dust particles during the treatment itself as well as dust as the result of wind erosion until the grasses and forbs re-establish themselves in the treated areas,

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

The effects of this alternative on the soil would be substantial. Removing acacia and creosote by this method also removes grasses and forbs, resulting in large areas of bare soil. This alternative would result in an increased risk of soil erosion due to wind and rain until the grasses and forbs re-establish themselves in the treated area.

Water: This alternative eliminates the potential impacts from herbicides of the Proposed Action. Precipitation runoff would increase and an associated increase in stream volume and peak volume. Loss of vegetation cover would result in increased erosion potential and subsequent sediment loads.

Vegetation: Vegetation treatments would have beneficial and adverse effects on terrestrial vegetation within the treatment area. Target and non-target vegetation in treated areas would be directly affected.

Livestock: This alternative eliminates the potential impacts from herbicides of the Proposed Action. Impacts to livestock grazing management would be the same as the Proposed Action.

Invasive, Non-native Species: Impacts would be similar to those of Alternative A.

Wildlife: Impacts would be similar to those of Alternative A.

Special Status Species: Impacts would be similar to those in the Proposed Action.

Cultural: Mechanical treatment could damage archaeological and historic sites. In order to avoid damaging sites, cultural inventory surveys would need to be conducted prior to project implementation in order to locate and avoid eligible and potentially eligible sites. Buried sites discovered by mechanical treatment may also increase the possibility of artifact theft due to site exposure. Performing cultural surveys to mitigate these impacts would add substantially to the cost of the project.

Visual Resource Management: Impacts would be similar to those in the Proposed Action.

Recreation: Hunting and hiking, off highway vehicle activity and other actions would still occur within propose area. There should not be any adverse actions by the proposed action.

Cave/Karst: Some of the area is in Medium Karst potential. Within these areas vehicles traveling over cave/karst areas should be careful not to drive over cave entrances as well as highly developed karst areas that may collapse under the vehicle.

Social and Economic: The direct and indirect social and economic impacts of manual treatment would be essentially the same as Alternative A – Manual Treatment.

D. Impacts of the No Action Alternative

The No Action Alternative avoids the impacts of herbicide applications and prescribed fire. Therefore, under the No Action alternative present conditions would not change. The area would primarily remain in a status quo condition with the areas dominated by shrub species and their present 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 no changes in habitat composition or condition wildlife populations would remain unchanged. No increase of forage or stabilization of soil would occur. No increase in use by recreationalists would occur. Movement towards the goals of Desired Plant Community or improvement in public land health would not occur.

E. Mitigation Measures and Residual Impacts

Mitigation Measures

Any project involving herbicides would follow the policies, standards and practices listed in Appendix 9, Treating Vegetation with Herbicides, of the 1997 Roswell RMP. In addition to the mitigation measures listed in the Proposed Action, the following measures would also apply:

- In areas of Medium cave/karst potential the area would be reviewed by the Roswell Field Office Outdoor Recreation Planner to determine if there is cave or karst features within the area. If cave/karst features are found, heavy equipment should not be used within these areas and surface disturbance shall be kept to a minimum within these areas.

- 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 (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 increases in animal numbers.

- 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.

- 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 (from April to June).

- Monitoring studies would be conducted to determine those areas that meet or exceed the treatment threshold. Post-treatment monitoring would be conducted to evaluate the effectiveness of treatments.

- Wildlife habitat concerns and special habitat features would be considered in designing proposed treatments to protect and preserve particular habitat components that contribute to habitat and species diversity across the landscape. Techniques such as leave out areas and buffers would be incorporated in project design to maintain a mosaic of habitats for a variety of wildlife species. Special habitat features may include drainages, draws and canyons, nesting trees, sinkholes, cave entrances or unique assemblage of vegetation that provide cover and habitat diversity.

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 the herbicide.

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

-A temporary increase in fire hazard from waste material (dry vegetation) left on the ground after treatment.

-Short-term decrease in habitat for wildlife species.

-Short-term increase in smoke and particulate matter.

V. CUMULATIVE IMPACTS

A cumulative impact is defined in 40 CFR 1508.7 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."

The analysis of cumulative impacts focuses on the geographical area defined as the set of BLM-administered allotments within the North Lincoln project area as illustrated on the attached maps and listed under Table 3. The specific resources being impacted are limited to those that are most important in terms of impacts resulting from remedial actions needing to be implemented to improve current environmental conditions. The proposed action is the treatment of invasive brush species within a grassland community type using a combination of methods to reach the goals and objectives for the restoration of the native grassland community. Environmental considerations are presented to mitigate impacts and include standard operating procedures for vegetation treatments, as well as specific design features that would be developed on a case-by-case basis for individual treatments and environmental conditions and resource concerns warrant.

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 the Bureau of Land Management. 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 mesquite, broom snakeweed, yucca and cactus species, saltcedar and other non-native plant species (noxious weeds) 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. On its own, these rangelands cannot revert back to the once pristine grassland prairie ecosystems of the past, and prior to man's activities, without resource management actions to improve soil and vegetation resources.

Past vegetation treatments within the project area have occurred. BLM records show other chemical treatment projects totaling 150 acres in the past. Collectively, these treatments account for about one percent of federal land.

Other major resource uses that have been occurring within the Roswell Field Office and expected to continue, include oil and gas development and rights-of-way construction. These legitimate activities under BLM's multiple use mandate are nevertheless cumulative impacts to grassland ecosystems as well. The reasonable and foreseeable development scenario for oil and gas and rights-of-way development can be found in the 1994 Draft Roswell RMP.

Livestock grazing is expected to continue in the project area but allocation of forage resources above current uses is not expected to occur. As markets for beef production fluctuates, so does actual livestock use on federal lands. As drought conditions and effects are seen on the landscape, this natural event also affects livestock grazing on public lands. Livestock numbers are expected to fluctuate following market conditions and rangeland health, with a decrease in stocking rate following a decline beef prices in the market and/or in rangeland vegetation production from lack of precipitation.

In the long-term, the treatment of up to 315,000 acres would most likely occur in stages spanning several years to allow for project planning and optimum treatment prescriptions. This "staggering" of site-specific projects reduces the amount of direct impacts to resources and buffers the cumulative impacts of repeated actions over the landscape. Individual treatments could range from 500 acres up to 1,000 acres in size, and possibly larger for prescribed fire activities. The size and number of treatments would be, in part, determined by economies of scale, with the costs reduced by efficiently implementing control over the project area. The degree of cumulative impacts would increase as the size of the individual treatments increases.

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 through the National Resource Conservation Service (NRCS). The amount of specific treatments that may be proposed on other lands within the project area is not known.

The very nature of the proposed action is to improve the grassland community while limiting and reducing impacts to other resources and uses by design, it is not a surface disturbing activity such as those associated with developments. Direct and indirect impacts of the proposed action to resources are adequately addressed above. Improving the grassland community within the project area has the effect of sustaining the viability and health of grasslands 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.

In addition to the proposed action for North Lincoln, there are six similar-in-action project areas to receive vegetation manipulation projects to enhance current rangeland conditions. These are the Pecos Uplands, Hondo, Turkey Track, East Chaves, West Chaves, Macho, and Tularosa project areas, all located within the Roswell Field Office area. These are mentioned here in the context of cumulative impacts of grassland restoration efforts on a large scale. As pointed out, site conditions differ and a reason for the development of additional environmental assessments covering proposed vegetation manipulation projects in their respective areas. As a matter of disclosure, the collective acreage for treatment of public land for this grassland restoration endeavor is about 1,127,000 acres of federal land, or about 75 percent of all public land within the Roswell Field Office.

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. In general, long term vegetation and soil health would benefit the grassland ecosystem and wildlife species dependent on this habitat type, custom and culture would be sustainable from enhance 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. The conclusion of impacts to other resource values from mesquite control would not be significant are discussed in detail in Section IV of the EA.

VI. COMMITMENT OF RESOURCE

The proposed action is a non-reversible and irretrievable commitment of the rangeland resource. Irreversible and irretrievable commitments would be minimal, but would include some short-term soil movement and some level of mortality to small mammals within the proposed burn areas.

VII. SUMMARY

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.

VIII. PERSONS OR AGENCIES CONSULTED

The following are people who have been consulted and their comments in regards to the proposed action other than the field office specialists.

BLM Staff
Howard Parman, Planning and Environmental Coordinator
Joseph Navarro, Rangeland Management Specialist
Dan Baggao, Wildlife Biologist
Rebecca L. Hill, Archaeologist
Bill Murry, Outdoor Recreation Planner
Michael McGee, Hydrologist
John Simitz, Geologist
Helen Miller, Rangeland Management Specialist
Jerry Dutchover, Geologist

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APPENDIX A

Chemical Labels and MSDS Information