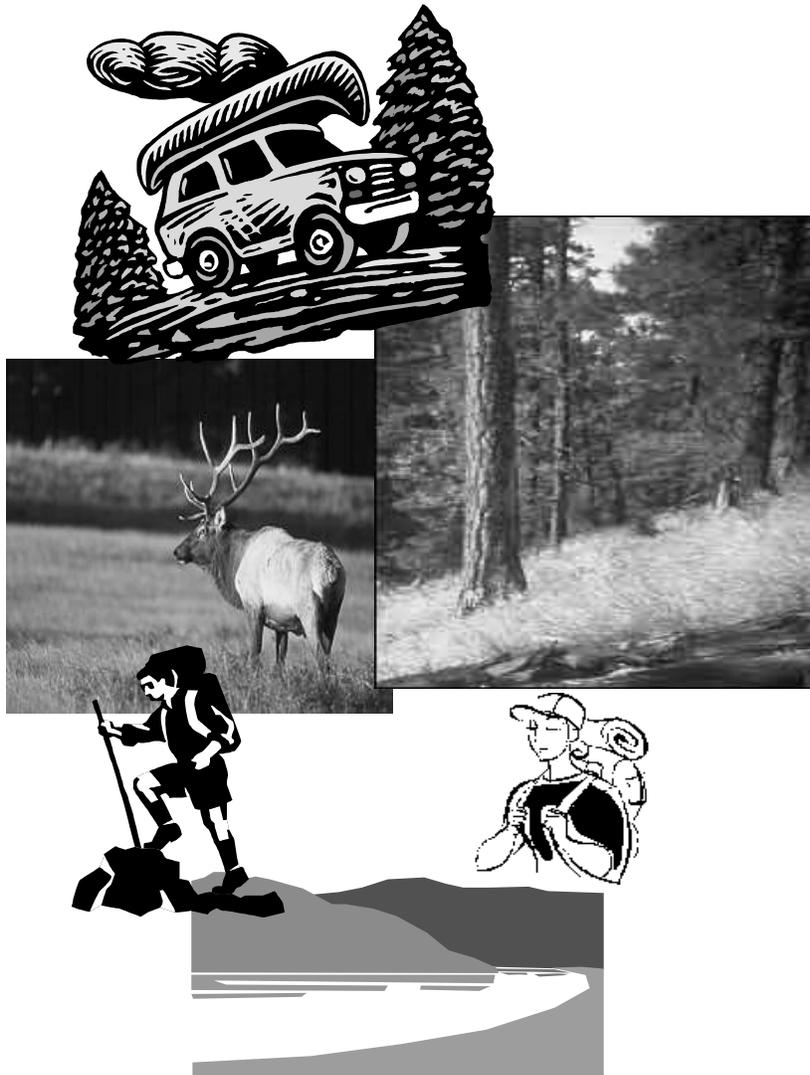




SIX SHOOTER BLACK DEER VEGETATION MANAGEMENT PROJECT

Environmental Assessment



Gila National Forest
Reserve Ranger District
Catron County, New Mexico
19 July 2004

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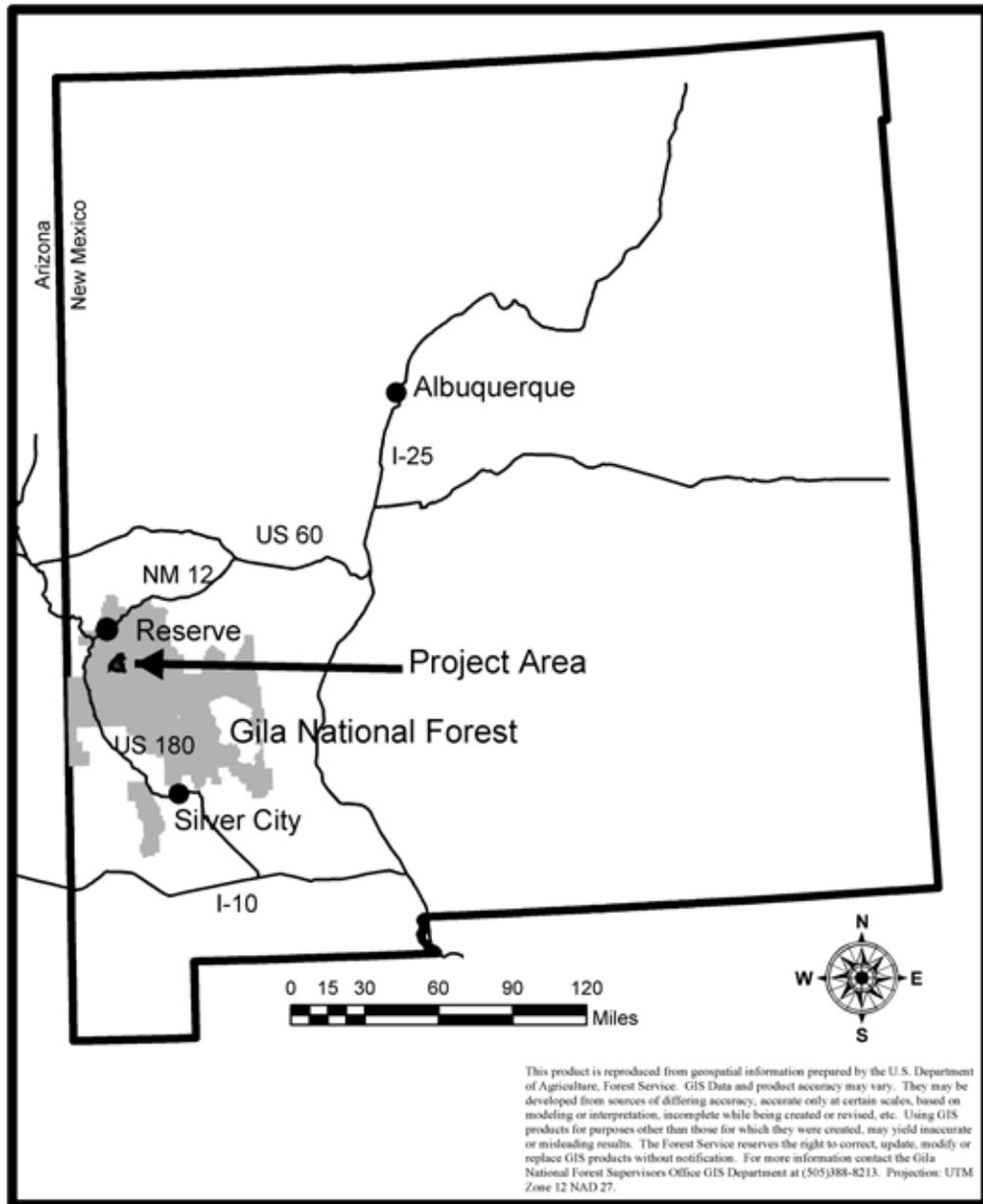
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Figure 1. Six Shooter and Black Deer Project overview map, Catron County, NM.



Chapter 1. Purpose and Need for Action

Users Guide to Chapter 1

1.1 Introduction

1.2 Proposed Action

1.3 Need for Action

1.4 Management Direction

1.5 Public Involvement

1.6 Issues

1.7 Decision(s) to be Made

1.1 Introduction

The Reserve Ranger District is proposing to carry out a vegetation management project in a portion of the Negrito Watershed. The project area is located in Catron County, about 15 miles southeast of the Village of Reserve, New Mexico (Figure 1). It encompasses approximately 12,426 acres of National Forest System land in the south-central portion of the Negrito Watershed.

This EA (Environmental Assessment) discloses the direct, indirect, and cumulative effects of the proposed action, one action alternative, and the no action alternative. Following public review and comment on this EA, the District Ranger will determine if a Decision Notice and FONSI (Finding of No Significant Impact) will be prepared.

1.2 Proposed Action

This section provides a summary of activities proposed for the Six Shooter Black Deer Vegetation Management Project. A more detailed description of the proposed actions is presented in Chapter 2.

PROPOSED ACTION

Forest Management

- Reduce Tree Density
- Move towards Uneven Aged Stand Structure

Woodland and Grassland Management

- Conduct Thinning
- Restore Meadows

Hazardous Fuel Reduction

- Conduct Fuel Treatment
- Carry-out Low Intensity Prescribed Burning

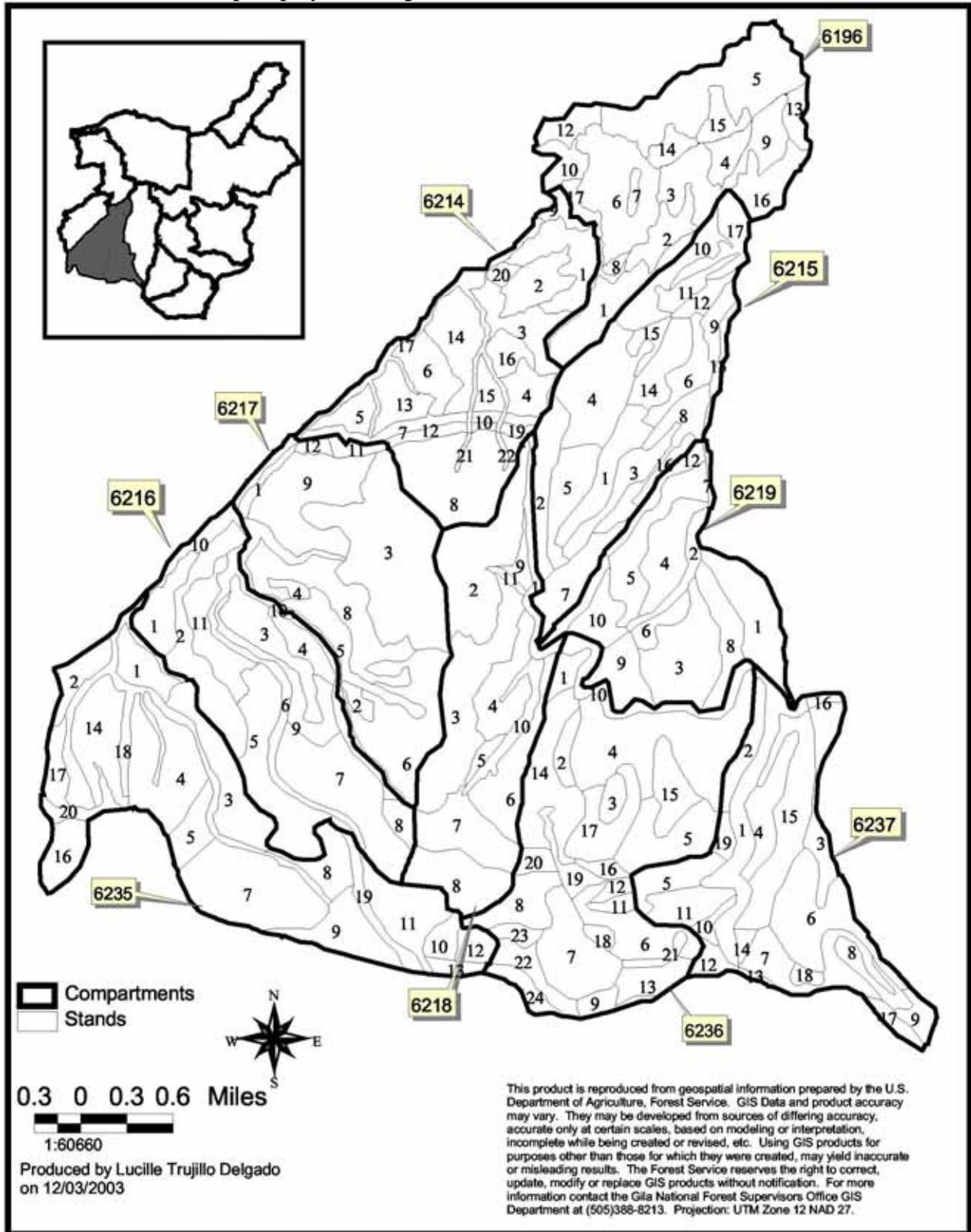
Travel Management

- Maintain Open Roads
- Reopen Closed Roads temporarily
- Decommission Roads

The proposed action would:

- Reduce tree density by thinning and prescribed burning in ponderosa pine and mixed conifer forest types to reduce hazardous fuel loadings and reduce tree density.
- Reduce tree density by thinning and prescribed burning in pinyon-juniper woodlands to reduce fire hazards and increase grass and shrub production, and to decrease erosion.
- Restore meadow habitat that has been encroached by thinning trees.

Figure 1-2. Stands and compartments in the Six Shooter Black Deer Project Area.
Inset map displays the Negrito Watershed and subunits.



- Restore an open savannah in two stands of ponderosa pine through thinning and prescribed burning.
- Roads opened for use during project implementation would be closed upon completion of the project. Approximately 2.8 miles of roads would be decommissioned through this project.

Forest management activities would occur on approximately 5738 acres of ponderosa pine and mixed conifer with a combination of silvicultural methods including thinning (3,739 acres), group select (201 acres), group selection/thinning (1,221 acres), and fuel treatment (577 acres). Approximately 42% of the project area would receive a silvicultural treatment.

Woodland and grassland management of pinyon-juniper woodlands and grasslands would include thinning and using prescribed fire to treat over dense stands. Approximately 150 acres of pinyon-juniper woodland would be thinned and 207 acres of meadow would be restored through tree removal and prescribed burning.

Hazardous Fuel Reduction: Prescribed fire would be used on approximately 10,387 acres across the project area. Fire would be used as the primary treatment on 4000 acres and as a follow up treatment on 6387 acres. Reintroducing fire to the ecosystem will provide further protection from high intensity wildfire. Use of low intensity fire to reduce fuels would be used to protect candidate stands for old growth (groups of trees that display characteristics likely to develop into old growth stands), especially in areas of protected activity centers (PACS) for Mexican spotted owls.

Proposed Action Summary	
Action/Parameter	
Thinning	3739 acres
Group Selection	201 acres
Group Selection/Thinning	1221 acres
Fuel Treatment	577 acres
Pinyon-juniper Treatment	150 acres
Meadow Restoration	207 acres
Percent Acreage - Silvicultural Treatment¹	42%
Percent Acreage - All Treatments²	49%
Prescription Burn Only	4000 acres
Rx Burn Post Treatments	6387 acres
Average Tree Density³ (BA)	85
Change in Herbaceous Forage	+19%
Maintain Open Roads	32 miles
Temporarily Open Closed Roads	24.8 miles
Decommission Roads	2.8 miles

¹Mechanical Treatment Only

²Excluding Prescribed Burn Only Treatment

³After project, includes all stands

Travel management would maintain currently open roads and open closed roads for management activities. There are currently 32 miles of open roads. About 24.8 miles of closed roads would be opened for use during the project and re-closed at the completion of the project. Approximately 2.8 miles of obliterated roads would be administratively decommissioned.

1.3 Need for Action

This section describes the need for the proposed actions to shift trends of vegetation structure and composition to natural patterns; to restore fire adapted ecosystems and reduce the threat of uncharacteristic response to wildfire events; to manage for healthy forests that are resilient to insect and disease; to provide quality wildlife habitat; and to provide social and economic values that provide sustainable resources.

Shift Trends to Uneven Aged Forests

There is a need to shift current trends in vegetation structure and composition to mosaic patterns similar to what is considered to have occurred prior to the 1900's.

Covington and Moore (1992) cites various reports of forest conditions prior to Euro-American settlement of North America. The forest structure was reportedly "open and park-like" with more grass cover than what is present today. Managing for natural patterns reduces risks to native species and natural processes; this strategy maintains biodiversity and increases options for management (Hunter 1990).

Need for Action

- Shift Trends to Uneven Aged Forests
- Restore Fire Adapted Ecosystems
- Manage for Healthy Forest
- Protect and Enhance Wildlife Habitat
- Provide Social and Economic Values

Current vegetation composition, structure, and mosaics within the Six Shooter and Black Deer project area are in high departure from an open forest. There is a deficit in some Vegetation Structural Stages (VSS) (VSS classes are defined in Table 1), including VSS 1, 2, 5, and 6. The landscape lacks variation in forest tree size class, age, and spatial patterns across the landscape. There are disproportionate amounts of small diameter, crowded stands of ponderosa pine. Mature and older stands are poorly represented. There are a large number of older trees spread across stands (approx. eight 18"+ dbh trees per acre).

Table 1-1. Vegetation Structural Stage classification

VSS	Forest (dbh – in) ¹	Woodland (drc ² – in) ³
1	0-0.9	0-0.9
2	1.0-4.9	1.0-2.9
3	5.0-11.9	3.0-4.9
4	12.0-17.9	5.0-10.9
5	18.0-23.9	11+
6	24+	N/A
Canopy Cover Classes		
A	0-39%	
B	40-59%	
C	60+%	

¹ For ponderosa pine, Douglas, and white fir

² Diameter at root crown

³ For pinyon and juniper species

Mixed conifer forests that historically contained Douglas and white fir, ponderosa, and Southwestern white pine, and some spruce prior to settlement in the late 1800's have shifted toward more fire intolerant mixed conifer and less of the fire resistant ponderosa pine across New Mexico and Arizona (Johnson 1994).

These changes highlight the need to carry out thinning projects on a landscape level to reduce the over population of ponderosa pine and other species to implement uneven aged management.

Restore Fire Adapted Ecosystems

There is a need to restore fire-adapted ecosystems and reduce risks of catastrophic fire behavior and effects. Current fire regimes are dominated by high intensity fire (Johnson 1994). Frequent low-intensity surface fires would have maintained ponderosa pine forests structure (Covington 1992) prior to 1900. Changes in forest structure and species composition following severe impacts associated with human disturbance (e.g. logging of old growth and

over grazing) during the late 1800's and fire exclusion beginning in the early 1900's have created forest stands that are expected to respond uncharacteristically to wildfire events. The dense understory of ponderosa pine creates an opportunity for stand replacement fire in an ecosystem that evolved with frequent low intensity surface fires.

Manage for Healthy Forest

There is a need to manage for healthy forests that are resilient to disturbances from fire, insects, and disease. Management for endemic levels of insects and disease encourages individual tree and forest stand resiliency that is integral to promoting healthy forests. This also provides structural and compositional characteristics such as dead trees and down logs needed to sustain nutrient cycling processes such as decay.

Current insect and disease levels are in departure from endemic levels across the west (USDA 2002). Historic levels of dwarf mistletoe were maintained in small patches by ground and surface fires. Existing conditions sustained by fire exclusion include extensive, connected patches of dwarf mistletoe. Dwarf mistletoe ratings average 0.3 and 0.25 in the pinyon-juniper woodlands and ponderosa pine types, respectively, across the project area. With the above ratings, approximately 64% of the project area is infected with dwarf mistletoe. There are disproportionate amounts of ponderosa pine stands in the project area infected with dwarf mistletoe compared to the desired future condition.

Western pine beetle populations have increased across New Mexico and Arizona, as well as in the Six Shooter and Black Deer project area in the past 3 years (USDA 2002). Ponderosa pine trees that have low

vigor are susceptible to attack and mortality. Historically, frequent low-intensity surface fires that reduced competition between individual trees and promoted vigorous growth and resilient trees maintained open ponderosa pine stands. Current landscape patterns lack the mosaic patterning that was present prior to European settlement of North America.

Protect and Enhance Wildlife Habitat

There is a need to protect and enhance habitat for federally listed species, sensitive species, management indicator species, migratory birds, and other wildlife within and near the project area.

There is a need to provide quality wildlife habitat for species by providing diverse conditions and reverse broad-scale pine habitats with high tree density. There is a need to increase late seral stages of forest and non-forest vegetation types and manage for a varied landscape (USDA 1996). There is an urgent need to restore low intensity fire regimes that created landscape patterns and habitat for a diverse array of species.

Current habitat conditions are in departure from what is desired according to the Forest Plan and amendments (USDA 1986, USDA 1996). Foraging habitats for species have declined where mid seral forests have replaced early seral grass, shrub, and forest stands.

Provide Social and Economic Values

There is a need to manage sustainable forests that provide social and economic values to local communities. Currently, the Reserve Ranger District provides mostly non-commercial wood products. A small diameter saw mill is being constructed in Reserve. The Reserve Ranger District is

working with local community groups to develop markets for small diameter forest products. Local and adjacent communities utilize wood products such as firewood, posts, and poles. Sustainable big game populations and other recreational opportunities (camping, birding, biking, fishing, outfitters and guides, and special events) contribute to the local economy and enhance the quality of life for nearby and distant communities.

1.4 Management Direction

Forest Plan

National forest management is guided by various laws, regulations, and policies that provide the framework for all levels of planning, including Regional Guides, Land and Resource Management Plans, and site-specific documents, such as this one. The Gila National Forest Plan (USDA 1986) as amended provides guidance for managing these lands. The Forest Plan also identifies additional standards and guidelines for specific areas of land to achieve agency multiple-use goals and objectives. Direction from the forest plan applies to all federal land within the project area affected by the proposed actions.

Mexican Spotted Owl Recovery Plan

The Mexican spotted owl is a federally listed threatened species managed in accordance with the Mexican spotted owl Recovery Plan (USDI FWS 1995). Within the project area, approximately 2,345 acres are protected habitat, 733 acres are mixed conifer restricted habitat, and 5,684 acres are pine/oak restricted habitat. A total of approximately 8,762 acres (70%) of the project are Mexican spotted owl restricted habitat.

National Fire Plan - Cohesive Strategy

The National Fire Plan (2001) provides budget direction to reduce wildland fire risks. Linked to the National Fire Plan, the Cohesive Strategy (US GAO 1999) provides guidance for prioritization and planning of projects to reduce wildland fire risks. Priorities for projects include reduction of risks to:

- Wildland Urban Interface
- Soil, Air, and Water
- Wildlife Species Habitat
- Wildland Sustainability

The general strategy for restoration involves reduction of departure from natural fire regimes and the historic range of variability in vegetation.

1.5 Public Involvement

This section describes the history of planning and public scoping process; the identification of issues retained or eliminated from detailed analysis.

History of Planning and Scoping Process

The recent planning history for the Negrito Watershed and the Six Shooter Black Deer area began with opportunities identified in the Negrito Ecosystem Analysis Report (USFS 1997). The report defines the desired conditions for the watershed in terms of forest health, the risk of catastrophic fire, and other issues. It describes what changes are needed in the forested stands and watershed condition to return the area to its historic range of variability in terms of vegetation and fire. The report identified management opportunities for the landscape that provide the background for this proposed action. This report was written as a tool for management to design projects and provides a comprehensive listing of

projects that have occurred in the past. It is a National Forest Management Act (NFMA) document and is not a decision document, such as an EA or EIS, written under the guidelines of the National Environmental Protection Act.

The Sheep Basin Restoration Project is in the implementation stages in the Sheep Basin project area, which is adjacent to the Six Shooter Black Deer project area. The Sheep Basin project proposed similar actions to those proposed in this environmental assessment and was the first project initiated after the Negrito Ecosystem Analysis Report was completed.

Public scoping

The Six Shooter and Black Deer Vegetation Management proposal was listed in the Gila National Forest's Schedule of Proposed Actions on November 15, 2001. The proposal was provided to the public and other agencies for comment during scoping beginning June 20, 2002. As part of the public involvement process, the Reserve Ranger District conducted field trips with representatives of the Catron County Citizens Group, the Catron County Commissioners office, the Center for Biological Diversity, and other interested parties.

1.6 Issues

This section describes relevant issues that were identified during the scoping process and analysis conducted by the ID Team. Issues that were retained as **significant issues are described in Section 1.6.1.**

The Forest Service separated the issues into two groups: significant and non-significant issues. Significant issues were defined as those directly or

indirectly caused by implementing the proposed action. Non-significant issues were identified as those: 1) outside the scope of the proposed action; 2) already decided by law, regulation, Forest Plan, or other higher level decision; 3) irrelevant to the decision to be made; or 4) conjectural and not supported by scientific or factual evidence. The Council for Environmental Quality (CEQ) NEPA regulations require this delineation in Sec. 1501.7, "...identify and eliminate from detailed study the issues which are not significant or which have been covered by prior environmental review (Sec. 1506.3)...". A list of non-significant issues and reasons regarding their categorization as non-significant is found in the Six Shooter and Black Deer project record.

Issues Studied in Detail

This section discusses significant issues for the proposed action; describes the action or actions that will cause the potential effects; explains relationships between the potential effects; and provides indicators used to measure the environmental consequences.

Issue # 1: Roads

Opening closed roads to implement project activities is unnecessary to meet project objectives

Indicators

- Acres with reduced fire hazard
- Percent of area treated

Issue # 1: Road Activities and Potential Effects: Opening closed roads to implement project activities is unnecessary to meet project objectives. Concerns were raised that the proposed opening of closed roads is not necessary to

reduce the fuel loading in the Negrito Watershed, or is not needed for the mechanical treatments and prescribed burns described in the scoping letter. As a result, Alternative 3 was developed to determine if the current open road network would meet the purpose and need, or if the purpose and need are better met through Alternative 2.

Indicators:

Acres with reduced fire hazard, Percent of area treated.

Issue # 2: Old Growth

Removal of large diameter, mature or old growth ponderosa pine reduces the amount of old growth.

Indicators

- Number of 18+ dbh trees after treatment
- Acres of old growth protected

Issue #2: Old Growth: Removal of large diameter, mature or old growth ponderosa pine reduces the amount of old growth. Several respondents commented on old growth protection measures, yellow pine retention, limiting affected trees based upon size, and mature tree retention. Setting an arbitrary diameter limit would protect some large immature trees and could cut some smaller mature trees. Therefore, Alternative 2 retains all yellow pines and Alternative 3 would remove selected yellow pines that are diseased or present a safety risk.

Indicators:

Number of 18+ dbh trees after treatment
Acres of old growth protected

1.7 Decision(s) To Be Made

This section describes the range of potential actions that are to be decided on, identifies other agencies involved in the NEPA analysis, the type of decision to be made and who the decision makers are.

This EA does not document a decision. The purpose of this document is to disclose the effects and consequences of the proposed action, an action alternative, and the no action alternative. This allows the public an opportunity to comment on the specific activities described in the alternatives. Using the information in this EA, the District Ranger will make a decision based on consideration of project alternatives, the effects, and public comments.

Decisions to be made for this project are:

- Should actions to open closed roads to access treatment areas be implemented in the Six Shooter and Black Deer Project Area?
- Should actions to restore vegetation conditions including silvicultural treatments, fuel treatments, and use of prescribed fire be implemented in the Six Shooter and Black Deer Project Area?

If so:

- Where within the project area should these activities occur?
- What type and mix of timber stand treatments and prescribed fire should be implemented?
- What roads should be used to access treatment areas?
- What operating standards, mitigation measures, and monitoring studies should be applied to this project?

Tools:

- Prescribed Fire
- Silvicultural: Thinning, Group Selection, and Fuel Treatments
- Travel Management: Road Opening, Road Closures, and Road Decommissioning

Prescribed fire: Use of prescribed fire techniques may be considered for any season; prescribed fires may be low intensity surface or mixed surface and limited crown fires. Existing features such as roads, trails, open areas of vegetation and hand constructed fuel breaks are considered as containment strategies for prescribed fire operations. Mechanical treatment of fuels, cutting, and piling, or spreading of fuels may be needed to pre-treat target areas prior to ignition, either to reduce fuel loadings or to create sufficient fuels to carry a ground fire. Ignition methods considered include helicopters equipped with fire ignition devices (helitorch or ping pong balls and/or drip torch ignition). Prescribed fire is also considered as a tool for treating fuels associated with treatment activities. Thinning and group selection treatments can produce fuels in excess of natural levels and actions to reduce fuels may consider broadcast burning or pile burning.

Silvicultural techniques that are considered for the proposed action include thinning and group selection techniques. Thinning is defined as removal of understory trees that contribute to overcrowding in stands and increased competition for growth. Group selection treatments would receive removal activity on 10% of the stand acreage. Group cuts, essentially small seed tree cuts no larger than 4 acres in size would be scattered throughout the stand. In some stands the remainder of the unit would be uncut at this entry. Other stands will have thinning across the remainder of the unit.

Chapter 2. Alternatives Including the Proposed Action

Users Guide to Chapter 2

- 2.1 Introduction
- 2.2 Alternative Development
- 2.3 Description of Alternatives, Including the Proposed Action
- 2.4 Description of Alternatives Considered but Eliminated from Detailed Study
- 2.5 A Comparison of Environmental Consequences

2.1 Introduction

This chapter documents the alternatives developed by the ID Team to address key

Table 2.1. Summary of Which Alternatives Respond Most Favorably to Issues.

Alternative	Issue 1 Roads	Issue 2 Old Growth
No Action Alt.1		
Proposed Action Alt 2		X
Alternative 3	X	
The primary purpose and need of the proposed action is to improve forest health and reduced wildfire risk activities, which includes reduction in tree density and restoration of forested and grassland habitats and restoration of fire.		

issues, to meet the purpose and need as described in Chapter 1, and describes the

“no action” alternative. Table 2-1 displays which alternatives respond most favorably to the key issues. Three alternatives are considered in detail: Alternative 1 (No Action), Alternative 2 (the Proposed Action), and Alternative 3.

Based on information and analysis presented in Chapter 3 Affected Environment and Environmental Consequences, this chapter provides a comparative summary of environmental effects of the alternatives.

2.2 Alternative Development

The alternatives and the proposed action were designed to meet the purpose and need for this project detailed in Chapter 1. The following factors and the issues listed in Chapter 1 were used to develop the alternatives.

Existing Vegetation Cover

Stand exam data was used to characterize current vegetation cover types and stand delineation for the project area. Cover types include: Ponderosa pine; Mixed conifer (Douglas-fir, white fir, Southwestern white pine and ponderosa pine); Pinyon-juniper woodlands; and Ponderosa pine/grasslands.

Vegetation Structural Stages

Vegetation structural stage characterizations were developed using agency databases, aerial photo interpretations, and field validations. VSS classification is defined in Chapter 1, page 5.

Desired Future Condition (DFC)

Desired Future Condition is defined as existing or potential vegetation cover type, seral stage, and disturbance that would meet the project purpose and need. The ID Team identified the DFC for proposed treatment units based on the historic range of variation in vegetation, structure, and disturbance. The ID team then determined what

vegetation structure could be **changed to meet objectives to:**

Shift trends to natural patterns;
 Restore fire adapted ecosystems;
 Manage for healthy forests;
 Provide quality wildlife habitat;
 Provide Social and Economic Values.

The team then determined what the **most effective tool combination** could be used to achieve the objectives.

Polygon Identification

The Six Shooter Black Deer project area was mapped using species composition, vegetation structure, and size classes. Each polygon was assigned a unique identifying number.

Tools

Protection, fire, and mechanical tools available to make changes in vegetation, structure and disturbance include:

Protection of existing vegetation and structure in the current condition;
Fire to include management ignited fire; and
Treatments using thinning, group, and individual tree selection silvicultural methods.

Treatment Prescription

Individual polygons were assigned a treatment prescription based on existing vegetation and structure and the desired future outcome to meet objectives. Some polygons were assigned more than one tool if objectives could potentially be met with either tool.

2.3 Description of Alternatives, Including the Proposed Action

Alternative 1: No Action

The National Environmental Policy Act and the Forest Service Handbook require the Forest Service to study the No Action Alternative in detail, and to use it as a

Alternative A: No Action

Continue present management

Management Requirements

None

Monitoring Requirements

None

baseline for comparing the effect of alternatives (40 CFR 1502.15(d); Forest Service Handbook 1909.15, 14.1). Though this alternative does not respond to the defined purpose and need for addressing Forest Plan objectives, it is included here as a baseline to the action alternatives.

The No Action Alternative assumes no actions beyond those already occurring (e.g. fire suppression, minor road maintenance, grazing management) would take place across the project area. No vegetative treatments, prescribed burns, or opening of closed roads for management needs would occur. Forest succession would continue and stand ages would advance. Forest tree species composition would be a product of succession and disturbance in a fire suppression environment, and would continue to move the stand composition away from that which historically occurred in the project area.

Forest Plan and Amendment direction for a desired future condition would not be met. The deficits in VSS 1, 2, 5, and 6 would remain. Overstocked conifer stands would continue to stagnate, increasing risk of loss due to insects or disease. Mortality of larger sized trees would result in a decrease in

management options for future forest structure. Regeneration would be reduced as size of open areas decrease. Stand diversity would decrease as stands would eventually only have one or two age classes, with the majority of the trees being smaller and younger. Stands and habitat would be at increased risk due to fuels buildup.

Available forage would continue to decrease. No economic benefits to the local economy from project-associated contracts or wood products would occur.

Present management activities would continue, including livestock grazing, personal use fuel wood gathering for dead and down wood, dispersed recreation (hunting, camping, sight seeing), and special use permits for outfitter and guides. Human caused fires would be suppressed and lightning caused fires would be considered for wildland fire use where appropriate. No silvicultural treatments would occur.

Maintenance of 32 miles of existing open roads would continue, no new roads would be constructed, nor would any closed roads be opened or decommissioned.

This alternative does not meet the purpose and need as described in Chapter 1. This alternative would not shift management towards uneven aged forest stands and would not restore fire-adapted ecosystems. Forest health would continue to decline and wildlife habitat would not be actively protected nor enhanced. There would be no economic benefits to the local community.

Mitigations Common to All Action Alternatives

These measures were guided by the direction from the previously cited Forest Plan and Amendment and recommendations by the ID Team. ID Team specialists used

on-the-ground inventories, Geographical Information System (GIS) data, and aerial photographs to prepare reports. Resource specialists provided input on how concerns could be mitigated (if not completely avoided) in the design of each activity. Resource concerns and mitigation measures may be further refined during final design work and/or during implementation.

Applicable Forest Plan standards and guidelines, the "Best Management Practices" (BMPs) used to meet the requirements of the Clean Water Act, and project-specific mitigation measures are identified in these reports. The following items are listed to highlight some of the key direction from the Gila Forest Plan (primarily from Chapter 4, "Management Direction").

Vegetation Management

- Thin trees primarily from below.
- Restore 207 acres of grassland.
- Thin in an effort to release Gambel oaks throughout the project area, freeing these trees by removal of adjacent species where possible.
- Small diameter thin 849 acres of ponderosa pine and mixed conifer stands, retaining approximately 115-180 trees per acre.
- Thin and mechanically control sprouting on 150 acres of pinyon juniper woodlands, thinning to 30-50 BA.
- Emphasize clumped distribution of older and mature trees where structural diversity is needed.
- Implement improvement cuts, at varying intensities and for the purpose of treating ladder fuels, on all acreage being silviculturally treated. Species to be treated include gray oak, pinyon pine, ponderosa

pine, Douglas-fir, white fir and pinyon-juniper species.

Threatened, Endangered, Sensitive and other Wildlife Resources

A Biological Assessment and Evaluation has been completed, and concurrences will be obtained from the responsible federal agency, for any threatened or endangered species and their habitat potentially inhabiting the project area. Management guidelines have been applied as needed to ensure that any wildlife species and their habitats will not be adversely affected.

- Leave all snags standing unless considered a safety hazard.
- Provide wildlife corridors that connect to other corridors outside the project area.
- Apply fuel treatments to approximately 577 acres of Mexican spotted owl protective habitat to abate fire risk.
- Leave all 23.9+ inch dbh trees in Mexican spotted owl restricted habitat.
- Follow Mexican Spotted Owl Recovery Plan monitoring protocols.
- Delineate “no treatment” areas or install sediment traps around and upstream of Chiricahua leopard frog habitat (tanks).

Soils, Water Quality and Wetlands

The design of project activities and road reconstruction is in accordance with Forest Plan standards and guidelines, the Regional Guide, Best Management Practices, and applicable Forest Service manual and handbook direction. Project activities are expected to meet all applicable State of New Mexico water quality standards. There are no listed 303.d water quality impaired streams in the project area, and no permits

under Section 404 of the Clean Water Act will be required.

- Use approximately 32 miles of existing open roads.
- Decommission 2.8 miles of currently closed roads (Appendix 1).
- A minimum 50-foot no treatment buffer from mechanized silvicultural treatments would be applied to intermittent and ephemeral drainages.
- Refrain from utilizing tractor based yarding measures on slopes greater than 25% where rhyolite soils occur, and on all other slopes greater than 40%. Skidding would occur up to ¼ mile from utilized roads.
- Utilize State of New Mexico Best Management Practices and Forest Service Soil and Water Conservation Practices to protect Soil and Water Resources (Project Records 53 and 54).

Heritage Resources

Areas considered as having a high probability of containing heritage resources (cultural sites) have been intensively surveyed by heritage specialists. All identified heritage sites will be avoided. All proposed actions have received clearance from the New Mexico State Historic Preservation Officer.

- Apply a protective buffer around heritage sites.
- Have an archeologist on site during treatment near sites.

Old Growth

There are no stands in the project area currently identified as meeting this condition. Vegetation structural stages (VSS) classes 5 and 6 (mature forest and old

forest) come closest to meeting this condition.

Because no identified old growth stands occur in the project area, components of stands with old growth characteristics are being left throughout the area. Twenty-six stands (2,640 acres, 21% of the project area) will be managed for Old Growth. One VSS 5 class stand will receive partial thinning, and no VSS 6 class stands will receive mechanical treatment.

- Manage 26 stands (2,641 acres) for Old Growth characteristics

Range

Coordinate range grazing allotment rotational schedules as appropriate to allow sufficient forage regeneration

Air Quality, Fuels and Fire

Emissions anticipated from the implementation of any project alternative will be of short duration and are not expected to exceed ambient air quality standards.

- Abide by the State of New Mexico smoke management guidelines
- Follow established Burn Plan procedures for notification, safety, timing, and duration of burns
- Mortality due to prescribed burning will be limited to 15-25% in non-restricted stands, 5-15% in MSO restricted stands
- Stands on steeper slopes may be prescribed burned

Visual Quality

Units within these areas have been designed to meet the visual quality objectives of the Partial Retention and Modification designations in the Forest Plan.

Social and Economic

Implementation of any project alternative is not anticipated to cause disproportionate adverse human health or environmental effects to minority or low-income populations.

Monitoring

The National Forest Management Act requires that National Forests monitor and evaluate their forest plans (36 CFR 219.11). Chapter 5 of the Forest Plan includes the monitoring and evaluation activities to be conducted as part of Forest Plan implementation.

The Forest Plan complies with all resource integration and management requirements of 36 CFR 219 (219.14 through 219.27). Application of Forest Plan direction for the Six Shooter and Black Deer Vegetation Management project ensures compliance at the project level.

Alternative 2: Proposed Action

This alternative would meet the purpose and need as described in Chapter 1. This alternative would shift the emphasis towards uneven aged management by reducing tree densities in varying amounts across stands and by protecting older trees and stands. Fire-adapted ecosystems would be restored through the use of prescribed fire as either the primary or secondary treatment. Forest health would be addressed by reducing tree densities, by creating a mosaic pattern across the landscape, by reducing the rate of dwarf mistletoe infection, and by maintaining stands of older mature trees. Meadows would be restored in areas where they previously existed. Wildlife habitat would be actively protected or enhanced by reducing tree densities, by creating a mosaic pattern, and by reducing the risk of catastrophic wildfire. Vegetation structure

would be modified to increase size class diversity in MSO habitat. There would be some economic benefits to the local community. Wood products would be

Alternative 2: Proposed Action

Ponderosa Pine Forest

Thin (3,068 acres)
Group Selection/Thin (1,221 acres)
Group Selection Only (201 acres)

Mixed Conifer Forest

Thin (671 acres)

Piñon-juniper Woodland

Mechanical Treatment (150 acres)

Meadow Restoration

Mechanical Treatment (207 acres)

Prescribed Burning

10,387 acres

Gambel Oak

Reduce Competition (4,239 acres)

Mature and Old Growth

Designate 26 stands to be managed as old growth (2,640 acres)

Roads

Open Roads (32 miles)
Open Closed Roads (24.8 miles)
Close Reopened Roads (24.8 miles)
Decommission Roads (2.8 miles)

Management Requirements

No removal of 24.0+ dbh trees
PACs delimited
Seasonal closures for owls and insects
Buffer Chiricahua leopard frog habitat
Buffer drainages
Operate under BMP's
Fire Condition Classes 2 & 3 reduced to Condition Class 1

Monitoring Requirements

Pre- and post treatment habitat monitoring in MSO restricted habitat and PAC's
MSO surveys
MSO surveys post treatment in one PAC
Prescription implementation monitoring
Treatment implementation monitoring
Prescribed burn monitoring

available for local mills and community needs.

This alternative responds to the Issue 1 (roads) by closing roads used for the project and by not using roads that would increase

impacts on the watershed, i.e. roads build in drainage bottoms. This alternative responds to Issue 2 (old growth) by not removing yellow pines, by limiting the removal of mature trees (other than yellow pines) and by focusing density reduction on smaller diameter trees.

Vegetation Management

- Thin trees primarily from below.
- Restore 207 acres of meadow.
- Thin in an effort to release Gambel oaks throughout the project area, freeing these trees by removal of other tree species where possible.
- Small diameter thin 671 acres of mixed conifer stands, retaining approximately 115-180 trees per acre.
- Thin and mechanically control sprouting on 150 acres of pinyon juniper woodlands, thinning to 30-50 BA.
- Apply underburning (prescribed fire) to 10,387 acres.
- Retain all yellow pines (see definition in Appendix 3).
- Emphasize clumped distribution of older and mature trees where structural diversity is needed.
- Implement improvement cuts, at varying intensities and for the purpose of treating ladder fuels, on all acreage being silviculturally treated. Species to be treated include gray oak, pinyon pine, ponderosa pine, Douglas-fir, white fir, and pinyon-juniper species.

Silvicultural Treatments

- Apply thinning treatment to 2,890 acres of ponderosa pine stands.
- Group select and thin on approximately 1,221 acres of ponderosa pine stands, creating openings of 1/4 to 4 acres in size

over approximately 10% (122 acres) of the area, thinning the remaining 1,099 acres to 50-70

- Group select within approximately 201 acres of ponderosa pine, creating openings of 1/4 to 4 acres in size over approximately 10% of the area (20 acres).
- Silvicultural activities that put slash on the ground should be restricted to the period between July 1 and January 31, unless a reasonable method is proposed which reduces the threat of ips beetle infestation. This would be for the purpose of limiting the potential for ips/bark beetle infestation.

Threatened, Endangered, Sensitive and other Wildlife Resources

A Biological Assessment and Evaluation has been completed, and concurrences would be obtained from the responsible federal agency, for any threatened or endangered species and their habitat potentially inhabiting the project area. Standards and guidelines have been applied.

- Leave all 24.0+ inch dbh trees in Mexican spotted owl restricted habitat.
- Leave all snags standing unless considered a safety hazard.
- Provide wildlife corridors that connect to other corridors outside the project area.
- Apply fuel treatments to approximately 577 acres of Mexican spotted owl protected habitat to abate fire risk.
- Use low risk burning methods in and near Mexican spotted owl protected habitat, such as jackpot burning.
- Delineation of no treatment areas or installation of sediment traps upstream of Chiricahua leopard frog

occupied stock tanks where appropriate, to reduce or eliminate sediment and ash deposition into these habitats.

- Leave all “yellow pines”.
- Emphasize clumped distribution of older and mature trees.
- Leave all oak and, where possible, remove immediately adjacent trees.

Old Growth

There are no stands in the project area currently identified as meeting this condition. Vegetation structural stages classes 5 and 6 come closest to meeting this condition. Because no identified old growth stands occur in the project area, components of stands with old growth characteristics are being left throughout the area. No yellow pine will be removed. Twenty-six stands (2,640 acres, 21% of the project area) will be managed for old growth. One mature class will receive partial thinning, and no old forest class stands will receive mechanical treatment.

Soils, Water Quality and Wetlands

The design of project activities and road reconstruction is in accordance with Forest Plan standards and guidelines, the Regional Guide, Best Management Practices (Project Record 54), and applicable Forest Service manual and handbook direction. Project activities are expected to meet all applicable State of New Mexico water quality standards (State of New Mexico 2002). There are no listed 303.d water quality impaired streams in the project area, and no permits under Section 404 of the Clean Water Act would be required.

- Use approximately 32 miles of existing open roads.
- Open 24.8 miles of existing closed roads, roads would be temporarily reopened, to be re-closed following

- treatment activities. These roads are listed in Appendix 1.
- Decommission 2.8 miles of currently closed roads (Appendix 1).
 - A minimum 50-foot no treatment buffer from mechanized silvicultural treatments would be applied to intermittent and ephemeral drainages.
 - Refrain from utilizing tractor based yarding measures on slopes greater than 25% where rhyolite soils occur, and on all other slopes greater than 40%. Skidding would occur up to ¼ mile from utilized roads.
 - Utilize State of New Mexico Best Management Practices and Forest Service Soil and Water Conservation Practices to protect Soil and Water Resources (Project Records 53 and 54).

Heritage Resources

Areas considered as having a high probability of containing heritage resources (cultural sites) have been intensively surveyed by heritage specialists. All identified heritage sites would be avoided. All proposed actions have received clearance from the New Mexico State Historic Preservation Officer.

Range

Coordinate range grazing allotment rotational schedules as appropriate to allow sufficient forage regeneration. When possible, pastures would be rested from livestock grazing for at least one growing season after burning.

Air Quality, Fuels, and Fire

Emissions anticipated from the implementation of any project alternative would be of short duration and are not expected to exceed ambient air quality standards.

- Abide by the State of New Mexico smoke management guidelines.
- Follow established Burn Plan procedures for notification, safety, timing, and duration of burns.
- Mortality due to prescribed burning would be limited to 15-25% in non-restricted stands, 5-15% in restricted stands.
- Stands on steeper slopes would be prescribed burned.

Visual Quality

Units within these areas have been designed to meet the visual quality objectives of the partial retention and modification designations in the Forest Plan.

Social and Economic

- Provide forest products for the local mill.
- Stimulate the local economy by providing timber related employment.

Alternative 3

Alternative 3 would address the purpose and need much in the same way as Alternative 2. This alternative would shift the emphasis towards uneven aged forest management by reducing tree densities in varying amounts across stands and by protecting older trees and mature stands, but across fewer acres. Fire-adapted ecosystems would be restored through the use of prescribed fire as either the primary or secondary treatment. More acres would be treated with fire as the primary treatment in this alternative. Forest health would be addressed by reducing tree densities, by creating a mosaic pattern across the landscape, by reducing the rate of dwarf mistletoe infection, and by maintaining stands of older mature trees, across a smaller portion of the project area. Pine grasslands would be restored in areas

where they previously existed. Wildlife habitat would be actively protected or enhanced by reducing tree densities, by creating a mosaic pattern, and by reducing

Alternative 3: Proposed Action

Ponderosa Pine Forest

Thin (2,051 acres)
Group Selection/Thin (873 acres)
Group Selection Only (131 acres)

Mixed Conifer Forest

Thin (671 acres)

Piñon-juniper Woodland

Mechanical Treatment (150 acres)

Meadow Restoration

Mechanical Treatment (207 acres)

Prescribed Burning

10,248 acres

Gambel Oak

Reduce Competition (2,804)

Mature and Old Growth

Designate 26 stands to be managed as old growth
(2,640 acres)

Roads

Open Roads (32 miles)
Decommission Roads (2.8 miles)

Management Requirements

No removal of 24.0+ dbh trees
PACs delimited
Seasonal closures for owls and insects
Buffer Chiricahua leopard frog habitat
Buffer drainages
Operate under BMP's
Fire Condition Classes 2 & 3 reduced to Condition Class 1

Monitoring Requirements

Pre- and post treatment habitat monitoring in MSO restricted habitat and PAC's
MSO surveys
MSO surveys post treatment in one PAC
Prescription implementation monitoring
Treatment implementation monitoring
Prescribed burn monitoring

the risk of catastrophic wildfire. Vegetation structure would be modified to increase size class diversity in MSO habitat. There would be some economic benefits to the local community. Wood products would be available for local mills and community needs. The degree to which this alternative

addresses the purpose and need would be reduced, compared to Alternative 2, due to the fewer number of acres mechanically treated. The effects of Alternative 3 relative to the purpose and need would have a shorter term impact than Alternative 2.

This alternative responds to the issue 1 (roads) by not using closed roads during the project and by not using roads that would increase impacts on the watershed, i.e. roads built in drainage bottoms. This alternative responds to Issue 2 (old growth) by removing yellow pines only when diseased or dying, by limiting the removal of older mature trees and by focusing density reduction on smaller diameter trees.

Vegetation Management

- Thin trees primarily from below.
- Restore 207 acres of meadow.
- Thin in an effort to release Gambel oaks throughout the project area, freeing these trees by removal of other tree species where possible.
- Small diameter thin 671 acres of mixed conifer stands, retaining approximately 115-180 trees per acre.
- Thin and mechanically control sprouting on 150 acres of pinyon juniper woodlands, thinning to 30-50 BA.
- Apply underburning (prescribed fire) to 10,248 acres.
- Retain most yellow pines (see definition in Appendix 3), removing dwarf mistletoe infected yellow pine trees.
- Emphasize clumped distribution of older and mature trees where structural diversity is needed.
- Implement improvement cuts, at varying intensities and for the purpose of treating ladder fuels, on all acreage being silviculturally

treated. Species to be treated include gray oak, pinyon pine, ponderosa pine, Douglas-fir, white fir and pinyon-juniper species.

- Silvicultural activities that put slash on the ground should be restricted to the period between July 1 and January 31 unless a reasonable method is proposed which reduces the threat of ips beetle infestation. This would be for the purpose of limiting the potential for ips/bark beetle infestation.

Silvicultural Treatments

- Apply thinning treatment to 2,051 acres of ponderosa pine stands.
- Group select and thin on approximately 873 acres of ponderosa pine stands, openings of 1/4 to 4 acres in size over approximately 10% (87 acres) of the area, thinning the remaining 786 acres to 50-70 BA, emphasizing a clumped distribution of older and mature trees.
- Group select within approximately 131 acres of ponderosa pine, creating openings of 1/4 to 4 acres in size over approximately 10% of the area (13 acres).
- Silvicultural activities that put slash on the ground should be restricted to the period between July 1 and January 31 unless a reasonable method is proposed which reduces the threat of ips beetle infestation. This would be for the purpose of limiting the potential for ips/bark beetle infestation.

Threatened, Endangered, Sensitive and other Wildlife Resources

A Biological Assessment and Evaluation has been completed, and concurrences would be obtained from the responsible federal

agency, for any threatened or endangered species and their habitat potentially inhabiting the project area. Standards and guidelines have been applied as needed to ensure that any wildlife species and their habitats would not be adversely affected.

- Leave all 23.9+ inch dbh trees in Mexican spotted owl restricted habitat.
- Leave all snags standing unless considered a safety hazard.
- Provide wildlife corridors that connect to other corridors outside the project area.
- Apply fuel treatments to approximately 577 acres of Mexican spotted owl protected habitat to abate fire risk.
- Use low risk burning methods in and near Mexican spotted owl protected habitat, such as jackpot burning.
- Delineation of no treatment areas or installation of sediment traps upstream of Chiricahua leopard frog occupied stock tanks where appropriate, to reduce or eliminate sediment and ash deposition into these habitats.
- Emphasize clumped distribution of older and mature trees.
- Leave all oak and remove immediately adjacent trees.

Old Growth

There are no stands in the project area currently identified as meeting this condition. Vegetation structural stages (VSS) classes 5 and 6 (mature forest and old forest) come closest to meeting this condition. Because no identified old growth stands occur in the project area, components of stands with old growth characteristics are being left throughout the area. Some yellow pine may be removed if diseased or dying. Twenty-six stands (2,640 acres, 21% of the

project area) will be managed for old growth. One mature class will receive partial thinning, and no old forest class stands will receive mechanical treatment.

Soils, Water Quality and Wetlands

The design of project activities and road reconstruction is in accordance with Forest Plan standards and guidelines, the Regional Guide, Best Management Practices, and applicable Forest Service manual and handbook direction. Project activities are expected to meet all applicable State of New Mexico water quality standards. There are no listed 303.d water quality impaired streams in the project area, and no permits under Section 404 of the Clean Water Act would be required.

- Use approximately 32 miles of currently open roads.
- Decommission 2.8 miles of currently closed roads (Appendix 1).
- A minimum 50-foot no treatment buffer from mechanized silvicultural treatments would be applied to intermittent and ephemeral drainages.
- Refrain from utilizing tractor based yarding measures on slopes greater than 25% where rhyolite soils occur, and on all other slopes greater than 40%. Skidding would occur up to ¼ mile from utilized roads.
- Utilize State of New Mexico Best Management Practices and Forest Service Soil and Water Conservation Practices to protect Soil and Water Resources.

Heritage Resources

Areas considered as having a high probability of containing heritage resources (cultural sites) have been intensively surveyed by heritage specialists. All identified heritage sites would be avoided.

All proposed actions have received clearance from the New Mexico State Historic Preservation Officer.

Range

Coordinate range grazing allotment rotational schedules as appropriate to allow sufficient forage regeneration. Pastures would be rested from livestock grazing for at least one growing season, after burning.

Air Quality, Fuels, and Fire

Emissions anticipated from the implementation of any project alternative would be of short duration and are not expected to exceed ambient air quality standards.

- Abide by the State of New Mexico smoke management guidelines.
- Follow established Burn Plan procedures for notification, safety, timing, and duration of burns.
- Mortality due to prescribed burning would be limited to 15-25% in non-restricted stands, 5-15% in restricted stands.
- Stands on steeper slopes would be prescribed burned.

Visual Quality

Units within these areas have been designed to meet the visual quality objectives of the Partial Retention and Modification designations in the Forest Plan.

Social and Economic

- Provide forest products for the local mill.
- Stimulate the local economy by providing timber related employment.

2.4 Description of Alternatives Considered but Eliminated from Detailed Study

An additional alternative was evaluated and dropped from detailed analysis. This alternative proposed the use of prescribed and natural fire alone. This was dropped from further analysis as it did not adequately meet the purpose and need of promoting structural diversity, would not reduce ladder fuels in a timely and cost effective manner, would require more frequent prescribed fire re-entry, would result in a shorter duration of ground cover and forage enhancement, and would not provide an economic benefit. Other actions considered, but dropped from further analysis because of potential issues, costs, and/or the inability to achieve the purpose and need, included use of herbicides, constructing 2.2 miles of new road, treating only mistletoe infected stands, applying an arbitrary diameter at breast height (dbh) cap on tree size, and reducing the size of the project area.

2.5 A Comparison of Environmental Consequences

The following table (Table 2.2) provides a summary of each action alternative. Information in the table is focused on activities and effects where different levels of effects or outputs can be distinguished quantitatively among alternatives.

Shift Trends to Uneven Aged Forests

Alternative 1 will not shift trends as no actions will be taken. Alternative 2 mechanically treats 4,260 acres in an effort to effectively begin the shift to uneven-aged management. Alternative 3 treats less acres (3,385) but with a similar shift being towards uneven aged management.

Restore Fire Adapted Ecosystems

Alternative 1 does not restore fire adapted ecosystems. Through a combination of mechanical treatment and prescribed fire, Alternative 2 will restore fire on the landscape across 10,387 acres. Alternative 3 will treat 10,248 acres with fire but with less acres of mechanical treatment the degree to which low intensity fire can be maintained at historic frequencies will be reduced.

Manage for Healthy Forest

Alternative 1 does not provide management for healthy forests. Alternative 2 includes treatments and mitigations that will improve forest health, including mechanical treatment, pre-commercial thinning, prescribed fire, mistletoe treatment, improved vigor and growth in trees and grasses by opening up the canopy, preserving yellow pine trees, providing regeneration sites, restoration of grassland habitat, creating mosaic patterns in the forest stands.

Alternative 3 also provides management actions that will improve forest health as listed above, but the acreage of mechanical treatment is reduced and the length of time that the treatment will provide improvements is reduced.

Protect and Enhance Wildlife Habitat

Alternative 1 does not protect or enhance wildlife habitat beyond the present management level. This includes primarily survey work. Alternative 2 provides actions and mitigations that will protect and enhance wildlife habitat. Many species will benefit from reducing tree densities to a level closer to that of the historic range of variability. Improved vigor and growth in the herbaceous layer will enhance wildlife foraging.

Table 2.2. Summary of no action (Alt 1), the proposed action (Alt 2), and the action alternative (Alt 3) treatments, actions, and outputs. (AC=Acres, MI=Mile, CCF=hundred cubic feet, BA=Basal Area)

Treatment, Action, or Outcome	Unit	Alt 1	Alt 2	Alt 3
Thin	AC	0	3,379	2,722
Group Select/Thin	AC	0	1,221	873
Group Select	AC	0	201	131
Piñon-Juniper Thin	AC	0	150	150
Meadow Restoration	AC	0	207	207
Prescribed Fire	AC	0	10,387	10,248
Open Roads Used	MI	0	32	32
Temporarily Open Closed Roads	MI	0	24.8	0
Roads Decommission	MI	0	2.8	2.8
Percent Area by Mechanical Treatment ¹	%	0%	42%	30%
Percent Area by All Treatments ²	%	0%	49%	33%
Saw Timber Volume ³	CCF	0	7,501	4,393
Average Tree Density ³	BA	105	85	90
High Soil Disturbance ³	AC	0	984	850

¹Mechanical Treatment Only

²Excluding Prescribed Burn Only Treatment

³After project estimate

Grassland species will benefit from the grassland restoration treatment. MSO habitat will be enhanced and protected by reducing the risk of wildfire in around the PAC's. Chiricahua leopard frog habitat will be protected from project activities by providing a buffer around known habitats.

Alternative 3 provides similar enhancements and protection to wildlife habitat, but the acreage of mechanical treatment is reduced and the length of time that the treatment will provide improvements is reduced, i.e. shortened time to the next needed treatment

Provide Social and Economic Values

Alternative 1 does not provide increases in social or economic values beyond what is currently being derived. Fuelwood gathering

and removal of other special use products would continue on a limited basis. Recreational pursuits of camping and hunting would continue.

Alternative 2 provides increase in social and economic values through the 4 items listed above. Improving forest health and managing for uneven aged forests, restoring fire adapted ecosystems, and protecting and enhancing wildlife habitats would increase the satisfaction of many of those using the forest for recreation. Increases in economic values will be provided through the sale of 7, 501 CCF of saw timber and other wood products. This will provide jobs for the economically depressed Catron County.

Alternative 3 will also improve the social and economic value of forest resources. The degree and area of treatment will be reduced. Only 4,393 CCF of saw timber will be provided a lesser quantity of other wood products will be provided and the area of treatment also reduced. Impacts will be of shorter duration under Alternative 3.

Table 2.3. Summary of Effects for Each Alternative by Key Issue.

Alternative	Issue 1 Roads	Issue 2 Old Growth
No Action	Average total road density in the project area of 2.9 mi/sq mi. Continued long-term disturbances in watershed caused by roads. Disturbance to wildlife, habitat fragmented by roads.	No acres protected. Risk of catastrophic wildfire is high. No habitat lost in the short-term; moderate to high risk of stand-replacing wildfires.
Alternative 2	7% decrease in average total road density to 2.7 mi/sq mi. Reduced road-related disturbances to watershed. Reduced disturbance and harassment of wildlife due to fewer roads. Decrease in risk of catastrophic wildfire. Short-term (less than 5 years): Disturbance during project implementation.	5,738 acres thinned to enhance growth in older trees. 26 stands designated old growth. Reduced risk of catastrophic wildfire on 10,387 acres. 577 acres of MSO PAC treated and protected from wildfire. Short-term (less than 5 years): Disturbance during project implementation, reduced fire risk in MSO habitat.
Alternative 3	7% decrease in average total road density to 2.7 mi/sq mi. Reduced road-related disturbances to watershed. Reduced disturbance and harassment of wildlife due to fewer roads. Decrease in risk of catastrophic wildfire. Short-term (less than 5 years): Disturbance during project implementation less than Alt 2.	4,083 acres thinned to enhance growth in older trees. 26 stands designated old growth. Reduced risk of catastrophic wildfire on 10,248 acres. 577 acres of MSO PAC treated and protected from wildfire. Short-term (less than 5 years): Disturbance during project implementation less than Alt 2, reduced fire risk in MSO habitat

Chapter 3. Affected Environment and Environmental Consequences

Users Guide to Chapter 3

3.1 Meeting the Need for the Action

3.2 Issue Related Consequences

3.3 Consequences Related to Significance Elements

3.1 Meeting the Need for the Action

Both actions alternatives would move the project area towards the desired condition as identified in Chapter 1. The implementation of the action alternatives would improve forest health and watershed conditions by treating over-stocked and declining timber stands, treating road-related erosion problems, increasing resilience to catastrophic disturbance, increasing net growth on lands where timber production is a resource co-emphasis, and concentrating growth on fewer trees so large trees develop faster. The No Action Alternative does not move the project area toward desired conditions. Table 3-1 summarizes how each alternative meets the Need for the action.

3.2 Issue Related Consequences

Issue 1. Opening closed roads to implement project activities is unnecessary to meet project objectives.

Affected Environment

The project area is bisected by Forest Road 141, which is paved and is the main access to Negrito Fire Base and to the north end of

the Gila National Forest. Arterial roads to FR 141 were constructed for access to past timber sales or range improvements. Roads are displayed in Appendix 1. There are 32 miles of open roads and 24.8 miles of closed roads in the project area. There are no hiking trails within the project area. A Road Analysis Plan will be completed prior to project implementation.

Alternative 1.

Direct and Indirect Effects

There would be no change in the existing road system should Alternative 1 be implemented. Road maintenance would remain on its current limited schedule.

Limited sediment delivery from rutted road conditions would continue. Not treating the hazardous fuels conditions would also maintain the risk of a high severity fire within the project area. A stand replacing high intensity/severity wildfire would negatively impact soil and water resources from the increase in sediment delivery to stream channels, and from the long term (30 – 100 years) loss of large organic material necessary for soil productivity.

Alternative 2.

Direct and Indirect Effects

Alternative 2 would use approximately 32 miles of existing open roads. Another 24.8 miles of existing closed roads would be temporarily reopened, and closed following treatment activities. These roads are listed in Appendix 1. There would be 2.8 miles of currently closed roads that would be decommissioned (Appendix 1). The actions would utilize State of New Mexico Best Management Practices and Forest Service

Table 3-1. Comparison of how alternatives meet the need for the action.

Need	No Action	Action Alternatives
Shift Trends to Uneven Aged Forests	No trend towards uneven aged stands, VSS classes 2, 3, and 4 are over represented.	Thinning activities to begin trend towards uneven aged stands, reintroduction of fire would further reduce stand densities in over stocked age classes. Alternative 2 mechanically treats 5,738 acres. Alternative 3 mechanically treats 4,083 acres. Protection of mature trees in both alternatives, Alt.2 would not remove yellow barked pines, while Alt. 3 may include removal of a small number of yellow pines for insect or disease related issues.
Restore Fire Adapted Ecosystems	No change in current fire potential	Following mechanical and/or burning, improving trend in risk of high intensity wildfire. Alternative 2 treats 10,387 acres by burning, Alternative 3 treats 10,248 acres by burning.
Manage for Healthy Forest	No change in current conditions	Thinning activities would improve forest health on 5,738 acres in Alt. 2 and 4,083 acres in Alt.3. Broadcast burning will improve forest health on 10,387 acres in Alt. 2 and 10,248 acres in Alt.3.
Protect and Enhance Wildlife Habitat	No change in current habitat condition	Activities listed above would open forest stands, reduce densities of smaller diameter trees, and protect habitat of listed species. Reducing the risk of wildfire would protect wildlife habitat across the project area.
Provide Social and Economic Values	No increased value from timber products, no economic opportunities for Catron County	Removal of 5,548 MBF in Alt. 2 and 3,250 MBF in Alt. 3 would result in economic increases for Catron County.

Soil and Water Conservation Practices to protect Soil and Water Resources (Project Records 53 and 54) to mitigate impacts on roads and soils.

Alternative 3.

Direct and Indirect Effects

Alternative 3 would use approximately 32 miles of existing open roads. No existing closed roads would be temporarily reopened. These roads are listed in Appendix 1. There would be 2.8 miles of currently closed roads that would be decommissioned (Appendix 1). The actions would utilize State of New Mexico Best Management Practices and Forest Service Soil and Water Conservation Practices to protect Soil and Water Resources (Project Records 53 and 54) to mitigate impacts on roads and soils.

Issue 2. Removal of large diameter, mature or old growth ponderosa pine reduces the amount of old growth.

Affected Environment

There are no stands in the project area currently identified as meeting this condition. Vegetation structural stages (VSS) classes 5 and 6 (mature forest and old forest) come closest to meeting this condition. Because no identified old growth stands occur in the project area, components of stands with old growth characteristics are being left throughout the area. Some yellow pine may be removed if diseased or dying. Twenty-six stands (2,640 acres, 21% of the

project area) will be managed for old growth. One mature class will receive partial thinning, and no old forest class stands will receive mechanical treatment. Current estimates on number of trees over 18 inches dbh is approximately 99,000 or an average of eight trees 18+ inches dbh per acre.

Alternative 1. - No Action

Direct Effects and Indirect Effects

There would be no change in tree densities under Alternative 1. Risk of reducing tree

Table 3-2. Estimated number of trees by treatment for the Six Shooter Black Deer Project Area.

Action Alternative	Before Treatment (inches)			After Treatment (inches)		
	14-18	18-24	24+	14-18	18-24	24+
Alternative 2						
Thin Ponderosa Pine	42604	21284	5797	38343	21075	5767
Thin Fir	13617	4741	1222	13617	4741	1222
Fuel Treatment	12116	4779	1079	12116	4779	1079
Group Select	3177	752	80	3114	744	80
Meadow Restoration	0	1037	456	0	1037	456
No Treatment	29604	11658	2823	29604	11658	2823
Broadcast Burn	55135	26397	7377	53481	26133	7377
Thin (woodland)	1611	339	334	1531	339	334
Thin & Group Selection	13357	6435	2187	10685	6371	2187
Alternative 3						
Thin Ponderosa Pine	37404	19557	5120	33664	19365	5120
Thin Fir	13617	4741	1222	13617	4741	1222
Fuel Treatment	15403	5891	1602	15403	5891	1602
Group Select	3177	752	80	3114	744	80
Meadow Restoration	0	1037	456	0	1037	456
No Treatment	31073	12263	2968	31073	12263	2968
Broadcast Burn	55580	26407	7386	53912	26143	7386
Thin (woodland)	1611	339	334	1531	339	334
Thin & Group Selection	13357	6435	2187	10685	6371	2187

densities, including large diameter trees by catastrophic wildfire would remain at high risk across much of the project area.

Alternative 2 - Proposed Action

Direct and Indirect Effects

Distribution of Vegetative Structural Stage classes would show a slight improvement in VSS 1 and slight reductions in VSS 3 and VSS 4. No immediate changes would occur with VSS classes 2, 5, and 6.

Reduction of tree densities to target levels of 50-70 sq ft/acre on approximately 45% of the forested landscape would enhance individual tree vigor and subsequent diameter and volume growth. An average (weighted) residual density of 85 sq ft/acre would be realized across the analysis area. Stand Density Index for the analysis area would approximate 162, or 35% of maximum. This would characterize overall growing conditions as just short of full site occupancy with the onset of competition between trees.

Densities of large trees would not change. Trees over 23.9 inches dbh would not be removed. Trees 18-23.9 inches would be reduced in number by less than 1% (Table 3-2).

Alternative 3

Direct and Indirect Effects

Distribution of Vegetative Structural Stage classes would show slight improvement over Alternative 1 but less than Alternative 2. Compared to Alternative 1, VSS 1 and 3 would slightly increase (less than 1% change) and VSS 4 would slightly decrease to about 22%. As with Alternative 2, no immediate changes would occur in VSS classes 2, 5, or 6.

Reduction of tree densities to target levels of 50-70 sq ft/acre would occur on approximately 34% of the forested landscape. An average (weighted) residual density of 90 sq ft/acre would be realized across the analysis area. Stand Density

Index (SDI) for the analysis area would approximate 172, or 37% of maximum. This would characterize growing conditions as at full site occupancy with competition active between trees.

Densities of large trees would not change. Trees over 23.9 inches dbh would not be removed. Trees 18-23.9 inches would be reduced in number by less than 1% (Table 3-2).

3.3 Consequences Relative to Significance Elements

In 1978, the Council on Environmental Quality promulgated regulations for implementing the National Environmental Policy Act (NEPA). These regulations (40 CFR Parts 1500-1508) include a definition of “significantly” as used in NEPA. The eleven elements of this definition are critical to reducing paperwork through use of a finding of no significant impact when an action will not have a significant effect on the human environment and is therefore exempt from requirements to prepare an environmental impact statement.

Context. ...the significance of an action must be analyzed in several contexts such as society as a whole (human, national), the affected region, the affected interests, and the locality. Significance varies with the setting...in the case of a site-specific action, significance would usually depend upon the effects in the locale rather than in the world as a whole. Both short- and long-term effects are relevant.

As discussed in more detail below for other elements of significance, the context of this proposal is limited to the locale of the Six Shooter and Black Deer Sixth Code Watersheds located in Southwestern New Mexico, Catron County. Even in a local

context, this proposal would not pose significant short- or long-term effects. The relatively small scale of this proposal limits the effects to a minor level. The proposal is designed to minimize and avoid adverse impacts to the extent that such impacts are almost undetectable and immeasurable, even at the local level.

Intensity. ...the severity of impact...more than one agency may make decision about partial aspects of a major action.

1. Impacts may be both beneficial and adverse. A significant effect may exist even if, on balance, effects are believed to be beneficial.

In the Proposed Action there may be both beneficial and adverse impacts, but adverse impacts are insignificant. Watershed conditions, including soil productivity, water quality or quantity and riparian conditions, are improving and that is not expected to change with either alternative, though the rates of continuing improvement are predicted to be slightly different with each alternative.

Air Quality

Affected Environment

The Negrito Ecosystem Management Area, including the Six Shooter and Black Deer Project Area, is located within the Lower Colorado River Basin Air Shed. The air shed stretches north south along the New Mexico-Arizona state line, and includes the San Francisco River and Gila River sub-basins. Within this geographical area the Gila National Forest, the Apache-Sitgreaves National Forest, and Fort Apache Reservation actively use prescribed fire as a management tool. The Springerville Power Plant and the Morenci copper-smelting

complex, both located in Arizona, also contribute emissions.

Class I air sheds within the Lower Colorado River Basin Air shed include the Gila Wilderness, approximately 10 miles south of the project area, and the Mt. Baldy Wilderness, located in eastern Arizona on the Apache-Sitgreaves National Forest. Class II designated sites include the Blue Range Primitive Area in Arizona. Sensitive locations within the air shed include the Blue Range Wilderness and El Malpais, New Mexico. New Mexico communities in the air shed include Grants, Quemado, Luna, Reserve, Aragon, Glenwood, Cliff, Gila, and Lordsburg. Arizona communities include St. Johns, Springerville, Alpine, Clifton, Morenci, and Duncan.

Fire management experience in the vicinity of the project area indicates smoke emissions may impact this air shed in the evening and early morning hours. Past monitoring indicates the majority of the smoke emissions resulting from daytime ignitions would travel towards the Western Closed Basin Air Shed.

The Western Closed Basin Air Shed is located east of the project area. The primary physiographic feature is the San Augustine Plains. The area has a relatively low population with a land base comprised primarily of private lands, Bureau of Land Management, State, and National Forest lands. Due to the closed basin feature of this area, smoke tends to settle during periods of stable air conditions. Emission sources within this air shed are wildland fire and prescribed fire during the summer and fall months. Sensitive locations include the Very Large Array (VLA) facility, Pie Town, Datil, and Magdalena.

Three non-attainment areas are located within the Southwestern Closed Basin Air Shed of southwestern New Mexico. They include Anthony, NM (PM₁₀), Grant County, NM (sulfur dioxide), and Sunland Park, NM (ozone). Smoke emissions from the Six Shooter and Black Deer Project Area are not expected to impact this air shed.

The Mogollon Baldy-Black Range forest corridor receives strong winds and frontal passages that produce downdrafts causing higher fire spread rates. Dry fuel conditions have been perpetuated by consecutive years of below-normal precipitation, increasing fire severity, particularly in the spruce-fir forests. Combustion of large fuels and live vegetation increases emissions reducing air quality and creating haze. The intense or extended periods of smoke associated with wildfires can also cause serious health effects and significantly decrease visibility.

Air quality and visibility is good to excellent in the project area and surrounding areas. Air degradation occurs temporarily from wildfires and prescribed burning. Dust can also be a source of air pollution during dry periods. Dust can be generated from traffic or maintenance on unpaved roads and other areas where soil cover is lacking, such as agricultural fields or construction sites. Smoke from wood stoves can temporarily increase PM₁₀ and PM_{2.5} pollutants and cause localized haze (PM₁₀ and PM_{2.5} are size classes of particulate matter).

There have been 15 prescribed and 9 sizeable (in excess of 40 acres) wildfires in the Negrito Watershed since 1983. Wildfires are suppressed according to the appropriate response objectives, and in the project area can be managed for resource benefits under the Gila's Forest-wide Prescribed Natural Fire Plan (USDA 1995b). This document allows naturally occurring

fire to play its role in a fire-dependent ecosystem. Burn and smoke management plans are written for each management ignited fires and managed natural ignitions (Wildland Fire Use).

Managed fires on the Gila have not caused unacceptable air quality impacts to the Class I air shed associated with the Gila Wilderness. The majority of wildfires occur prior to summer rains, coinciding with weather conducive for smoke dispersal. Smoke from these fires can last from days to weeks. Simple Approach Smoke Emissions Model (SASEM) is used to determine PM₁₀ emissions to evaluate whether prescribed burning could be conducted without exceeding NAAQS standards and to determine if mitigation is necessary to achieve compliance with the standard.

Burn and smoke plans are required to contain management prescription that predict emissions, daytime and nighttime smoke paths and acceptable smoke dispersal directions. Few prescribed burning or wildfire complaints have been received, with 40 continuous days of smoke being a generally accepted upper tolerance level. Under the prescribed fire burn plan, four or more complaints or concerns invoke a contingency plan for smoke reduction. Concerns from sensitive receptors, such as health care facilities, leads to immediate actions to reduce smoke output.

Although inversions are common, unstable atmospheric days allow the Reserve Ranger District good burning weather from September through March in most years. In the project area, smoke collects in flatter areas and in drainages. Smoke would tend to funnel into drainages as nighttime air cools, traveling downslope into Negrito Creek and the San Francisco River, traveling toward towns and rural residences at lower

elevations. Rainy Mesa Ranch is located east of the project area in a large flat area where smoke sometimes settles during the night. Smoke would generally rise with warming temperatures clearing out by late morning.

Alternative 1

Direct and Indirect Effects

Alternative 1 would have no direct effect to existing air quality. Indirect effects may occur from wildfires associated with continued vegetation buildup, inside and outside the project area. Managed fires outside the project area may also affect air quality. Wildfire suppression would continue according to Forest Plan policy and cooperative agreements with the State of New Mexico.

A combination of surface and passive crown fire would be expected. Relative to the action alternatives, this would produce greater amounts of smoke and particulate emissions, reducing air quality and creating visual pollution. Intense or extended periods of smoke can cause health problems, impacting sensitive receptors and Class I Air sheds.

Alternatives 2 and 3

Direct and Indirect Effects

Both action alternatives contain similar types of prescribed burning projects. Analysis of smoke emissions is based on the same assumptions listed above, and the SASEM results are in the Air Quality Report (Project Record 50).

Burning activities would adhere to pertinent air quality regulations and the associated burn plan. The effects of prescribed burns

on air quality, smoke control and monitoring measures would be identified in the Smoke Management Plan. Avoidance, dilution, and emission-reduction strategies would be utilized. Prescriptions include desirable meteorological conditions for acceptable smoke dispersion.

Smoke from pile burning is expected to cause haze in the vicinity of the nearest receptors. The modeling shows concentrations would be greatest within a mile of the burn area. Following the State of New Mexico smoke management guidelines would reduce PM 10 emissions and allow for more available wind and atmospheric combinations under which burning can be conducted.

Debris (slash) piles would be cured, drying for a minimum of 45-90 days, allowing maximum consumption of all material. Lighting well-cured piles during the daytime, when good venting conditions exist, would maximize smoke dispersal and limit impacts downwind. Smoldering would be minimized, reducing the amount of smoke moving downslope during the evening and nighttime. Staggering broadcast and pile burns over a longer period of time would reduce the impact on the air shed. Following the State of New Mexico smoke management guidelines, smoke produced would be below the NAAQS emissions standard. Table 3.3 assumes size and weight of landing or machine piles estimated to be 20 feet by 20 feet by 12 feet, with a volume of each pile about 25 tons. Dimensions of hand piles are estimated to be 6 feet by 6 feet by 4 feet, volume of each pile is about 0.5 tons.

Burn treatments are described in the Fuels Treatment section of this EA and in the Fire and Fuels and Air Quality specialist reports (Project Records 50 and 51). Duration of

ignition can also be regulated to meet PM 10 standards (Table 3.4). Under some conditions up to 1000 acres can be burned in a day without exceeding standards, although the Reserve District often is able to accomplish 200-500 acres per day taking into account available personnel, terrain, and accessibility.

Table 3.3. Emissions resulting from burning slash piles

Particulate Size Class	PM10
NAAQS standard for 24hr period	150 ug/m3
Alternative 2 & 3 hand piles, Max 8 hr particulate production	138.5 ug/m3
Alternative 2 & 3 landing piles, Max 8 hr particulate production	141.9 ug/m3

Table 3.4. PM10 estimates from prescribed burning

Fuel Model	Alternative 2 & 3 broadcast burn (underburn), Max 8 hr particulate production
Light conifer slash/partial cuts, 10 tons/ac	74.4 ug/m3
Open pine, perennial grass, 4 tons/ac	147.6 ug/m3
Dense conifer, heavy down wood & duff, 20 tons/ac	102.6 ug/m3
Closed long needle pine	74 ug/m3

Monitoring is a standard part of the burn plan and is completed for each burn or burn period, to ensure that objectives are being met. Smoke monitoring determines direction of dispersal and lift heights and can be done from the ground, from fire towers and/or from aircraft.

The effects of dust from road maintenance, such as grading, would be short term, dissipating in hours. Road maintenance would occur within and outside the analysis area several times during a year for the vegetation management actions in the Proposed Action (Alternative 2). The dust created during road maintenance would be related to the amount of moisture in the road

with best results when the roads are thoroughly wetted.

Conclusions

Implementing prescribed fire through either action alternative would produce smoke emissions. Based on professional experience and previous monitoring, the amount and length would be short-term in duration. The SASEM results indicate smoke emissions under prescribed conditions can be successfully mitigated. Fire managers would continue working with the New Mexico State Environmental Department to implement the Smoke Management Plan and adhere to the recommended mitigation measures.

Alternative 3 proposes to treat fewer acres and burn a similar amount of acres compared to Alternative 2. Fuel loading would be less in Alternative 3 because more acres have "no treatment". Emissions would therefore be less since less fuel is burned, assuming that fuel moisture content is similar for all underburn units.

Fuels and Fire

Affected Environment

The Gila National Forest is a diverse landscape of rugged mountains, deep canyons, meadows, and semi-desert conditions. Elevations range from 4,200 to 10,900 feet across the forest. In the mountains, pinyon-juniper woodlands occupy the lower elevations, ponderosa pine occupies mid elevations and spruce-fir forests are found on the upper elevations and northerly slopes. Aggressive fire suppression has reduced the extent of fires that naturally occurred over the area. Within the project and surrounding areas, 94% of the fires occurring over the past 30 years

have been less than 10 acres in size.

Suppression of fire has resulted in a drastic increase of fuels over time.

A lack of frequent low intensity fires and reduced acres of vegetation management have caused a trend toward denser coniferous forest, a reduction in grasslands and woodland types from encroaching pine and juniper, and a decrease in forage species throughout the project area. This change from a fire maintained landscape in combination with drought, high winds, and steeply sloping topography has resulted in a potential wildfire shift toward more passive crown fires which can develop into active crown fires as winds increase. Tree mortality from these wildfires can be high.

Surface fuel loading in the majority of the stands is equal to or less than 5 tons per acre and composed primarily of needle litter, grass, and small branches. Ponderosa pine stands have fuel ladders extending from the ground into the upper canopy. Canopies are interlocked with very few openings (Project Record 51). Herbaceous plants are sparse in some areas under moderate to dense ponderosa pine, mixed conifer, and pinyon-juniper canopies. The mixed conifer, Douglas-fir and white fir types have higher fuel loading between 10-20 tons per acre, with a few stands having 30+ tons per acre.

Canopy base height and canopy bulk density (Scott and Reinhardt 2001) are measurements used to determine potential crown fire. These terms are defined in Appendix 2. Many of the conifer stands have low canopy base heights due to large crowns with low branches and multiple layers of flammable vegetation. The combination of low canopy base height and higher bulk density (or closer spaced trees) has the potential to initiate and maintain a crown fire.

Fire history information was gathered from the District wildfire atlas, photos of Sheep Basin, Sheppard, Black Burro, Burnt Cabin, and Todd Cienega Management Ignited Fires and high intensity wildfires. Recent wildfires on the Reserve Ranger District, and throughout the western United States, have been high intensity crown fires, killing most vegetation and destroying soil productivity over large areas. Fire behavior analysis attributes this trend to accumulated high fuel loadings, drought, steep slopes, high winds, and increased stand densities. Though high fire intensities can result in damage to vegetation, wildlife, soils, and other elements of the ecosystem, they have and will continue to occur. With this in mind the biggest concern under current conditions is the intensity of fires that are likely under the dense vegetation conditions that now exist. Six of the fires listed in Table 3.5 were on steep slopes with dense vegetation. The Divide Fire burned at high intensity through dense pockets of

Table 3.5. Reserve Ranger District High Intensity Wildfires 1974-2003.

Name	Date	Acres
Salvation	6/27/1974	27000
Long	6/10/1989	530
H.B.	7/27/1995	13000
Leggett	6/27/1998	258
B.S.	10/15/1998	1883
Saliz	6/14/2000	1000
Divide	7/12/2003	3570

ponderosa pine and on steep slopes with mixed conifer, dropping to the ground in areas that had been previously logged and broadcast burned.

Road access for fire suppression is good for most areas where fire potential is high. There are also several open areas that can be

used for helispots. The area is within a 15 minute response time from Negrito Fire Base via helicopter. In all alternatives, fire suppression effectiveness would be dependent upon the involved fuels and the type of suppression resources that can be applied to suppression efforts.

Alternative 1

Direct and Indirect Effects

Wildfire suppression would continue according to Forest Plan policy and cooperative agreements with the State of New Mexico. No immediate change to fire behavior is expected. A wildfire would be the more common disturbance affecting a localized change in fire behavior. The area would continue to be an ignition and high fire hazard risk, with the risk of natural and human-caused ignitions remaining high.

Accumulation of ground fuels from annual needle cast, dieback, and breakage would continue. Mortality of trees is likely to continue at present rates and would add to the surface fuel loading in the absence of fire. Natural regeneration of shade tolerant conifers would continue, developing multi-layered stands, resulting in stand conditions more conducive to sustaining active crown fire.

Forest types are not expected to dramatically shift in a fire suppression environment, except where crown fires occur. In the absence of low intensity surface fires, crown fire potential is expected to increase in stands where ladder fuels develop or where large amounts of surface fuels are present. With more trees on site, future canopy density is expected to increase. This condition predisposes some stands to crown fire when they are in proximity to stands where crown fire can be initiated.

In summary, fuel hazards (ladder fuels, dense canopies, surface fuels) would continue to accumulate, and would increase the potential for larger and more intense fires.

Alternative 2

Direct and Indirect Effects

Thinning, group selection/thinning, pre-commercial thinning, and prescribed fire are the most influential treatments that change fire behavior (Feidler, et al. 2002, Omi and Martinson 2002, Project Record 51). The silvicultural treatments proposed for Alternative 2 treat only 45% (5,518 acres) of the project area. Approximately 2,039 acres would not be treated and 4,000 acres will be prescribed fire only. The 55% left untreated contains ladder or canopy fuels resulting in “no change” to potential fire behavior when run in computer models. Therefore stands proposed for group selection and prescribed burning were modeled for prescribed burning only. Changes to surface fuel models are expected to persist for 5-10 years, in the absence of a major tree mortality event such as a windstorm, heavy snow, insect, or disease epidemic (Project Record 51). Overall, lower fire intensity and reduced fire size can be expected.

A short-term fire risk is expected in thinning treatments due to curing slash. Since it is unlikely that all timber treatments would be active at the same time, fire hazard from cured slash is not expected to be widespread.

Mortality of trees within Mexican spotted owl protected activity centers (PACs) and restricted stands is a concern, where vegetation and surface fuels are not treated. Jackpot burning is a technique that can reduce the surface fuel load during the non-

nesting season, allowing lower intensity prescribed burning to be accomplished in spring or fall without excessive tree mortality. One PAC would receive fuel treatment followed by prescribed burning to reduce the potential for the occurrence of a more intense wildfire.

Disrupting continuity of surface fuels prior to burning reduces prescribed burn intensity and mortality of residual trees. Piling and burning and burning under more moist fuel conditions are techniques that can be applied to reduce surface fuel loading and better meet burn objectives without risk of excessive tree mortality.

All thinning activities remove trees from below the main canopy. This increases the canopy base height out of reach of predicted flames heights (adjusted for slope), reducing torching at the modeled 8 mph wind speed. Additionally, thinning leads to larger and taller stems that are more fire resistant.

Underburning would remove surface fuels and cause mortality of the smaller diameter trees and lower limbs that contribute to low canopy base height. Slow moving backing fires consume surface fuels and duff creating small areas that allow seed germination, yet generate heat lethal to smaller stems. Strip head fires can be used to generate heat and/or flame lengths necessary to lethally scorch lower limbs and smaller trees.

Total tree mortality has generally been less than 10% in recently implemented Reserve Ranger District prescribed burns (Black Burro, Eckleberger, Sheep Basin). Patches of high mortality were found where high heat intensities were caused by narrow fire strips or on very steep slopes, with most of the mortality in the 1-6 inch diameter trees. Tree mortality from prescribed burning for this project would be limited to 15-25% in

non-restricted stands, 5-15% in restricted stands. Some tree mortality is expected and desired particularly in the smaller diameter trees.

Activities that reduce the number of stems per acre (thinning, prescribed burning, pre-commercial thinning) generally result in a more vigorous stand. Non stressed trees and those whose crowns are at least 15 feet from the ground are more likely to survive wildfire because they have adequate live moisture and have less potential for crown damage. The potential for crown fire initiation would decrease due to the reduction in ladder fuels and canopy density. Less dense and higher canopies have lower risks of damage from heat and direct scorch, as hot air is able to move through more easily.

Frequent lower intensity prescribed burning, mimicking a natural fire regime, stimulates trees to grow deeper roots, develop thicker bark, and scorches lower branches, making them more resistant to lethal damage from wildfires. Thicker bark insulates the tree from heat and direct flame.

After treatments, most of the remaining acres with a high risk of fire occur within the PACs, as torching is likely at low wind speeds. Backing fires may not cause as much tree mortality as rate of spread is slow and flame lengths are less than 2 feet, as seen on the Bull Fire.

Connected PACs form contiguous areas of dense vegetation. They would continue to have the potential for passive fire in all or portions of their extent, resulting in greater fire intensity and tree mortality, and diminishing the condition of their habitat. Prescribed burning and vegetation treatment around PACs would afford some fire protection as surrounding wildfires are

expected to be surface fires. Depending on point of ignition and a timely suppression response, fires may be controlled outside of PACs. One PAC would receive fuel treatment followed by prescribed burning to reduce the potential for the occurrence of a more intense wildfire.

As a conservative estimate, reduced fire behavior is expected to persist for up to 10 years. Assuming maintenance fire would be used in the future, low density of saplings and poles and/or concentrations in small areas would maintain low risk of crown fire. These areas can be protected during future prescribed burning by control lines and/or lighting techniques.

Thinning of stands tends to allow more air movement that dries fuels more quickly. In the ponderosa pine stands, surface fire behavior is expected to remain the same. Grazing reduces light herbaceous fuels and lowers fire behavior, but can also reduce the potential for a prescription burn to carry and hinder accomplishment of management objectives.

Alternative 3

Direct and Indirect Effects

This alternative has fewer acres proposed for treatment or tree removal (4,083 acres) as access is restricted to existing open roads. The silvicultural treatments proposed for Alternative 3 treat only 34% of the project area. Approximately 2,138 acres would not be treated and prescribed burning only would treat 3,987 acres. Total acres of underburning are proposed on about 100 fewer acres than in Alternative 2.

Slightly more acres of prescribed burn only treatments are proposed because fewer acres are to be treated if existing closed roads are

not used. With less acres receiving silvicultural treatment, low and moderate intensity fires are prescribed. One prescribed fire may not be able to meet basal area density target in some stands. Mortality in trees less than 10-inch diameter would be achieved by creating desired flame lengths and/or heat through variations in ignition techniques.

Moderate and high intensity fires are needed in some areas to create the desired canopy openings to achieve reduced crowning potential. The risk of escape becomes greater in higher intensity burns. Burn complexity increases, and generally more personnel are needed to be on-site, increasing the burn costs.

Potential fire resulting after treatments is the same as in Alternative 2. Fire-killed trees would create a temporary fire hazard until red needles drop. Dead trees would eventually fall and in some areas, where mortality of small trees was high, create an undesirable fuel build up. Fuel loading would be controlled through maintenance burning or piling and burning. More frequent burning to obtain the desired fuel loading would increase costs.

Suppression access to interior portions of the area would become more difficult for ground-based equipment as closed roads deteriorate.

Conclusion

Stand replacement fire is not desired because of the risks to habitat for threatened and endangered species, sensitive species, and other wildlife, the unacceptable risk to public and firefighter safety, and for the overall health of the ecosystem. The action treatments would alter the fire intensity in pine and mixed conifer stands, allowing

them to continue growing into the future. The treatments would create opportunities within the Negrito Watershed where natural ignitions can be managed to mimic a lower intensity natural disturbance.

Fuel treatments would moderate extreme fire behavior within silviculturally treated areas, especially in short fire return interval systems like ponderosa pine (Omi and Martinson 2002). Alternatives 2 and 3 would affect fire behavior over a large area, causing a reduction in crown fire propagation. When combined with adjacent treated areas, the risk of high intensity fire behavior is reduced over a large portion of the Negrito Watershed (10%).

Maintenance and prescribed fires, as a continuing process, would reduce surface fuels build up, maintain low density of seedlings and saplings, and cause physical reactions in trees enabling them to better survive.

Range

Affected Environment

The Six Shooter and Black Deer Project Area encompasses 28% of the of the Negrito Allotment. The current authorized grazing plan for the Negrito/Yeguas Allotment is 6707 animal unit months for 12 months in a rest rotation program year-round on approximately 54,088 acres. The forage base within the project area primarily consists of mountain muhly (*Muhlenbergia montana*), Arizona fescue (*Festuca arizonica*), and blue gramma (*Bouteloua gracilis*) within ponderosa pine stands on higher moisture areas (i.e. north slope meadows and higher elevation) and blue and side oats gramma (*Bouteloua curtipendula*) within pinyon-juniper stands on the other drier sites.

This analysis focuses on the potential effects of the proposed actions on forage health and productivity within ponderosa pine and pinyon-juniper stands. Desired future conditions, pasture rotation, monitoring and mitigation measures are from FSH 2209.21 - Range Analysis Handbook and the cited Forest Plan and Amendment.

The Negrito Ecosystem Analysis Report (USDA 1997) and the Forest Plan (USDA 1986) describe the existing range conditions for forage as being unsatisfactory. Thick timber stands produce barriers that prevent cattle from freely moving, and causes congregation to occur in drainages. Grasslands are being encroached upon by ponderosa pine and pinyon-juniper stands. A lack of natural or prescribed fire encourages forb and tree encroachment into meadows and reduces the amount of natural openings normally found in this environment.

Alternative 1

Direct and Indirect Effects

The implementation of Alternative 1 would not alter present forage health and productivity within ponderosa pine and pinyon-juniper stands. Herbaceous productivity and health would decline over time as the tree canopy increases shade, blocking sunlight on the ground, and as the duff layer increases in thickness, reducing the germination of seeds.

Using Jameson's regression curves (Jameson 1967) in collaboration with the Forest Vegetation Simulator (FVS) from present herbaceous production it is estimated by the year 2020 that Alternative 1 would result in a 24% decrease in herbaceous material across the Six Shooter

and Black Deer Project Area (Project Record 48).

In the event of a high severity stand-replacing wildfire, the herbaceous cover would be removed (burned) with little chance of recovery, as the fire would likely kill the apical meristem of the plant. In the event that rehabilitation activities such as grass reseeding occur after a high severity wildfire herbaceous cover may be reintroduced. A high severity fire would alter the surface soil structure and potentially reduce soil nutrients.

Alternative 2

Direct and Indirect Effects

Overall, herbaceous forage in areas that are both cut and burned would benefit from increased sunlight and the reduction of litter and duff.

Broadcast Burn (areas outside of thinning units): Broadcast burning outside of thinning units would increase herbaceous production and health for a short period of time. Without opening of the canopy cover, needle cast litter would again smother the soil, reducing the amount sunlight and nutrients for growth of herbaceous plants. Over time, the litter cover would become reestablished thus inhibiting herbaceous plant establishment. Broadcast burning would reduce the potential for having a high severity stand-replacing wildfire, therefore protecting existing herbaceous cover.

Slash - lop/scatter (areas within thinning units): Professional experience has shown increases in the production and health of herbaceous forage in areas where pinyon-juniper treatments have occurred on the Black Range Ranger District. Lopping and scattering woody material appears to have

provided nutrients and increases the soils capacity to retain moisture. The process of lop and scatter creates safe sites under the branches for herbaceous species to establish without pressure from grazing ungulates. These pockets of protected herbaceous plants would create a seed source for the surrounding area. Also, the nutrients from the needles (specifically nitrogen) would, in time, become available for the herbaceous species that are often limited in this region by nitrogen. After the area is burned, the herbaceous plant community would have a large surge, and could be maintained with a diminished pinyon-juniper component.

Broadcast Burn – Slash pile and burn (areas within thinning units): Depending on the temperatures reached within the slash pile, herbaceous material may or may not benefit. Burning of the piles concentrates the fuels into one area and would tend to heat the soils more than broadcast burning. The soils under the piles may become hydrophobic and the seeds in the soil tend to be burned up, thus not allowing for the establishment of herbaceous forage. With any burning projects the pasture, or burn area, would be rested from livestock grazing, when possible, for at least one growing season, after burning.

Pinyon-Juniper Woodland Treatments: Herbaceous forage production is influenced by tree density (Jameson 1967). Tree density is expressed in terms of either basal area per acre or canopy cover. Alternative 2 proposes to reduce the canopy cover of 150 acres within the pinyon-juniper stands and would have a positive effect on the establishment of herbaceous forage, forage health, and productivity by reducing competition between the herbaceous and woody component. It is estimated that this effect would last approximately 20-30 years until the canopy starts to close back in.

Ponderosa Pine Treatments: Effects on herbaceous plant establishment and forage production are similar to those projected under the pinyon-juniper discussion above. The reduction of canopy cover across 4,237 acres of ponderosa pine stands would have a positive effect on the establishment of herbaceous forage, forage health, and productivity by reducing competition between the herbaceous and woody component. It is estimated that this effect would last approximately 20-30 years, depending on the site, until the canopy starts to close.

Using Jameson's regression curves in collaboration with the FVS from present herbaceous production it is estimated by the year 2020 that Alternative 2 would result in a 19% increase in herbaceous material across the Project Area. This increase would improve range and forage conditions for wildlife and livestock.

Alternative 3

Direct and Indirect Effects

Effects associated with Alternative 3 are similar to those listed under Alternative 2 with the following except that only 2,804 acres of ponderosa pine stands would be treated.

Using Jameson's regression curves in collaboration with the FVS from present herbaceous production it is estimated by the year 2020 that Alternative 3 would result in an 11% increase in herbaceous material across the project area. This increase would improve range and forage conditions for wildlife and livestock.

Social/Economic

Affected Environment

The proposed project is located within Catron County, New Mexico, where it would generate employment in the logging and manufacturing sector of the economy. The purpose and need for this project is primarily for forest health and fire suppression. In accomplishing these objectives it is anticipated that jobs and timber products will benefit the local economy. The thinning would most likely take place through a commercial timber sale, and the products processed at a proposed mill in Catron County or exported to another mill, possibly in Nutrioso, Arizona or White Sands, New Mexico. If a mill outside of Catron County were used, expected revenues are likely to change due to increased transportation costs.

The Village of Reserve is the principal community and economic center of Catron County, located in southwest New Mexico. Catron County has a population of approximately 3543 people, which has increased 38% since the 1990 census (U.S. Census Bureau 2000).

The Catron County economy has historically been based around agricultural sectors of ranching and timber (see www.census.gov). These industries remain the driving economic force today although timber products have not been available on a regular basis nor has a local mill been in operation since the early 1990's. The local economy has been greatly affected by the lack of larger and more regular forest projects. Recreation is a very small component of the economy and is generally associated with big game hunting (e.g., elk, deer, turkey). In 2000, the largest industries in Catron County were federal civilian

government (30%), state and local government (28%), and services (16%). Although, Catron County experienced a 38% population increase, jobs in agriculture, manufacturing, information, finance, professional services, and other services declined from 1990-2000.

The software package QUICKSILVER (Vasievich 2002) was used to conduct the financial analysis for this project (Project Record 56). The financial analysis only includes predicted direct costs and revenues associated with each alternative for the Six Shooter and Black Deer Vegetation Management Project. Economic effects, including direct, indirect, and cumulative are disclosed. The financial analysis does not include an estimate of non-monetary values for recreation, wildlife, and forage. This analysis assumes there is a market for all material, however currently there are no markets for timber products, especially small diameter materials, in the area. Transportation costs prohibit hauling material to mills outside the area. There is a need to stimulate the timber market locally to create a timber infrastructure in Catron County. A small sawmill will start operations in 2004 and there is a need to revitalize the timber infrastructure of the community and create a stable market in the region.

The dollar values used in the analysis and presented in the report have been approximated. When applied consistently throughout the analysis, they give a relative value to compare alternatives. These values are not intended to be a precise measure of an alternative's economic effect.

The stumpage values of \$20/CCF for sawlogs 9+ inch dbh and \$1/CCF for products other than sawlogs 5-9 inch dbh were estimated using adjoining Forest's estimates and professional judgment. The revenues are assumed to occur at one time. This assumption simplifies the situation that would normally occur when revenues occur throughout the life of the sale. This assumption would tend to raise the economic value of the project, but it is consistent with the assumption for sale administration costs, which tend to lower the economic value of the project. Estimated volume for Alternative 2 is 7,501 CCF for 9+ inch dbh and 2,771 CCF 5-9 inch dbh material. Estimated volume for Alternative 3 is 4,393 CCF for 9+ inch dbh and 1,625 CCF for 5-9 inch dbh material.

All cost and benefit values are entered into the "Quick-Silver" program. This program analyzes the costs and benefits for a variety of investments or operations in order to compare the economic performance (costs and revenues) associated with each alternative. The results of the analysis are displayed in Tables 3-6 and 3-7. The values shown are intended to show relative efficiency of each alternative and serve as a

Table 3-6. Revenue by Alternative	Alternative		
	1	2	3
Revenue			
9+ inch dbh Saw timber	\$0	\$150,020	\$87,860
5 – 9 inch dbh Products other than saw timber	\$0	\$2,774	\$1,625
Total Revenue	\$0	\$152,794	\$89,485

means of comparing alternatives. The values would fluctuate with changes in costs and stumpage values, and do not reflect actual costs and revenues. The only benefits included in this analysis were those revenues associated with the sale of saw timber and products other than saw timber. Currently, no reliable market exists in the local area, especially for pulpwood. Pulpwood has a negative market value due to the costs in

removing and handling this material. This analysis assumes a market exists.

The benefit/cost ratio, present net value, present net value benefits, and present net value costs were estimated for each alternative.

Costs	Alternative		
	1	2	3
B/C Ratio	NA	0.20	0.15
Present Net Value	\$0	-\$610,920	-\$500,003
Present Net Value Benefits	\$0	\$152,794	\$89,485
Present Net Value Costs	\$0	\$763,714	\$589,488

The estimated cost of environmental document preparation, \$200,000, is a sunk cost and is applied to each alternative. By comparing the cost of each management activity with the level of outcomes and the description of effects in the specialist's report for that resource, the reader can get a sense of any tradeoffs associated with the activity. Timber removal is the only proposed activity that has a revenue component as well as costs. Proposed fuel reduction and road maintenance only have a cost component. The cost of potential damage to the human and natural communities due to catastrophic wildfire, the cost of reduced forage and loss of habitat, the cost of an unhealthy, unbalanced ecosystem, etc., all of which are a part of the primary purpose and need for the project, are not considered in the financial analysis.

Both Alternative 2 and Alternative 3 would create employment opportunities in the wood products industries. Employment associated with road maintenance would be more limited under Alternative 2.

Alternative 1

Direct and Indirect Effects

This alternative proposes no action and produces no economic outputs. Project planning costs are sunk costs incurred initially. Planning costs for the project are estimated at \$200,000. Since this cost is incurred by all alternatives, it would not be included in the comparison of each alternative. This cost is incurred regardless of the alternative selected. There is no return on this investment. No timber would be removed

and no fuels reduction, or road reconstruction would be done.

No benefits, (direct, indirect or non-quantifiable) can be attributed to this alternative. No value associated with removing fire-damaged or fire-killed trees is recovered. Economic impacts are minimal compared to other alternatives.

The issue of environmental justice was analyzed (Project Record 59) and determined to be an issue should this alternative be selected. This is in accordance with Executive Order 12898.

Alternative 2

Direct and Indirect Effects

Alternative 2 produces the greatest revenues, but also has the greatest associated costs. The benefit/cost ratio and Present Net Value (PNV) is higher than Alternative 3. Alternative 2 proposes a variety of treatment activities including timber removal of 10,272 Hundred Cubic Feet (CCF) of merchantable material with fuel reduction

on 10,387 acres and use of 24.8 of existing closed roads.

The total direct costs for Alternative 2 include sale preparation and administration, fuel reduction, and road reconstruction, estimated at \$763,714. The Present Net Value (PNV) for all costs plus the revenue generated from the sale of timber for Alternative 2 is -\$610,920, which indicates the cost of the non-timber sale related fuel treatments and road reconstruction. While the Present Net Value (PNV) is lower, the benefit cost ratio is higher when compared to Alternative 3.

There would be no effect on environmental justice should this alternative be selected.

Alternative 3

Direct and Indirect Effects

Alternative 3 has the lowest cost of the action alternatives, as well as the lowest revenue. Alternative 3 produces significantly less sawtimber (6,018 CCF of merchantable material) with fuel reduction on 10,248 acres, and no road reconstruction. Although Alternative 2 has higher costs associated with most activities (e.g., pile and burn, prescription burn post treatment, timber sale administration, timber sale preparation, road use), Alternative 3 has a higher cost associated with prescribed burning. The Present Net Value for Alternative 3 is -\$500,003, which is higher than Alternative 2.

There would be no effect on environmental justice should this alternative be selected.

Conclusion

The main factors leading to the differences in financial measures between alternatives are:

- Volume of timber removed;
- Differences in the number of acres treated with post mechanical treatments;
- Varying costs associated with road reconstruction, prescribed fire, timber sale, and timber administration and;
- There would be an environmental justice issue with selection of Alternative 1 but not Alternatives 2 or 3.

There is a tremendous need to undergo this project in terms of the social and economic benefits derived. Not only would jobs and revenue be created for the county population but also it is unlikely that these forest health projects would be accomplished with the present funding available. By conducting the project with a timber contract completing much of the thinning projects, there are reduced costs to the government. The market analysis presented above is somewhat flawed in that a market for timber products does not currently exist in Catron County and transport costs would prohibit transporting materials out of the area. There is a need to provide and stimulate the timber market locally to create new infrastructure, which is currently lacking, and create a stable market supply of timber products. Smaller diameter trees that are available for removal have replaced traditional logging of larger diameter trees. Infrastructure and markets need to be developed for these products in order to more efficiently and jointly accomplish the forest health aspects of this project and provide a positive social and economic benefit.

Vegetation

Affected Environment

Within the context of this analysis, vegetation effects are expressed in terms of forest density (primarily canopy cover and stem density), heterogeneity (vertical and horizontal forest structure, openings, other habitat considerations for TES, etc), and insect/disease management. There are 10,677 acres of ponderosa pine 1,106 acres of mixed conifer, 328 acres of pinyon-juniper woodland and 315 acres of grassland types in the Six Shooter and Black Deer Project Area.

Alternative 1

Direct and Indirect Effects

Forest structure, composition, and function will continue to diverge from that which historically occurred across the landscape. These changes will be a product of succession and disturbance limited to a fire suppression environment.

Distribution of Vegetative Structural Stage classes across the landscape will remain that which currently exists, i.e. VSS 1 – 0%, VSS 2 – 2.8%, VSS 3 – 69.4%, VSS 4 – 23.4%, VSS 5 – 4.3%, and VSS 6 – 0.1%. As such, the majority (92.8%) of the analysis area will remain in VSS classes 3 and 4 with notable deficiencies in VSS classes 1, 2, 5, and 6. Recruitment of seedlings and saplings will only occur in minor openings; recruitment of large diameter, older trees will continue to occur at a slow and declining rate.

Stand Density Index, a method of measuring the degree of competition in forested areas, is currently 44.8% of maximum. This value indicates full site occupancy over most of

the analysis area with minimum forage cover on the forest floor. Competition is active between trees; in addition, individual tree diameter and volume growth is in decline.

Establishment and in-growth of less desirable species and ladder fuels, such as Alligator Juniper, will continue.

The current average (weighted) density of 105 sq ft/acre will remain unaffected predisposing forested areas to insect/disease attack and/or catastrophic wildfire.

Current dwarf mistletoe ratings of 0.3 on 228 acres of Pinyon-Juniper woodland, 0.25 on 6,618 acres of Ponderosa Pine forest type and 0.3 on 951 acres of Douglas-Fir forest type will remain unchanged. The above ratings mean that reduced vigor and productivity due to this parasite will continue to affect 64+% of the analysis area.

Mechanical and prescribed burning treatments designed to enhance the quality of 964 acres of “set-aside old growth” habitat and 797 acres of MSO target/threshold habitat will not occur. This will result in increased time to meet desired conditions within these key habitat components as well as increased threat from insect/disease attack and/or catastrophic wildfire.

Tree canopy densities of 40%+ across 78 percent of the forested landscape will remain untreated resulting in a continued loss of forb and shrub abundance, diversity and vigor. Canopy cover for VSS 4/5/6 classes will remain at an average of 42.5%.

Conifer encroachment will continue to adversely affect 207 acres of grassland or forested habitat managed for open conditions. This will result in further loss

and degradation of these key landscape features.

Alternative 2

Direct and Indirect Effects

Implementation of this alternative will initiate management of the area as identified in the purpose and need statement.

Approximately 5,518 acres of conifer stands will be treated silviculturally under this proposal.

Distribution of Vegetative Structural Stage classes will show slight improvement with VSS 1 increasing to 1.3%; VSS 3 and VSS 4 will be reduced to 68.3% and 23.2%, respectively. No immediate changes would occur with VSS classes 2, 5, and 6.

Reduction of tree densities to target levels of 50-70 sq ft/acre on approximately 45% of the forested landscape will enhance individual tree vigor and subsequent diameter and volume growth. An average (weighted) residual density of 85 sq ft/acre will be realized across the analysis area. Stand Density Index for the analysis area will approximate 162, or 35% of maximum. This will characterize overall growing conditions as just short of full site occupancy with the onset of competition between trees. Forage availability can be expressed as “intermediate” that is, less than maximum and more than minimum.

Included in this action will be reduction of “ladder fuels” which will in turn reduce the likelihood of fire entering the forest canopy within the treated areas.

Approximately 3,696 dwarf mistletoe infected acres (or 47.4% of the total mistletoe acreage) will be treated to reduce the effect of this parasite. Within these

areas, dwarf mistletoe will be reduced to a level which will provide for increased vigor and productivity both on an individual tree and landscape basis.

Treatments designed to 1) improve the vigor; and 2) reduce the potential of loss from insect/disease as well as catastrophic wildfire will occur in 964 acres of set-aside potential Old Growth and 797 acres of MSO target threshold habitat.

Canopy closure (post treatment) will see increases of 580 acres and 887 acres in VSS classes 3A and 4A, respectively. Decreases in acreage will occur in VSS classes 3B (48), 3C (661) and 4B (909). No changes in canopy closure will occur in VSS classes 4C and higher. As a result, an average canopy closure of 40.5% will remain in VSS classes 4, 5 and 6 meeting the Northern Goshawk management guidelines of 40%+ in those classes.

Conifer encroachment on 207 acres of grassland or forested habitat maintained in open condition will occur helping to maintain the integrity and productivity of these key components across the landscape.

Overall, improvement in forest conditions across the analysis area is greater than in Alternatives 1 and 3.

Alternative 3

Direct and Indirect Effects

Implementation of this alternative will initiate management of the area as identified in the purpose and need statement, but will limit treatment activities to those areas that can be conducted from currently open roads. Approximately 4,083 acres of conifer stands will be treated silviculturally under this proposal.

Distribution of Vegetative Structural Stage classes will show slight improvement over Alternative 1 but less than Alternative 2. Compared to Alternative 1, VSS 1 will increase to 0.8%; VSS 3 will increase to 69.6%; and VSS 4 will decrease to 22.4%. As with Alternative 2, no immediate changes would occur in VSS classes 2, 5, or 6.

Reduction of tree densities to target levels of 50-70 sq ft/acre will occur on approximately 34% of the forested landscape. An average (weighted) residual density of 90 sq ft/acre will be realized across the analysis area. Stand Density Index (SDI) for the analysis area will approximate 172, or 37% of maximum. This will characterize growing conditions as at full site occupancy with competition active between trees. Forage availability can be expressed as “minimum”.

Included in this action will be reduction of “ladder fuels” which will in turn reduce the likelihood of fire entering the forest canopy within the treated areas.

Approximately 2,372 acres (or 30.4% of the total mistletoe acreage) currently infected with dwarf mistletoe will be treated to reduce the effect of this parasite. Within these areas, dwarf mistletoe will be reduced to a level which will provide for increased vigor and productivity both on an individual tree and landscape scale. This alternative allows for more treatment than in Alternative 1 but less than in Alternative 2.

As in Alternative 2, treatments designed to 1) improve the vigor; 2) reduce the potential of loss from insect/disease as well as catastrophic wildfire will occur in 964 acres of set-aside potential Old Growth and 797 acres of MSO target threshold habitat.

Canopy closure (post treatment) will see increases of 679 acres and 696 acres in VSS classes 3A and 4A, respectively. Decreases in acreage will occur in VSS classes 3B (313), 3C (435) and 4B (715). As in Alternative 2, no changes in canopy closure will occur in VSS classes 4C and higher. As a result, an average canopy closure of 41.1% will remain in VSS classes 4, 5 and 6 meeting the Northern Goshawk management guidelines of 40%+ in those classes.

Similar to Alternative 2, conifer encroachment on 207 acres of grassland or forested habitat maintained in open condition will occur helping to maintain the integrity and productivity of these key landscape features.

Overall, improvement in forest conditions across the analysis area is greater than in Alternative 1 but less than in Alternative 2.

Watershed/Soils

Affected Environment

The Six Shooter and Black Deer Project area lies within the Negrito Creek 5th Code Watershed. The majority of the project area flows into Negrito Creek. The project area is generally based on 6th level hydrologic units in the Negrito Creek Watershed, however there are some very small treatment areas (in the very south end of the project area) that do fall into the Middle San Francisco 5th Code Watershed.

The analysis focuses on the two primary 6th code watersheds (Six Shooter and Black Deer) and includes the small portions which fall into the Middle San Francisco 5th Code HUC. Analysis utilizing the full boundary of the affected Middle San Francisco HUC boundaries would dilute the analysis results with large non-activity areas.

The area is located in relatively high elevation mountainous terrain in west central New Mexico. Elevations range from approximately 7000 to 8600 feet in the project area and 5800 to 9800 in the Negrito Watershed. Slopes are moderately dissected and low to moderate in steepness. The climate is generally dry with summer monsoon rainfall events and light winter snowfall dominating the local climate. Annual precipitation is low, approximately 20-24 inch, with most of the precipitation falling as rainfall.

Information on current soils, water quality guidelines, and stream segment status was collected from the Negrito Ecosystem Area Terrestrial Ecosystem Report (USDA 1995a), Environmental Protection Agency, New Mexico Department of Environmental Quality, and literature from the New Mexico Department State Land Office. Field surveys were conducted to determine current condition of watershed and soil resources, and to evaluate potential affects from proposed vegetation management activities.

Streams

There are no perennial stream channels within the project area. Most of the 57 miles of stream channels flow ephemerally or intermittently (mostly ephemeral). The stream systems in the area are mostly made up of dry swale to intermittent channels that generally experience overland flow during spring runoff or from localized summer thunderstorms. There are a few locations where shallow groundwater flow is intercepted by stream channels, which provide limited perennial flow downstream.

These isolated perennial seeps produce localized stream flow, but these flows are not contiguous or connected with any

downstream perennial stream features. There are also several watering tanks within the project area, but they are generally located far enough away from the stream channels to diminish the impacts from concentrated livestock watering. However, livestock still tend to congregate in the stream channel bottoms where shade and grass are available.

The most notable impacts to stream channels and water quality within the project area occur from accelerated soil erosion and the resultant sediment delivery. Most of the current and potential impacts to streams and water quality can be categorized into source areas which are occurring on the hillslopes and those which are immediately adjacent to stream channels or other water bodies.

Examples of current or recent hillslope activities include grazing (ongoing) and silvicultural practices (most recent was 1990). Those activities that have the greatest impact on streams are those that are immediately adjacent to stream channels where there is little vegetative buffer to trap and store eroded soil material. Road facilities are a primary example of those activities in the project area that occur adjacent to stream channels.

Erosion from hillslope activities was modeled using the Disturbed WEPP interface of the WEPP erosion model (Elliot et al. 2000) to estimate the current delivery of eroded sediment to stream channels. The model was run over several scenarios utilizing a 50-foot healthy forested buffer to provide for a baseline measure against which erosion from proposed upslope management activities can be compared. Ground cover was assumed to be 85%, reflecting the lower, more conservative estimate of the ground for the dominant soil Map Units (5977 and 5978). Modeled

sediment delivery rates do not show any difference between eroded sediment volumes and delivered sediment volumes. In actuality there would be some sediment retention due to the stream buffer.

Roads in the area range from very low standard native surface and two-track construction, to graveled surface roads, to oiled surface roads. Research has shown that roads are by far the most impacting of the activities that are immediately adjacent to stream channels (Elliot et. al. 1999). However, in most instances, the roads within the project area are not contributing to major stream flow diversions or sediment delivery to stream channels. Except for the main collector roads, the majority of the roads in the area are designed with an outsloped template and are therefore not extending the channel system with inside road ditches or diverting channel flows from one small watershed to another. The main arterial roads (road numbers 141, 626, 626A, 625, 182, and 633) are often ditched on at least one side and sometimes on both sides of the road. These roads do in some instances divert extra flows or increase the runoff efficiency of the watershed. However, no channel impacts were seen or noted which were resulting from the road drainage addition to the channel system.

There are many roads in channel bottoms that are at risk for flood events, although none currently show signs of active erosion. In most cases, the road templates are being reclaimed naturally with grasses and pine seedlings to an almost natural condition.

There are some localized areas (on FS roads 179 and 924) where wet season travel on native surface roads and a lack of road maintenance has created moderately to severely rutted roads. In these instances, the wheel ruts do have the potential to channel

water and sediment, some of which could be delivered directly to a channel.

Erosion from roads was modeled using the Road WEPP Erosion Prediction Model (Elliot et. al. 1999) to estimate the current delivery of eroded sediment from roads to stream channels. The model was run over several scenarios to provide for a baseline measure against which erosion from proposed road management activities could be compared. Erosion from outsloped roads (both graveled and native surfaced) greater than 50 feet from the stream channel are generally not contributing sediment to stream channels. Insloped roads (both graveled and native surfaced) are producing small amounts of sediment where they are paralleling stream channels with a buffer of 50 feet or more. The model output estimates generally match field observations that sediment delivery from roads is limited to stream crossings and adjacent parallel open roads. According to the WEPP modeling, roads are producing relatively small or moderate amounts of sediment where they have little or no buffer (less than 50 feet) to the stream channel. This is usually the case where roads cross the stream channels or where a road intermittently impinges a channel.

All road crossings were considered to have almost no buffer and very little slope at the stream crossing (5 feet of buffer or less, and modeled to reflect both insloped and outsloped road templates, and graveled and native soil road surface conditions). It must be noted that these are modeled results based on a 30 year return interval storm, chosen as a worst-case scenario, and cannot be taken to be exact amounts currently being delivered to stream channels. Shorter return intervals did not provide sufficient differences in model outputs to distinguish between proposed project alternatives.

Therefore the 30 year return interval was chosen to both provide conservative estimates while still displaying relative comparisons in action alternatives.

According to these model results, there is a very low risk that sufficient sediment would be produced from this project to effect downstream water quality. The combination of ephemeral and intermittent streamflow regimes, the application of stream buffers, and the application of New Mexico State Best Management Practices (Project Record 54) and Forest Service Soil and Water Conservation Practices (Project Record 53) all present a case for low risk for impacts to downstream water quality.

Soils

A Terrestrial Ecosystem Report (TES) was completed for the Negrito Creek 5th Code Watershed in 1995 (USDA 1995b). The Negrito TES describes the soils within the Negrito Watershed and identifies soil units that are at risk for reduced soil quality due to natural erosion hazard or past land management practices.

Surface soil textures are generally very cobbly loams (74% of the project area). Most of the area is dominated by soils that are derived from basalts, however there are some rhyolite derived soils that are more sensitive to management activities. Erosion hazard is rated as severe on several units where soils can be displaced long distances downslope. Bare soil areas occur naturally near bluffs and rock outcrops.

Risk was defined using erosion rate estimates derived from the Universal Soil Loss Equation (USLE) for developing alternative comparisons for soil disturbance risk (as an index of potential detrimental soil disturbance). The Road Interface for the

WEPP Model was used to describe differences by alternative in sediment delivery to streams from roads.

Ground cover, which is important for retarding surface erosion, tends to be sparse to moderate, or close to the soil tolerance levels on five soils map units within the project area. The sum of the area for these units represents approximately 16% of the project area. The tolerance values are a reflection of the maximum rate of soil loss that can occur while sustaining the inherent site productivity. The listed values are the minimum vegetative ground cover percentages that are needed to provide for sustained soil productivity. Vegetative ground cover includes both surface litter and vegetation.

Large woody material (LWM) consists of fallen large trees that are in various stages of decomposition, and includes material larger than 12 inches in diameter and 8 feet in length. In terms of soil productivity, LWM provides for long term nutrient cycling, micro site opportunities for increased soil moisture retention, and vegetation establishment. LWM is also important for many wildlife species. Graham et al. (1994) studied the occurrence and distribution of Coarse Woody Debris (CWD) in various healthy forest types. Coarse Woody Debris includes all dead organic surface materials 3 inches and greater.

Data from this study, some of which occurred in the dry pine forest type found on the Coconino National Forest dry pine types, indicate that CWD averages about 7 tons/acre. Within the project area there appeared to be sufficient LWM in conjunction with the smaller diameter CWD fuels to meet Graham's recommendation. The LWM appears to occur at a minimum rate of approximately 4-8 pieces per acre,

including standing dead snags, and is consistent with other findings (Brown et. al. 2003).

During the field surveys the project area was stratified into areas of recent past management activities (soil disturbance) and proposed project activity areas. The soil quality standards examined were compaction, rutting, displacement, severely burned soils, surface erosion, soil mass movement, and organic matter guidelines. With few exceptions, areas showed no lingering signs of impacts to the soil resource. Reduction of vegetative cover and slight surface compaction were evident over some areas where ungulates (livestock, elk, and deer) have impacted the soil resource. Most of the forest type areas appear to have soils that are functioning at or near their productive capacity.

The action alternatives would treat forested stands using a combination of forest stand thinning and prescribed fire. The forest stand thinning activities would require the use of mechanized equipment to remove the thinned materials from the woods. All action alternatives would utilize streamside buffers as described in the project design section. All streams in the project area would receive at least a 50-foot stream buffer. Road maintenance for Alternative 2, in most cases, would occur outside of stream buffer zones unless a stream crossing is necessary. Any stream crossings on closed roads would be reconstructed as close to right angles to the stream channel as is possible.

Alternative 1:

Direct and Indirect Effects

The no action alternative would maintain the trend of the current condition for the

watershed and soils resources. The majority of the soil units within the project area are functioning at or near their productive capacity. There are several units that lack sufficient ground cover. Limited sediment delivery from rutted road conditions would continue. Not treating the hazardous fuels conditions would also maintain the risk of a high severity fire within the project area. A stand replacing high intensity/severity wildfire would negatively impact soil and water resources from the increase in sediment delivery to stream channels, and from the long term (30 – 100 years) loss of large organic material necessary for soil productivity.

Alternative 2:

Direct and Indirect Effects

Soils: Soils in the area would receive the most impact from the proposed action, as it includes the greater amount (area) of disturbance activities associated with the removal of timber using mechanized equipment and the maintenance of approximately 24.8 miles of existing road. Effects were analyzed using an index of disturbance based on silvicultural prescription and yarding activities.

Areas with activities rated as low risk for disturbance (no treatment, fuel treatment and pre-commercial thinning), are expected to recover within one year or less. Areas with activities rated as moderate (prescribed fire, and select thinning of timber stands) risk for disturbance are expected to recover within 1-3 years. Mechanical treatment areas that would have tractor yarding disturbance activities all rated as high. These areas are expected to recover within 5-10 years. Table 3-8 displays the effects of Alternative 2 on risk of soil disturbance by treatment.

Table 3-8: Alternative 2 Relative magnitude of Soil Disturbance¹.

Soil Disturbance	Percent of actual Treated Area within Project Units	Acres of actual Treated Area within Project Units
Low	41%	5217
Moderate	7%	942
High	8%	984

¹Ratings of Low, Moderate, and High are based on the relative impact of the project alternative activities. Percentages and acres are based on treatment types and yarding methods- not on unit boundary areas. For example a 100-acre unit might be designated for group selection and tractor yarding, but only a portion of that area would be impacted by the treatment activities. High soil disturbance yarding would occur on approximately 70 percent of the group selection area- estimated to be 30-60% of the 100-acre unit.

Sediment Delivery Effects: Except for road crossings on stream channels, most of the land disturbing activities would be located well away from stream channels. Stream channel buffers of 50 feet would be used for all units adjacent to stream channels. Erosion from hillslope activities was modeled using the Disturbed WEPP Interface of the WEPP Erosion Model to estimate the current delivery of eroded sediment to stream channels. The model was run over several scenarios utilizing a 50 foot healthy forested buffer to provide for a baseline measure against which erosion from proposed upslope management activities can be compared. Ground cover on the stream buffer was assumed to be 85% for the managed units. This reflects the lower, more conservative estimate of the ground for the dominant soil map units. The upslope 100-foot vegetation management unit was assumed to have 50% ground cover as a result of tractor yarding activities. The prescribed fire activities were assumed to reduce the upper 100 foot unit to 50% ground cover, and the lower 50 foot buffer to 70% ground cover. Active ignition within stream buffer zones would not occur except where safety concerns warranted.

Accelerated erosion and excessive sediment delivery was assumed to occur at 5 tons/acre

and greater. Moderate erosion and sediment delivery conditions were assumed to occur between 2 and

5 tons/acre. Anything less than 2 tons/acre was considered to be low in terms of erosion and sediment delivery. The modeled results (Table 3-9) indicate that there is a potential for moderate erosion from the prescribed fire activities on the steeper slopes (40%). This condition would be expected to remain for 3 – 5 years as vegetation and fallen organic material help to restore the pre-activity ground cover condition.

Table 3-9. Alternative 3 Relative magnitude of Soil Disturbance¹.

Soil Disturbance	Percent of actual Treated Area within Project Units	Acres of actual Treated Area within Project Units
Low	38%	4703
Moderate	10%	1199
High	7%	850

¹Ratings of Low, Moderate, and High are based on the relative impact of the project alternative activities. Percentages and acres are based on treatment types and yarding methods- not on unit boundary areas. For example a 100-acre unit might be designated for group selection and tractor yarding, but only a portion of that area is actually going to be impacted by the treatment activities. High soil disturbance yarding would occur on approximately 70 percent of the group selection area- estimated to be 30-60% of the 100-acre unit.

The proposed action also would re-open several roads to implement the project. Several segments of these roads are within 50 feet of an existing stream channel. There is a risk that sediment could be delivered from the re-opening activities where raw road fill slope material is side-cast towards the stream channel. Best management practices would be applied to reduce the actual amount of bare fill slope material available for delivery to the stream channel.

The locations where sediment is also delivered are at road stream crossings and road segments adjacent to stream channels. Absolute prevention of sediment delivery at these locations is not possible, however, with the application of Best Management Practices (BMPs), sediment delivery from these road segment sites can be drastically reduced. According to the Road Erosion Module of the WEPP Program (Table 3-10), sediment delivery to road crossing sites currently averages 0.1 tons/yr for graveled road crossings and 0.2 tons/yr for ungraveled road crossings. Road maintenance sites at road crossings would increase this by approximately double or threefold as freshly disturbed roadbed soils are made available for transport to the stream channels. Road maintenance activities would avoid further disturbance of stream crossing sites through the application of State BMPs and Forest Service Soil and Water Conservation Practices.

stream crossing sites through the application of State BMPs and Forest Service Soil and Water Conservation Practices, such as avoiding road blading over stream channels and by restricting haul activities during wet road conditions. Therefore, Alternative 3 should nearly resemble the current condition in terms of road sediment delivered to stream channels at stream crossings.

Alternative 3:

Direct and Indirect Effects

Soils: Soils in the project area would receive less impact as compared to Alternative 2, but not significantly different from the proposed action.

Sediment Delivery Effects: The assumptions and estimated erosion and sediment delivery associated with hill slope activities are the same as Alternative 2, Table 3-8.

Alternative 3 would not reconstruct any existing roads so there should be no extra sediment produced at stream crossings, or any that would be produced would be very minimal (Table 3-9). Road maintenance activities would avoid further disturbance of

Table 3-10. Estimated Erosion and Sediment Delivery From Hill Slope Activities (Disturbed WEPP Model), Alternatives 2 and 3

Soil Texture	Upper Slope limit (%)	Vegetative Condition (upper erosion unit; lower erosion unit)	Tons of Sediment Eroded (based on 30 yr Return Interval) (tons/acre/yr)	Tons of Sediment Delivered (based on 30 yr Return Interval) (tons/acre/yr)
Current Condition				
Loam	60	Trees 20 yrs +; Trees 20 yrs +(Buffer)	0.66	0.66
Loam	40	Trees 20 yrs +; Trees 20 yrs +(Buffer)	0.41	0.41
Loam	20	Trees 20 yrs +; Trees 20 yrs +(Buffer)	0.19	0.19
Loam	10	Trees 20 yrs +; Trees 20 yrs +(Buffer)	0.05	0.05
Proposed Action				
Loam	60	Low Severity Burn; Trees 20 yrs +(Buffer)	0.50	0.50
Loam	40	Trees 5 yrs +(Logged); Trees 20 yrs +(Buffer)	2.32	2.16
Loam	20	Trees 5 yrs +(Logged); Trees 20 yrs +(Buffer)	1.30	1.22
Loam	10	Trees 5 yrs +(Logged); Trees 20 yrs +(Buffer)	0.53	0.53
Loam	40	Rx Fire +(Low Severity); Trees 20 yrs +(Buffer)	3.43	3.15
Loam	20	Rx Fire +(Low Severity); Trees 20 yrs +(Buffer)	1.85	1.77
Loam	10	Rx Fire +(Low Severity); Trees 20 yrs +(Buffer)	0.88	0.86

Wildlife

All fish and wildlife would be heavily impacted by a large-scale, high intensity wildfire burning through the area destroying habitat, individuals, and prey species. The implementation of Alternatives 2 or 3 would reduce the risk of a high intensity wildfire burning through the project area and would consequently benefit all fish and wildlife. The following section examines the effects on wildlife species in the Six Shooter and Black Deer Project from activities listed in Alternatives 1-3.

See Biological Assessment/Evaluation (Project Record 62) -- for complete analysis. This section contains an analysis of the effects of the alternatives on Management Indicator Species and migratory birds. Effects on federally listed and USFS Region 3 Sensitive Species are presented in Item 9, page 88.

Management Indicator Species

The Land and Resource Management Plan for the Gila National Forest, adopted in 1986, identified 26 Management Indicator Species (MIS). All 26 MIS were considered in the Six Shooter Black Deer Project analysis. Because of indicator habitat (vegetation) types found within the project area, 17 of the MIS were found to have the potential of being affected by project implementation. They are: Rocky Mountain elk (*Cervus elaphus*), mule deer (*Odocoileus hemionus*), Mexican spotted owl (*Strix occidentalis lucida*), Merriam's wild turkey (*Meleagris gallopavo*), blue grouse (*Dendragapus obscurus*), common [northern] flicker (*Colaptes auratus*), hairy woodpecker (*Picoides villosus*), long-tailed vole (*Microtus longicaudus*), Mexican [Mogollon] vole (*Microtus mogollonensis*), Abert's squirrel (*Sciurus aberti*), red squirrel

(*Tamiasciurus hudsonicus*), black-tail jackrabbit (*Lepus californicus*), Mearns' [Montezuma] quail (*Cyrtonyx montezumae mearnsi*), horned lark (*Eremophila alpestris*), plain [juniper] titmouse (*Baeolophus ridgwayi*), Sonora sucker (*Catostomus insignis*), and desert sucker (*Catostomus clarki*).

Because of lack of suitable habitat in the project area or lack of effects to habitat downstream of the project area, there would be no effect on the following species due to project implementation: antelope (*Antilocapra americana*), Arizona grey squirrel (*Sciurus arizonensis*), beaver (*Castor canadensis*), killdeer (*Charadrius vociferous*), black hawk (*Buteogallus anthracinus*), mallard (*Anas platyrhynchos*), yellow warbler (*Dendroica petechia*), hooded oriole (*Icturus cucullatus*), and Gila trout (*Onchorhynchus gilae*).

Within the Gila National Forest there are 277,436 acres of mixed conifer, 1,119,773 acres of ponderosa pine, 1,591,082 acres of woodland, 120,334 acres of mountain grassland, 163,787 acres of plains grassland, 43,454 acres of desert shrub, and 26,741 acres of riparian (USDA 1986). To ensure population viability of all species, it is important to maintain diverse vegetation types across the landscape.

Changes in seral conditions occur due to a number of factors including natural succession, wildland fire, disease, insect, and human influences. In general, natural succession is a slow process and takes many years for vegetation types to change seral conditions. The exceptions are changes that result from wildland fire, disease, insects, and human related activities. In order to evaluate habitat changes associated with management indicator species, a review of all activities having the potential to change

vegetation conditions and associated seral stages was conducted (Project Record 62).

For most management indicator species, the risk of degradation or elimination of habitat due to catastrophic wildfire would increase under Alternative 1 (no action).

Rocky Mountain elk - moderate seral stage indicator of grassland, woodland, ponderosa pine, and mixed conifer.

Analysis indicates the acreage of mountain grassland has increased from low to moderate seral condition by 3% since the Forest Plan was developed (cite). The acreage of moderate seral condition woodland has not changed. The acreage of moderate seral condition ponderosa pine and mixed conifer has increased 1-2%. This change has been beneficial for elk.

With increasing national and state trends, and estimates of stable to increasing numbers on the Forest, long-term population trends for the Gila National Forest appear to be stable. However, since the State Game Commission has continued to increase permits across the Forest, elk numbers are expected to decrease within the foreseeable future.

Elk occur in the Six Shooter and Black Deer Project where much of the acreage is moderate seral stage ponderosa pine, mixed conifer, and pinyon-juniper woodland with some moderate seral stage grassland.

Alternatives 2 and 3 would not change substantial acreage of existing seral stages. Direct effects would include human disturbance during project implementation and an immediate reduction in thermal and hiding cover. Indirect effects include an eventual, relatively short-term increase in foraging habitat, and reduced risk of

degradation or elimination of habitat due to catastrophic wildfires.

Project implementation would not have a detectable effect on the population trends of elk in the Gila National Forest.

Mule deer - moderate seral stage indicator of pinyon-juniper woodland, oak woodland, and moderate to high seral stage indicator of desert shrub, and shrub woodland.

Analysis indicates the acreage of moderate to high seral condition for desert shrub and woodland has not changed since the Forest Plan was developed.

With decreasing national and state trends, and fluctuating numbers on the Forest, long-term population trends for the Gila National Forest appear to be decreasing (cite). Current decreasing deer numbers on the Gila may be correlated with the ongoing, prolonged drought, and inferior deer habitat.

Mule deer occur in the Six Shooter and Black Deer Project where much of the acreage is moderate seral stage ponderosa pine and pinyon-juniper woodland with some moderate seral stage grassland. Mule deer are a moderate to high seral stage indicator of desert shrub and shrub woodland habitats.

Alternatives 2 and 3 would not change substantial acreage of existing pinyon-juniper woodland. Direct effects would include human disturbance during project implementation and an immediate reduction in thermal and hiding cover. Indirect effects would include an eventual, relatively short-term increase in browsing and foraging habitat and reduced risk of degradation or elimination of habitat due to catastrophic wildfires. Overall mule deer habitat should

Table 3-11. Summary of habitat and population trends for Management Indicator Species

Management Indicator Species (Predicted trend)	Alternatives					
	1		2		3	
	Habitat	Population	Habitat	Population	Habitat	Population
Elk	Stable	Stable	Up	Stable	Up	Stable
Mule deer	Stable	Stable	Up	Stable	Up	Stable
Arizona gray squirrel	Up	Stable	Up	Stable	Up	Stable
Abert's squirrel	Stable	Stable	Up	Stable	Up	Stable
Red squirrel	Stable	Stable	Up	Stable	Up	Stable
Blacktail jackrabbit	Stable	Stable	Up	Stable	Up	Stable
Long-tailed vole	Stable	Stable	Stable	Stable	Stable	Stable
Mexican vole	Stable	Stable	Stable	Stable	Stable	Stable
Mearn's quail	Stable	Stable	Up	Stable	Up	Stable
Merriam's Wild Turkey	Stable	Stable	Up	Stable	Up	Stable
Blue grouse	Stable	Stable	Up	Stable	Up	Stable
Plain titmouse	Stable	Stable	Up	Stable	Up	Stable
Hairy woodpecker	Stable	Stable	Up	Stable	Up	Stable
Mexican spotted owl	Stable	Stable	Stable	Stable	Stable	Stable
Common flicker	Stable	Stable	Up	Stable	Up	Stable
Horned lark	Stable	Stable	Up	Stable	Up	Stable
Sonora sucker	Stable	Stable	Up	Stable	Up	Stable
Desert sucker	Stable	Stable	Up	Stable	Up	Stable

improve with project implementation and the project would not have a detectable effect on the population trends of mule deer in the Gila National Forest.

Mexican spotted owl - high seral stage indicator of mixed conifer and high elevation riparian. (See also *Mexican spotted owl effects analysis (page 78)*)

Across the Gila National Forest, the acreage of high seral condition mixed-conifer has decreased 2%, while the acreage of high seral condition riparian has not changed since the Forest Plan was developed. This change has occurred in small pockets, in a mosaic pattern, scattered across the landscape. This change has been beneficial to the owl, as compared to catastrophic fire, which would have resulted in large areas of stand-replacement fire.

Suitable nesting habitat that includes some high seral stage mixed conifer habitat occurs in the Six Shooter and Black Deer Project. High elevation riparian habitats do not occur within the project area. Mexican spotted owl occurrence was documented and as a result two PACs were delineated that are completely in the project and four were delineated that are partially within the project.

A biological determination that implementation of Alternatives 2 and 3 may affect, but is not likely to adversely affect the Mexican spotted owl was made for both action alternatives (Project Record 62). Project implementation would not have a detectable effect on the population trends of the Mexican spotted owl in the Gila National Forest.

Merriam's wild turkey - moderate seral stage indicator of woodland, mixed conifer and mid to high elevation riparian, moderate

to high seral stage indicator of ponderosa pine.

Across the Gila National Forest, the acreage of moderate seral condition mixed conifer has increased 1% since the Forest Plan was developed. The acreage of moderate seral condition ponderosa pine has increased 2%, and the acreage of high seral condition ponderosa pine has decreased 2%. Overall, these changes have been beneficial to the turkey. In New Mexico, wild turkey populations have experienced recent declines due to drought conditions. The New Mexico Department of Game and Fish (2000) predicts population numbers would increase over the next five years as wild turkeys occupy currently unoccupied habitats and via transplants.

Alternatives 2 and 3 would result in a trend toward increased acreage of moderate to high seral stage ponderosa pine habitat. Direct effects would include human disturbance during project implementation, potential reduction in quality of nesting habitat in some stands, created openings in the forest canopy, and the probability that some roost trees would be removed. Indirect effects would be an eventual, relatively short-term increase in herbaceous biomass that would improve habitat quality for both poults and adults. Project implementation would not have a detectable effect on population trends of Merriam's wild turkey in the Gila National Forest.

Blue grouse - moderate to high seral stage indicator of mixed conifer.

Across the Gila National Forest, the acreage of moderate seral condition mixed conifer has increased 1% and the acreage of high seral condition mixed conifer has decreased 2%, since the Forest Plan was developed. However, this change has occurred in small

pockets, in a mosaic pattern, scattered over the landscape. This change has been beneficial to the blue grouse, as compared to catastrophic fire, which would have resulted in large areas of stand replacing fire.

Alternatives 2 and 3 would increase the acreage of moderate and high seral stage mixed conifer habitat. Some mixed conifer stands would be treated to abate fire risk, and some would be thinned from below to increase the growth rate of residual trees. If these stands are indeed occupied by blue grouse, direct effects would include human disturbance during project implementation, potential short-term reduction in quality of nesting habitat in some stands, and the possibility that some roost trees would be removed.

Indirect effects would be an eventual, relatively short-term increase in herbaceous biomass that would improve habitat quality. Project implementation would not have a detectable effect on population trends of blue grouse in the Gila National Forest.

Common (Northern) flicker - high seral stage indicator of pinyon-juniper woodland and oak woodland.

Across the Gila National Forest, the acreage of high seral condition woodland has not changed significantly since the Forest Plan was developed. With over 2,988,000 acres of ponderosa pine, mixed conifer, and woodland type vegetation on the Gila National Forest, snag habitat is abundant for this species.

With secure global, national, and state rankings, and a slight increase in state population trends, long-term population trends for the Gila National Forest appear to be stable. Large snags are an important habitat component for the northern flicker.

In the Six Shooter and Black Deer Project emphasis is placed on the retention of existing snags and most large trees that would provide future snags. High seral condition woodlands would be increased somewhat as thinning of pinyon-juniper woodlands would concentrate on removing the smaller size class trees.

Pine oak woodland stands within the project and surrounding area would be managed for the Mexican spotted owl with the intent of retaining most large diameter ponderosa pines, which would also benefit the northern flicker.

Alternatives 2 and 3 would somewhat increase the acreage of high seral stage pinyon-juniper woodland habitat. Direct effects would include human disturbance during project implementation, and potential immediate reduction in quality of nesting habitat in some stands. Indirect effects would include an eventual, relatively short-term increase in herbaceous biomass that would improve overall habitat quality and reduced risk of degradation or elimination of habitat due to catastrophic wildfires. Project implementation would not have a detectable effect on population trends of northern flickers in the Gila National Forest.

Hairy woodpecker - high seral stage indicator of ponderosa pine and mixed conifer.

Across the Gila National Forest, the acreage of high seral condition ponderosa pine has decreased 2%, and the acreage of high condition mixed-conifer has also decreased 2% since the Forest Plan was developed. These changes have occurred primarily due to natural fires, and have been beneficial to the hairy woodpecker because of increased snag habitat.

With secure global, national, and state rankings, slightly decreasing regional trends, slightly increasing state trends, and moderately decreasing trends on individual BBS routes, long-term population trends for the hairy woodpeckers appear to be stable to slightly decreasing at the Forest level. Limiting factors for the hairy woodpecker include predation and habitat modification. Snags (10 inches or more dbh) and an average of five snags/hectare are assumed optimal for hairy woodpecker reproduction, but may not be adequate for foraging (Sousa 1987).

With over 2,988,000 acres of ponderosa pine, mixed conifer, and woodland type vegetation on the Gila National Forest, snag habitat is abundant for this species. In the Six Shooter and Black Deer Project Area, emphasis is placed on the retention of existing snags and most large trees that would provide future snags.

Alternatives 2 and 3 would somewhat increase the acreage of mature and overmature ponderosa pines preferred by this species. Pine/oak stands within the project area would be managed for the Mexican spotted owl with the intent of retaining most large diameter ponderosa pines which would also benefit the hairy woodpecker. Direct effects would include human disturbance during project implementation, and removal of some trees that are potential habitat. Indirect effects would include an eventual, relatively substantial increase in the acreage of high seral stage ponderosa pine, which would increase suitable habitat for this species.

The reduced risk of catastrophic wildfires would lower the probability of loss of habitat. Project implementation would not have a detectable effect on population trends

of hairy woodpeckers in the Gila National Forest.

Long-tailed vole - low seral stage indicator of ponderosa pine and mixed conifer.

Across the Gila National Forest, the acreage of low seral condition ponderosa pine has not changed, and the acreage of low seral condition mixed conifer has increased 1% since the Forest Plan was developed. This change has been beneficial to the long-tailed vole.

Alternatives 2 and 3 direct effects would include human disturbance during project implementation and an immediate marginal increase in the acreage of low seral stage ponderosa pine habitat. Indirect effects would include a reduction in the risk of catastrophic wildfire and decreased possibility of increased acreage of low seral stage ponderosa pine habitat. Project implementation would not have a detectable effect on population trends of long-tailed voles in the Gila National Forest.

Mexican [Mogollon] vole - low seral stage indicator of high elevation riparian; primary high seral stage indicator of wet meadow.

Across the Gila National Forest, the acreage of low seral condition riparian has decreased 26% by moving to moderate seral condition, and the acreage of high seral condition riparian has remained stable. The improvement of riparian condition has been beneficial to the Mexican vole.

Riparian vegetation seral stages do not occur in the Six Shooter and Black Deer Project and downstream riparian condition would not be altered to a measurable degree. Mexican voles also inhabit grassy open areas in ponderosa pine forests including openings created in the forest canopy.

Alternatives 2 and 3 direct effects would include human disturbance during project implementation. Indirect effects would include the reduced possibility of riparian habitat degradation that corresponds with the reduced risk of catastrophic wildfire. The resultant increase in herbaceous biomass would improve potential habitat quality. Project implementation would not have a detectable effect on population trends of Mexican voles in the Gila National Forest.

Abert's squirrel - moderate to high seral stage indicator of ponderosa pine.

Across the Gila National Forest, the acreage of moderate seral condition ponderosa pine has increased 2%, although the high seral condition ponderosa pine has decreased 2%. Therefore there has been no net change in habitat for Abert's squirrels. With secure global and national rankings, and an apparently secure rank at the state level (sufficiently abundant to withstand hunting), the long-term population trend for Abert's squirrel on the Gila National Forest appears to be stable.

Alternatives 2 and 3 direct effects would include human disturbance during project implementation, and the removal of some potential nest trees. The removal of some potential nest trees may, in the short term, cause a reduction of the Abert's squirrel population in the project area. The predicted short-term reduction would occur on less than 0.3% of available ponderosa pine habitat on the Forest.

The indirect effects would include an increased combined acreage of up to approximately 25% of moderate and high seral stage ponderosa pine habitat and reduction in the risk of degradation or

elimination of habitat due to catastrophic wildfire. Project implementation would not have a detectable effect on the population trend of Abert's squirrels in the Gila National Forest.

Red squirrel - high-seral stage indicator of mixed-conifer.

In the mountain ranges of the Gila National Forest, these squirrels are rare and local in stands of spruce that are limited to moist, north-facing slopes. Population abundance of the red squirrel is influenced to some degree by hunting. The entire Gila National Forest is open for red squirrel hunting for two months each fall. Population trend data are unavailable at the Forest scale, and at other scales that are sufficient to draw conclusions about population trends at the planning level, however, this species is considered sufficiently abundant to withstand hunting.

Across the Gila National Forest, the acreage of high seral condition mixed-conifer has decreased 2%. With secure global, national, and state rankings, and sufficient abundance to withstand hunting, the long-term population trend for the red squirrel on the Gila National Forest appears to be stable. Red squirrels have been observed in mixed conifer stands in the Six Shooter and Black Deer Project.

Alternatives 2 and 3 direct effects would include human disturbance during project implementation and immediate alteration of some habitat. The indirect effects would include an eventual increased amount of high seral stage mixed conifer habitat and a reduction in the risk of degradation or elimination of habitat due to catastrophic wildfire. The project would not have a detectable effect on the population trend of Abert's squirrels in the Gila National Forest.

Black-tailed jackrabbit - low seral stage indicator of desert shrub, plains grassland, pinyon-juniper woodland, and oak woodland.

Across the Gila National Forest, the acreage of low seral condition woodland has remained stable, low seral condition plains grassland has decreased 1%, low seral condition mountain grassland has decreased 3%, and low seral condition desert shrub has remained stable. With secure global, national and state rankings, the long-term population trend for the black-tailed jackrabbit on the Gila National Forest appears to be stable. At the Forest scale, jackrabbits are a fairly common species (USDA 1995a).

Black-tailed jackrabbits have not been documented in the Six Shooter and Black Deer Project. Occurrence has been documented in the Negrito Creek 5th code watershed where they were commonly observed in Collins Park grasslands and reported in a transition area of open meadow to ponderosa pine forest (Frey 1995) approximately 2.0 miles from the project area. Personal observations of black-tailed jackrabbits on the Reserve Ranger District on an annual basis since 1989 indicate that cyclical fluctuations in population numbers occur but the overall population trend appears to be stable.

Alternatives 2 and 3 direct effects would include human disturbance during project implementation, an immediate reduction in the acreage of low seral stage pinyon-juniper habitat, and immediate increase in the acreage of available grasslands. Mountain grassland restoration would occur where encroachment conifers would be removed. Meadows, treated grasslands, and woodlands would be broadcast burned.

Thinning and broadcast burning would occur in pinyon-juniper woodlands where stand densities would be reduced.

Indirect effects include the reduction in the risk of degradation or elimination of habitat due to catastrophic wildfire. These management activities would improve the quality of existing potential habitat. Project implementation would not have a detectable effect on the population trend of black-tailed jackrabbits in the Gila National Forest.

Mearns' (Montezuma) quail - moderate to high seral stage indicator of pinyon-juniper woodland, and high seral stage indicator of plains grassland, mountain grassland, and oak woodland.

Mearns' quail are uncommon breeding residents of the Gila National Forest (Zimmerman 1995). Surveys for Mearns' quail have not occurred on the Forest, however, over the past five years the species has been observed in various locations where they were previously unknown. More numerous and larger coveys of Mearns' quail have been seen on both the Wilderness and Silver City Ranger Districts (Jerry Monzingo and Russell Ward, pers. comm.)

Across the Gila National Forest, acreage of moderate and high seral condition woodland has remained stable, and acreage of high seral condition grassland has also remained stable. Therefore, habitat has remained stable for the Mearns' quail. With apparently secure global, and national rankings, vulnerable state rankings, an overall fluctuating trend in New Mexico, and increased observations and larger coveys of Mearns' quail on at least two Ranger Districts, the trend for the species on the Forest is thought to be stable. The status of Mearns' quail cannot be accurately assessed using the current BBS and CBS

data (Great Backyard Bird Count 2002). As with other quail, Mearns' populations are often impacted by uncontrollable factors (i.e., weather). Quail populations are often dependent on nesting success. Spring and summer moisture has a strong influence on hatches and chick survival (Dixon and Knight 1993).

Mearns' quail have not been documented in the Six Shooter and Black Deer Project where high seral stage mountain grassland and low seral stage oak woodlands are limited to small clumps. Personal observations of Mearns' quail on the Reserve Ranger District at various times since 1989, indicate population levels are low but appear to be stable.

Alternatives 2 and 3 direct effects include human disturbance during project implementation. Indirect effects would be an immediate marginal increase in the acreage of mountain grassland. Grassland restoration would occur where encroachment conifers would be removed. Meadows, treated grasslands, and woodlands would be broadcast burned. The acreage of moderate and high seral stage pinyon-juniper woodlands should increase somewhat and the overstory canopy coverage would be more open.

In the short term, habitat quality would decrease as the limited amount of high seral stage grassland would be subjected to broadcast burns but in the long term, the acreage of this seral stage should increase. Additionally, in the long term, the amount of Gambel oak acorns produced should increase as the Gambel oak competition with ponderosa pine is reduced by thinning of the pine. Overall long-term habitat quality should improve. Indirect effects would include the reduction in the risk of degradation or elimination of habitat due to

catastrophic wildfire. Project implementation would not have a detectable effect on the population trend of Mearns' quail in the Gila National Forest.

Horned lark - low seral stage indicator of plains grassland and mountain grassland.

Four BBS routes are located on or near the Gila National Forest. Two routes, one near Horse Springs and the other near Quemado, have detected horned larks. They were present in all years surveyed at both routes, and neither data set indicates a declining trend. Horned larks seem particularly abundant on the Quemado route. The horned lark has not been documented as occurring within the Six Shooter and Black Deer Project where low seral stage mountain grassland is limited.

Alternatives 2 and 3 direct effects would include human disturbance during project implementation. There would be an immediate marginal increase in the acreage of mountain grassland. Grassland restoration would occur where encroachment conifers would be removed. Meadows and treated grasslands would be broadcast burned. Overall long-term habitat quality should improve by project implementation.

Indirect effects would include the reduction in the risk of degradation or elimination of habitat due to catastrophic wildfire. Project implementation would not have a detectable effect on the population trend of the horned lark on the Gila National Forest.

Plain (Juniper) titmouse - high seral stage indicator of pinion juniper woodland and a moderate seral stage indicator of shrub woodland.

Within the 1,591,082 acres of woodlands on the Gila National Forest, habitat is abundant for the plain titmouse. Four Breeding Bird Survey routes were used to evaluate trend on the Gila National Forest. The Reserve and Emory routes (Rt. 69 and 76 respectively) are on the Forest, and part of the Horse Springs route (Rt. 19) is also on the Forest. Data from the Quemado route (Rt. 63) are also included due to its proximity to the Forest, and because of similar pinion-juniper habitat. The plain titmouse was regularly detected on the Emory and Reserve routes from 1993 to 2000. The plain titmouse was also regularly detected on the Quemado route from 1995 to 1997 (no subsequent data available). This species was detected on the Horse Springs route in 1975 and 1977, however it has not been detected since then.

Trend estimates for Reserve and Emory indicate an increasing trend in the plain titmouse on the Gila National Forest. Analyzing population change on survey routes is probably the most effective use of BBS data, however these data do not provide an explanation for the causes of population trends (Sauer et. al. 2001). Across the Gila National Forest, the acreage of high seral condition woodland has remained stable. With approximately 1,591,082 acres of woodland vegetation type on the Gila National Forest, cavities are expected to be abundant for this species.

Breeding Bird Survey Route 69 traverses the Six Shooter and Black Deer Project. The plain (juniper) titmouse was documented as occurring in or adjacent to the project where some high seral stage pinyon-juniper habitat occurs.

Alternatives 2 and 3 direct effects would include human disturbance during project implementation. Indirect effects would be an immediate marginal increase in the

acreage of high seral stage pinion-juniper woodlands. Thinning and broadcast burning would occur in pinyon-juniper woodlands where stand densities would be reduced. Indirect effects would include the reduction in the risk of degradation or elimination of habitat due to catastrophic wildfire. Overall long-term habitat quality should improve by project implementation. Project implementation would not have a detectable effect on the population trend of the plain (juniper) titmouse in the Gila National Forest.

Sonora sucker and desert sucker - low seral stage indicators of low/mid/high elevation riparian.

Long-term monitoring of Sonora and desert suckers has occurred on five sites within the Gila National Forest (Propst 2001). There is considerable year-to-year variation in Sonora sucker and desert sucker densities, however no indication of a long-term positive or negative trend (Dave Propst, pers. comm.).

Alternatives 2 and 3 would have no direct effects on the Sonora and desert suckers. Indirect effects may impact the Sonora and desert suckers in the short term but the impacts are not likely to result in a trend toward Federal listing or loss of viability. Overall long-term habitat quality should improve by project implementation. Project implementation would not have a detectable effect on population trends of Sonora and desert suckers on the Gila National Forest.

Migratory Birds

Within the Gila National Forest, all migratory birds documented as occurring in or near the project area range from rare/uncommon summer and winter residents to uncommon/fairly common/

common seasonal or permanent residents or transients (Table 3-12) (NMGF 2002). Their preferred habitat types range from grasslands to open- to closed-canopied ponderosa pine and mixed conifer forests to open- to closed- canopied pinyon-juniper woodlands and riparian areas. Depending on species, they consume a variety of invertebrates, insects, fruits, seeds, cones,

young, mid-age, mature, or over mature, would be detrimental to those species that are dependent on moderately closed and closed canopies, but beneficial to species that prefer open canopies.

None of the stands in the project area currently meet the Amended Forest Plan recommended percentages of vegetation

Table 3-12. Migratory birds occurring in the Six Shooter Black Deer Project Area.

Acorn woodpecker - <i>Melanerpes formicivorus</i>	Olive-sided flycatcher - <i>Contopus borealis</i>
American kestrel - <i>Falco sparverius</i>	Pinyon jay - <i>Gymnorhinus cyanocephalus</i>
American robin - <i>Turdus migratorius</i>	Plumbeous vireo - <i>Vireo plumbeus</i>
Ash-throated flycatcher - <i>Myiarchus cinerascens</i>	Purple martin - <i>Progne subis</i>
Band-tailed pigeon - <i>Columba fasciata</i>	Pygmy nuthatch - <i>Sitta pygmaea</i>
Broad-tailed hummingbird - <i>Selasphorus platycercus</i>	Red crossbill - <i>Loxia curvirostra</i>
Brown creeper - <i>Certhia americana</i>	Red-breasted nuthatch - <i>Sitta canadensis</i>
Bushtit - <i>Psaltriparus minimum</i>	Red-faced warbler - <i>Cardellina rubrifrons</i>
Chipping sparrow - <i>Spizella passerina</i>	Red-tailed hawk - <i>Buteo jamaicensis</i>
Clark's nutcracker - <i>Nucifraga columbiana</i>	Ruby-crowned kinglet - <i>Regulus calendula</i>
Common nighthawk - <i>Chordeiles minor</i>	Rufous hummingbird - <i>Selasphorus rufus</i>
Common raven - <i>Corvus corax</i>	Spotted towhee - <i>Pipilo maculatus</i>
Cooper's hawk - <i>Accipiter cooperii</i>	Steller's jay - <i>Cyanocitta stelleri</i>
Cordilleran flycatcher - <i>Empidonax occidentalis</i>	Townsend's solitaire - <i>Myadestes townsendi</i>
Dark-eyed junco - <i>Junco hyemalis</i>	Turkey vulture - <i>Cathartes aura</i>
Gray flycatcher - <i>Empidonax wrightii</i>	Violet-green swallow - <i>Tachycineta thalassina</i>
Great-horned owl - <i>Bubo virginianus</i>	Virginia's warbler - <i>Vermifora virginiae</i>
Hairy woodpecker - <i>Picoides villosus</i>	Western bluebird - <i>Sialia mexicana</i>
Hermit thrush - <i>Catharus guttatus</i>	Western tanager - <i>Piranga olivacea</i>
Juniper titmouse - <i>Baeolophus griseus</i>	Western wood-pewee - <i>Contopus sordidulus</i>
Lesser goldfinch - <i>Carduelis psaltria</i>	White-breasted nuthatch - <i>Sitta carolinensis</i>
Lewis' woodpecker - <i>Melanerpes lewis</i>	White-throated swift - <i>Aeronautes saxatalis</i>
Mountain chickadee - <i>Poecile gambeli</i>	Williamson's sapsucker - <i>Sphyrapicus thyroideus</i>
Mourning dove - <i>Zenaid macroura</i>	Yellow-rumped warbler - <i>Dendroica coronata</i>
Northern flicker - <i>Colaptes auratus</i>	Zone-tailed hawk - <i>Buteo albonotatus</i>
Northern goshawk - <i>Accipiter gentilis</i>	

small mammals and other vertebrates, as well as carrion.

Management activities that result in temporary habitat fragmentation are likely to have the most impacts to migratory birds. Much of the project area is in a moderately closed to closed canopied young and mid-age class. Over 98% of the project area had an open canopy based on interpretation of 1935 aerial photos (USDA 1997). Currently, less than 20% of the project area has an open canopy. Temporary habitat fragmentation in the form of conversion of the existing dense young forest to open-canopied stands would occur in varying degrees according to alternative. Substantial opening of forest canopies whether trees are

structural stages or minimum criteria for the structural attributes used to determine old growth. Stands have been designated to be managed towards old growth in accordance with the Amended Forest Plan. Most of the designated stands that come closest to meeting the minimum old growth criteria are located in Mexican spotted owl Protected Activity Centers and would not be treated.

Several migratory birds are addressed above under threatened, sensitive, and management indicator species. Migratory birds are not necessarily species of concern but do illustrate the importance of the area to New Mexican avifauna. Of the numerous migratory birds that likely occur in and near

the project area, the following have been documented as occurring there.

Alternative 1 would not modify migratory habitat in the short-term as existing environmental conditions and trends would continue. Currently approximately 2,365 acres have an open canopy, 6,555 acres have a moderately closed canopy, and 2,841 acres have a closed canopy. Accumulations of ground fuels from annual needle cast, dieback, and breakage would continue. Mortality of trees would be likely to continue at present rates and would add to the surface fuel loading in the absence of fire.

Natural regeneration of shade tolerant conifers would continue, developing multi-layered stands, resulting in stand conditions more conducive to sustaining active crown fire.

Alternative 2, with the retention of all yellow ponderosa pines, would maintain nearly all of the large trees that contain existing cavity habitat and are future snags. These trees would remain in existing groups. A small number of large trees that do not have yellow bark would be removed due to dwarf mistletoe infestation and to achieve tree density objectives. Some migratory birds use dwarf mistletoe-induced brooms that would be targeted for removal. It is predicted that following implementation of this alternative, approximately 3,822 acres would have an open canopy, 5,598 acres would have a moderately closed canopy, and 2,180 acres would have a closed canopy.

Alternative 3 would retain most yellow ponderosa pines that contain existing cavity habitat and are future snags. A smaller number of large trees that do not have yellow bark would be removed due to dwarf mistletoe infestation than *Alternative 2*, as

less acreage would be entered. Some migratory birds use dwarf mistletoe-induced brooms that would be targeted for removal. It is predicted that following implementation of this alternative, approximately 3,740 acres would have an open canopy, 5,527 acres would have a moderately closed canopy, and 2,406 acres would have a closed canopy.

The effects of implementing either alternative would be positive for some migratory birds and negative for others in either the short- or long-term.

2. The degree of effects on public health and safety.

The action alternatives would avoid adverse effects to public safety through expert design of projects on the ground. The action alternatives would be governed by standard public health and safety clauses, which would be included in the timber sale contract and contracts for road work. Actions such as dust abatement, signing of roads identifying the area, such as an active timber sale, safely securing truckloads, and maintaining the haul route are standard precautionary measures that would be employed.

The action alternatives would also provide for beneficial effects on public health and safety by conducting watershed improvement projects to improve water quality, improving open roads, and closing roads that pose safety concerns.

3. Unique characteristics of the geographic area such as proximity to historic or cultural resources, park lands, prime farmlands, wetlands, wild and scenic rivers, or ecologically critical areas.

Historic or cultural resources – Historical and cultural resources located within the allotment have been identified and according to the Historical and Cultural Resource Report, there will be no effects to those resources.

Park lands-there are no park lands in close proximity to the project area.

Prime farmlands-there are no prime farmlands in close proximity to the project area or that will be affected by the project.

Wetlands-no wetlands have been identified within the project area.

Wild and scenic rivers-no wild or scenic rivers or rivers that are eligible for study have been designated or identified within the project area.

Ecologically critical areas-no critical habitat for threatened or endangered species is located within the project area. Six protected activity centers for the Mexican spotted owl are located within the project area. This habitat will be protected by not treating the PACS mechanically, and by conducting fuel treatments and prescribed burning in one PAC. The Biological Evaluation/Assessment for this project made a determination of no effect on all federally threatened and endangered species and their habitats, except for the Mexican Spotted Owl. The determination for the Mexican Spotted Owl and its habitat was “may affect, not likely to adversely affect”. Consultation with the US Fish and Wildlife Service resulted in concurrence with that determination.

4. The degree of controversy over environmental effects.

Legitimate controversy under environmental law must be based on credible scientific evidence. The issues identified through scoping include roads and large trees. While these issues are significant and have been analyzed in previous sections, the degree of controversy regarding these issues is relatively low. The proposed action includes components that are standard practices in resource management. Analysis of the available current data, including recent resource surveys, indicates that the effects of the proposed action will be insignificant. Issues involving roads and large trees were identified through public scoping but do not present a high degree of controversy.

Public involvement efforts have not revealed any other significant controversies regarding environmental effects of this proposal or its alternatives.

5. The degree to which the possible effects on the human environment are highly uncertain or involve unique or unknown risks.

Methods that were used to analyze the effects of the proposed action are based on the best available science and data. These methods minimize the chance of highly uncertain effects or effects which involve unique or unknown risks. Additionally, vegetation management and timber treatment have been historically implemented on forests in New Mexico for many decades. Though there are varying opinions about the value of timber treatment on public lands, the effects of vegetation management and timber treatment, both beneficial and adverse, are relatively well

known and do not present highly uncertain, unique or unknown risks.

6. The degree to which the action may establish a precedent for future actions with significant effects or represents a decision in principle about a future consideration.

Neither of the alternatives analyzed here, nor any of their individual components, would establish a precedent for future actions. The Forest Service has carried out treatment activities similar to the proposed action as one of many tools for managing vegetation on the National Forests.

7. Whether the action is related to other actions with individually insignificant but cumulatively significant impacts. Significance exists if it is reasonable to anticipate a cumulatively significant impact on the environment. Significance cannot be avoided by terming an action temporary or by breaking it down into small component parts.

Air Quality Cumulative Effects

Alternative 1

Reasonably foreseeable activities that would influence air quality include road maintenance, prescribed burning and wildfire. These can occur somewhat randomly across the District in any given year. From 1989 through 2001, an average of 3,175 acres were burned per year on the Reserve District. The smallest prescribed burn was 1,247 acres (Sheppard Burn 1998) and the largest was 11,924 acres (Sheep Basin Burn 1995). Implementation of the Collins Park Burn (about 10,450 acres) can occur anytime. A 3,400-acre prescribed burn is planned with the Sheep Basin Restoration Project. While not yet

proposed, it is likely that the Burro Vegetation Management Project (27,360 acres) would contain similar treatments.

Prescribed burning is generally carried out in the fall, winter, or spring. Weather and fuel moisture conditions are conducive during these periods to meeting the objectives of the burn. Burn objectives include reducing the fuel load of the smaller material (less than 3 inch) and reducing density of tree stems, usually in the smaller diameter classes, to ultimately make the burned area more resilient to effects of a wildfire. Fuel moisture, wind direction, atmospheric stability, and extent of area burned are regulated to meet emission standards.

There are many residents of Reserve burning wood for heat. Smoke can linger in town during inversions and cause haze. Smoke from prescribed burning can increase concentrations already present.

A wildfire is an unplanned event where weather, fuel moisture, and area burned are not predetermined. Wildfires tend to burn throughout the day and night, generating constant smoke that may last days or weeks. Torching and crown runs common in crown fire consume canopy fuels, increasing smoke production when compared to a surface fire. Standards for air quality are often exceeded.

The combustion of fuels in a wildfire is not completely efficient. Head fires tend to leave behind a large amount of smoldering fuel. Smoldering fuels can produce at least twice the amount of emissions as flaming fuels. Backing fires associated with prescribed burns move more slowly so a higher proportion of fuel is consumed in the flaming phase, leaving less to smolder. In a wildfire the type of fire may not be regulated

resulting in more smoke produced from longer periods of head fire.

The amount of dust created during road maintenance would be related to the moisture content of the road surface. Blading results are best when a road is thoroughly wetted; therefore it is unlikely that maintenance would occur when roads are dry. It can be assumed that unrestrained road use would create dust and have an effect on air quality, but the amount of additional particulate matter cannot be predicted.

Alternatives 2 and 3

Past, present, and reasonably foreseeable activities and their direct and indirect impacts on air quality are difficult to address in terms of cumulative effects. Generally the effects of one activity are completed before another activity begins. Once these activities are completed the effects on air quality desist and are not cumulative with the next activity or sets of activity. Prescribed burning as proposed in the Six Shooter and Black Deer areas would be managed with the other prescribed burning in the air shed, in compliance with the State air quality standards and required plans.

A wildfire event that may occur after implementation of either Alternative 2 or 3 would likely be a surface fire, rather than a combination of surface and passive crown fire as expected with the existing conditions. Concentrations of all smoke and emissions would be less than the existing condition due to the reduced levels of available fuel.

Fuels and Fire Cumulative Effects

Fire management direction continues to evolve as more is learned about the use and effects of fire and its influence on the

development of vegetation found in the Negrito Watershed. However, the majority of naturally occurring fires and all human-caused fires not prescribed for management reasons would likely continue to be suppressed due to complex resource issues (i.e. protection of structures, private inholdings, and/or sensitive species habitat).

This policy of fire suppression would limit fire's role in the ecosystem to areas where prescribed fire can be effectively managed or wildfires that escape suppression. In all alternatives, fire suppression effectiveness would be dependent upon the involved fuels, and the types of suppression resources that can be applied to suppression efforts.

Alternative 1

Live and dead fuels would accumulate to a dangerous level in many stands within the project area. The fuels component of the ecosystem would consist of continuous overstory canopies, dense fuels, and ladder fuels that connect surface and aerial fuels. Summer fires occurring in these stands would exhibit fire behavior that would present serious control problems, result in high levels of stand mortality, and pose a risk to the safety of suppression personnel.

Implementation of the Sheep Basin timber treatment, fuels treatments, and prescribed burn (6,143 acres) immediately to the west and the completion of the Eckleberger Prescribed Burn (18,601) immediately to the east of Six Shooter and Black Deer areas would result in reduced fire behavior in those areas, and reduce the potential for crown fire entering this sub-watershed from those sides. The Milligan (18,764 acres) and Collins Park (10,449 acres) Burns are also planned for the watershed and would be completed by 2005. The Bull Fire (577 acres), which entered the northeast corner of

the project area, was a surface fire that consumed approximately 70% of the affected 1000 hrs fuels (1-3 inch diameter surface fuels). The Bull Fire was beneficial in reducing short-term fire hazard.

Alternative 2

The Sheep Basin timber treatment, fuels treatments, and prescribed burn and the completion of the Eckleberger Prescribed Burn (18,601) are expected to reduce fire intensity, reduce the likelihood of passive and active crown fire, therefore resulting in the ability of the this area of the watershed to be more resilient to wildfires that may occur within the next 10-20 years. The Milligan (18,764 acres) and Collins Park (10,449 acres) Burns are also planned for the watershed and would be completed by 2005. The Bull Fire (577 acres), which entered the northeast corner of the project area, was a surface fire that consumed approximately 70% of the affected 1000 hrs fuels (1-3 inch diameter surface fuels). The Bull Fire was beneficial in reducing short-term fire hazard.

Areas treated in the past 20 years that were prescribed burned now burn with less intensity. In the long-term (>10 years), proposed vegetation management such as thinning, would further decrease fuel loads (aerial and ground).

Prescribed fire in southwestern ponderosa pine can temporarily reduce fuel (Sackett 1980, Harrington 1981). However, ponderosa pine trees can cast from 0.6 to 1.8 tons per acre of needle litter annually (Sackett 1980) allowing fine fuels, which dry out the quickest, to accumulate over time. Grass and needle cast are the primary fire carriers in this project area. Foreseeable future management ignited fires are also considered in the Six Shooter and Black Deer, Milligan/Collins Park, Eckleberger,

Sheep Basin, Apache, and Burro projects (Appendix 2).

Assuming that low to moderate intensity maintenance fires are applied at 10-15 year intervals, mimicking the natural fire regime, the long-term effect of prescribed burning would result in future wildfires that burn with less intensity and duration, resulting in less damage to soils and vegetation. Wildfires would be easier to control, increasing the ability to successfully protect existing stands and untreated riparian areas.

Alternative 3

Generally the same as discussed in Alternative 2. More frequent short interval prescribed burns may be necessary to achieve the tree density targets in non-treated stands while meeting the mortality guidelines.

Heritage Cumulative Effects

Archaeology cumulative effects: Cumulative effects will be minimal if the utilization levels are maintained. If the levels are not maintained, the cumulative effects could degrade, expose, displace, or destroy cultural resources. Significant data and information about the past could be completely and irretrievable lost. No other activities are occurring or are foreseen in the allotment that would have cumulative adverse effects on cultural resources.

Range Cumulative Effects

From 1989 to 1995, 7,735 acres of the Negrito Watershed were burned to reduce fuels loading. These burns helped to free up resources for herbaceous species. There was limited opening of the canopy associated with the under-story burns, and as a result the effects were short lived, and no longer

has a measurable effect on the forage production.

From 1980-1990 there have been 7,429 acres that have been commercially thinned. The areas associated with these thinnings are showing a mix of responses. There are pockets of rapid, thick regeneration of ponderosa pine that is limiting herbaceous plant growth. There are also areas with a strong herbaceous component that has remained, providing forage for ungulates and cover for many species of wildlife.

In 1995, 3,924 acres were burned in the Project Area, to reduce fuel loading associated with a thinning project. Of the 3,924 that were burned in this unit, 2,164 acres had been commercially thinned. The response has been a positive increase in the herbaceous community, which has provided more forage for wildlife and livestock.

These ongoing and proposed actions in adjoining units in the Negrito Ecosystem may have a cumulative affect on the Six Shooter and Black Deer Vegetation Management Project area. Three large projects are underway to reduce fuels loading in the Negrito Ecosystem. The Eckleberger Burn, began in 2001 and is ongoing, will treat 18601 acres in the Elk unit. The Milligan Burn was implemented in 2001 and is in progress, will treat 18764 acres in the Milligan unit. The Collins Park Burn was begun in 2001, and is in progress, will treat 10449 acres in the Burro unit. The effects of fuels reduction without an associated opening up of the tree canopy will have a limited cumulative effect on herbaceous forage. The short term increase in forage would potentially allow for some decreased use in timing and intensity for the pastures located in the Six Shooter and Black Deer units, after the initial rest from livestock in the treatment areas. Other

projects that would potentially have a cumulative effect on the Six Shooter and Black Deer units are the 6,143 acre Sheep Basin Restoration Project, and the 27,360-acre Burro Vegetation Management Project. These projects are a combination of thinning and fuels reduction. The short-term cumulative effect of this project would be increased pressure from livestock on the pastures in the Six Shooter and Black Deer units. However, the long-term cumulative effect would be to decrease the pressures associated with livestock grazing and wildlife use because of the increased forage that would be available in these units.

Alternative 1

With Alternative 1, the cumulative effect would be increased grazing pressure on herbaceous plant species within the pastures that are located in the Six Shooter and Black Deer Project Area. This increased grazing pressure would lead to the long term need to more heavily utilize the other pastures within the Negrito Allotment to meet the needs of the current grazing management plan, or to reduce the allowable animal unit months on the Negrito/Yeguas Allotment by the year 2020.

If Alternative 1 were selected the cumulative affect would be an overall decrease in forage production across the Negrito Allotment within the Six Shooter and Black Deer Project Area.

Alternatives 2 and 3

With the overall projected herbaceous increase of 19% for Alternative 2, and 11% for Alternative 3 (Project Record 48), the associated pressures from livestock grazing would decrease in the Project Area, which would also decrease the pressures on the

surrounding pastures within the Negrito/Yeguas Allotment.

The cumulative effects of thinning and fuels reduction burning with the above mentioned ongoing and proposed actions in association with the actions that would be taken under these alternatives would produce minimal short term effects in the Six Shooter and Black Deer units. The long-term effect would be to decrease the pressures associated with livestock grazing and wildlife use because of the increased forage that would be available throughout these units.

Considering all of the aspects of the treatment options and the projected increase in herbaceous production, by the year 2020 the cumulative effects would be an overall decrease in grazing pressures in the treatment area and the Negrito/Yeguas Allotment as well as the surrounding wildlife habitat. This treatment program would allow for the greater dispersal of livestock grazing within the Negrito/Yeguas Allotment, and reduce the pressure placed on palatable herbaceous species within the allotment.

Social/Economic Cumulative Effects

Past management activities within the Six Shooter and Black Deer Project Area and in the Negrito Watershed benefited the economic and social climate of Catron County. Inactivity of forest projects has led to a loss of infrastructure for processing wood products and declines in employment opportunities in the county. Private forestry does not occur except on very small scales. The county is dependent on the national forest for wood products and would benefit from the cumulative effects of projects in the Negrito Watershed. Two other projects that may provide economic benefit to the

area include the Sheep Basin Restoration Project and the Burro Project. If all three projects were implemented, the potential for a local mill, and a general increase in economic benefit to the local economy would be realized. A future event, albeit unplanned, that could have economic effects on the project area as well as the local economy is the occurrence of a large wildfire. If fire-killed trees remain on site, fuel conditions for another high severity wildfire would be retained. Hence, Alternative 1 poses the greatest risk of a large wildfire occurring within the project area because it does nothing to curb or reduce the buildup of hazardous fuels. As a result, it also poses the greatest risk of future costs and economic loss. The average wildfire suppression cost on National Forest land for Fire Season 2000 was \$480 per acre (www.nifc.gov/stats/). In addition to these suppression costs, there would be costs associated with land restoration, loss of resource values, and possible loss of structural improvements.

The goal of ecosystem management is to restore and sustain the health and productivity of ecosystems through an ecological approach that is fully integrated with social and economic goals. The cumulative effect of the Six Shooter and Black Deer Project will be not only the improvement of ecosystem health but also the simultaneous improvement of socioeconomic well being by promoting economic development in local communities. This is the ultimate goal of ecosystem management.

Vegetation Cumulative Effects

Vegetative conditions within the Six Shooter Black Deer analysis area are similar to those found across the larger Negrito Watershed which is approximately 127,931 acres in

size. These conditions include, but are not limited to, high stand densities, undesirable forest structure, and insect/disease conditions.

Treatments to address density and structural concerns have actually occurred on only approximately 19% (24,659 acres) of the Negrito Watershed within the past 30 years (Project Record 67). The lack of aggressive past treatment to address these concerns has contributed to the current condition.

Future projects scheduled within the Watershed include the Eckleberger, Collins Park and Milligan prescribed burn projects; also, the Burro Vegetation Management Project. Presently, no other vegetation manipulation projects are proposed within the Watershed.

While specific treatments have not been proposed in the majority of the Negrito Watershed at this time, any future proposed projects within the ponderosa pine, pinyon-juniper woodland and grassland cover types will most likely be similar to those proposed in this analysis due to similarities in vegetation conditions. Direct and indirect effects of future projects would be assessed as those projects move forward.

For purposes of this discussion, cumulative effects will be discussed in terms of stand density and structure; insect/disease activity; and Old Growth/MSO target threshold habitat (the latter two being combined).

Alternative 1

With no treatment being implemented, selection of this alternative will result in no change from current density conditions within the Negrito Watershed. Overall health and productivity of the forested landscape will continue to decline due to

overcrowding. Individual tree mortality will increase until densities are reduced most likely by wildfire or insect/disease activity.

In the document “Changing Conditions in Southwestern Forests and Implications on Land Stewardship” (Forest Service, Southwestern Region, July 1993), the author states that “Today’s forests have more volume, more trees in nearly every diameter class, and more canopy layers than ever before. Recent research verifies this fact. Dense stands are difficult to maintain in a healthy condition and, in unmanaged condition, are susceptible to catastrophic crown fires and pest/beetle epidemics when they are not properly managed. Current stands are extremely dense compared to presettlement conditions and are not sustainable in their present state. High tree density is clearly related to susceptibility to bark beetle epidemics.

The current low level of timber and cultural treatments cannot prevent aging and increasing small-tree density of Southwestern forests. They will become older, denser, and perhaps more extensive. However, at some point, ecological limits will be reached, resulting in extensive forest destruction from insects, diseases, and fires.”

In the document “Influence of Forest Structure on Wildfire Behavior and the Severity of It’s Effects (USDA Forest Service. Drs. Russell T. Graham and Sarah McCaffrey – USDA Forest Service, North Central Research Station. May 28, 2003), the authors state “Buildup of forest fuels creates “ladders” for wildfire to climb up into tree tops and then, where overstory trees are densely packed, the fire spreads quickly from tree to tree in a phenomenon known as crown fire or “crowning”. Crown fires caused by excessive fuel accumulations are

generally considered the primary threat to ecological and human values...such fires kill large numbers of trees, damage soil, increase erosion, impair air quality, and degrade or destroy species habitat.”

Dwarf mistletoe occurs on 64% or 7,797 acres of the Six Shooter/Black Deer analysis area. “Managing for dense, multi-storied stands in ponderosa pine and Douglas-fir has increased and, if allowed to continue, will increase dwarf mistletoe infection. High levels of infection eventually eliminate high stand densities and large trees (Hawksworth, 1961). Stands become unsuitable for species such as Mexican spotted owl, have lower visual quality and timber productivity is reduced.” (Changing Conditions in Southwestern Forests and Implications on Land Stewardship. Forest Service, Southwestern Region, July 1993).

If left untreated, the current analysis area-wide dwarf mistletoe rating of 0.25 in the Ponderosa pine type will increase from a current rating of 0.25 to 0.95 in 20 years; within the Douglas-fir type, the rating will increase from a current rating of 0.3 to 1.0. Within the Pinyon-Juniper woodland type, rate of increase will be somewhat less than Douglas-Fir due to differences in how the parasite spreads and intensifies in that forest type. In each of the cover types, the percentage of host trees infected will increase from less than 30% to more than 50% in that same time frame. (Personal communication with Dave Conklin, R-3 Entomology/Pathology, August, 2003)

Outyear projects such as the Eckerberger, Collins Park and Milligan prescribed burns (to be implemented over approximately 37% of the Watershed) may reduce tree densities and dwarf mistletoe infection levels in random and isolated areas. These projects would be low/moderate intensity burns

resulting in only minor (less than 1%) reductions in tree densities and mistletoe infection levels. The Burro Vegetation Management project will analyze approximately 15% of the Negrito Watershed. This project will likely include treatments similar to Six Shooter Black Deer although specifics are not yet available. Due to the large area within the Watershed, overall changes from the Burro project will likely be inadequate to cause the necessary changes across the Watershed.

Forest structure (VSS) in the Negrito Watershed is similar to that of the Six Shooter Black Deer analysis area in that the majority of the landscape lies within VSS 3 and 4 classifications. VSS classes within the area will move towards desired conditions for Northern Goshawk and Mexican Spotted Owl although at greatly reduced rates. Increased tree densities will result in a corresponding increased threat to forest health and productivity. This in turn, will adversely affect retention and recruitment of large trees. Canopy closure, already at 40%+ across 78% of the Six Shooter Black Deer analysis area alone, will remain moderate to high in the majority of the Watershed.

Treatments designed to enhance and protect 964 acres of set-aside potential Old Growth and 797 acres of MSO Target/threshold habitat will not occur. As a result, recruitment and development of these key habitats would be delayed and retention would be jeopardized by the potential for catastrophic wildfire and/or insect and disease activity.

Unless lost due to wildfire or insect/disease activity, approximately 150 acres of MSO target threshold habitat in the Six Shooter Black Deer analysis area, or less than 1% of the Negrito Watershed, is estimated to meet

desired criteria within the next 100 years. Similarly, less than 1% of the set-aside potential Old Growth will reach full development within the same watershed within the next 100 years.

Alternative 2

Selection of this alternative will increase the variation in stand densities within the Negrito Watershed only slightly. The Six Shooter Black Deer analysis area is approximately 10% of the Negrito Watershed. Of this, tree thinning within the Ponderosa Pine and Douglas-fir forest types would occur on approximately 5,130 acres or approximately 6% of the total acreage of those forest types in the overall Negrito Watershed. Tree thinning within the Pinyon-Juniper woodland would occur on 150 acres or approximately 0.4% of that forest type within the Negrito Watershed; within the grassland, 207 acres are being treated which comprise 1.8% of that component of the Watershed. Should no other treatments occur within the Watershed, with the exception of this project, tree densities will continue to increase with the result of increased individual tree mortality and potential for insect/disease and catastrophic wildfire activity. Recruitment and retention of large diameter trees would decline. Grassland areas would continue to experience encroachment by conifer species.

This alternative (as does Alternative 3 to a lesser degree) treats forest fuels through a combination of thinning, regeneration treatment, and prescribed burning.

“The most effective strategy for preventing crown fires in closed canopy stands is to use thinning together with other treatments, including burning, to reduce surface, ladder and crown fuels. Thinning and prescribed burning are standard vegetation management

practices whose effectiveness has been backed by hundreds of scientific investigations and years of professional experience.

Thinning allows land managers to conduct prescribed burns with less difficulty, less smoke, and less risk of the fire escaping. Using them together in an integrated fashion allows them to complement one another. (Influence of Forest Structure on Wildfire Behavior and the Severity of Its Effects, USDA Forest Service, Drs. Russell T. Graham and Sarah McCaffrey – USDA Forest Service North Central Research Station. May 28, 2003).

Treatment of dwarf mistletoe will occur on 3,696 acres or approximately 6% of the total infected acreage within the Negrito Watershed. Should no other treatments occur within the Watershed, with the exception of this project, overall forest productivity would continue to decline at a slow, but continuous rate. As mortality occurs, localized areas with a viable seed source would regenerate; as trees die across the landscape, fuel loadings will increase resulting in increased potential for catastrophic wildfire.

As discussed in Alternative 1, implementation of the Eckleberger, Collins Park, and Milligan prescribed burns and the Burro Vegetation Management project are expected to have negligible effects on tree densities, forest structure, and dwarf mistletoe management within the Negrito Watershed.

VSS, or stand structure, distribution will be changed only slightly through this alternative. The Six Shooter/Black Deer analysis area is representative of the Negrito Watershed in that majority of the structure classification is VSS 3 and 4. Even with the

prior mentioned outyear projects within the Watershed, VSS classes would remain stagnated in the VSS 3 and 4 levels with very slow movement towards that VSS classification desired for management of the Northern Goshawk as outlined in the Record of Decision for Amendment of Forest Plans, Arizona and New Mexico 5/96. Individual and small group mortality would allow limited recruitment of the VSS 1 class; the ability to recruit and retain large diameter trees would be restricted.

Treatments on 964 acres of set-aside potential Old Growth and 767 acres of MSO target threshold would occur encouraging movement of these key habitats to the desired conditions. These treated stands would benefit through enhanced growing conditions as well as limited protection from catastrophic wildfire and insect/disease activity; however, assuming no other treatment occurs, the presence of these key habitat components will continue to be limited in the Watershed.

The cumulative effects of implementing Alternative 2 make that alternative more desirable than Alternative 1 and slightly better than implementation of Alternative 3.

Alternative 3

Selection of this alternative would increase the variation in stand densities within the Negrito Watershed more than Alternative 1 but less than Alternative 2.

Tree thinning within the Ponderosa Pine and Douglas-Fir forest types would occur on approximately 3,800 acres or approximately 4% of the total acreage of these forest types in the Watershed. Tree thinning within the Pinyon-Juniper woodland would occur on approximately 150 acres or approximately 0.4% of that forest type within the

Watershed; within the grassland, 207 acres would be treated which comprise less than 1.8% of the grassland type within the Watershed. Should no other treatments occur within the Watershed, with the exception of this project, tree densities will continue to increase with the result of increased individual tree mortality and potential for insect/disease and catastrophic wildfire. Recruitment and retention of large diameter trees would decline. Grassland areas would continue to experience encroachment by conifer species.

Treatment of dwarf mistletoe will occur on 2,372 acres or approximately 4% of the total infected acreage within the Negrito Watershed. Should no other treatments occur within the Watershed, with the exception of this project, overall forest productivity would continue to decline at a slow, but continuous rate. As mortality occurs, areas with a viable seed source would regenerate; as trees die across the landscape, fuel loadings will increase resulting in increased potential for catastrophic wildfire.

As previously discussed, implementation of the Eckleberger, Collins Park and Milligan prescribed burns and the Burro Vegetation Project are expected to have negligible effects on tree densities, forest structure, and dwarf mistletoe management within the Negrito Watershed.

VSS, or stand structure, distribution will change less than that in Alternative 2 primarily due to the fewer acres being treated. The discussion there pertaining to outyear projects and their impact as well as limited recruitment in the VSS 1 class and restricted recruitment of large diameter trees is also applicable here.

As in Alternative 2, treatments will occur on 964 acres of set-aside potential Old Growth and 767 acres of MSO target threshold habitat with similar effects to those expressed in that Alternative.

Watershed/Soils and Roads Cumulative Effects

Projects included in this analysis are displayed in Appendix 2. The impacts that would create soil disturbance and sediment delivery are expected to be very localized and are not of a magnitude to create a lasting effect. There would be a short-term (0 – 10 years) cumulative effect from the proposed project activities and past projects.

Cumulative effects from past activities from a watershed extent perspective would also be very minimal and short lived. The volumes of sediment predicted to be delivered to ephemeral and intermittent stream channels from a 30-year storm event are relatively small. Also, the implementation of State BMPs, Forest Service Soil and Water Conservation Practices, and project design features in combination with a sporadic stream flow regime present a fairly low risk for any substantial or long lasting cumulative effects.

The Negrito Creek Fifth code watershed is approximately 127,930 acres. The Six Shooter and Black Deer Vegetation Management Project area is approximately 12,426 acres or approximately 10% of the Negrito Watershed. Most of the past treatment disturbances, especially those that are older than 30 years, have ameliorated and are realistically not contributing to any measurable watershed effects. The Sheep Basin Restoration Project is planned for implementation in 2004. This project would treat up to 6,143 acres with similar methods as in the Six Shooter and Black Deer

Vegetation Management Project. The Burro Vegetation Management Project is planned for implementation in 2005 and will treat portions of 27,360 acres. After the completion of these projects less than 35% of the watershed would have been treated over a 5-10 year period. As previously stated, many of the past project activities are no longer measurably contributing to a cumulative effect. Due to the 5-10 year time span of the current and proposed vegetation treatments, and the low intensity of timber treatment, the watershed would experience minimal cumulative effects from this treatment and past activities.

Within the project area, approximately 4,310 acres would receive group selection, group selection and thinning, and commercial thinning treatments in Alternative 2, and approximately 2,803 acres in Alternative 3. This represents approximately 3% (Alt. 2) and 2% (Alt. 3) of the Negrito Watershed. If any of the action alternatives for the project are implemented over a 5-10 year period, they could have a small short-term negative impact to the watershed. However, analyses for the affected environment in both projects (Six Shooter Black Deer and Sheep Basin) indicated that there is little risk for impacts to watershed resources. Road reopening (Appendix 1) would contribute to some short-term small sediment inputs. These roads would be opened as needed, and would be closed in the near future (post project), in a condition where they are not substantively impacting soil and water resources.

From a long-term aspect, the project should have a positive impact to the watershed. The watershed conditions should continue to improve with fewer trees competing for light, soil moisture and nutrients, increased ground cover, and completed road decommissioning (Appendix 1). The area

would have a reduced risk of catastrophic fires due to the reduction in fuel loadings.

The Negrito Creek Watershed is not affected by other watersheds due to it being in the headwaters of Negrito Creek and no other watershed drains into it. Grazing by livestock is occurring over most of the watershed. All of the allotments have or would go through a Range NEPA process to analyze grazing on the allotment. A forage utilization rate for each allotment has been set and is being monitored. This would improve the grazing uses on the allotments and improve the watershed conditions. The Corner Mountain allotment presently has no permanent permittee. The allotment is designated as a swing allotment to be used as a grass bank. Elk impacts are occurring throughout the watershed and have been recognized as an impact to the resources. The New Mexico Game and Fish Department has started to issue more elk permits for the area. This may help bring the elk numbers down and reduce resource impacts. Most of the Negrito Creek Watershed is in satisfactory condition as determined by the Terrestrial Ecosystem Survey (USDA 1995a).

Portions of the watershed have been or would be treated with management ignited fires. These burns have or would reduce the fuel loadings and reduce the risk of hot wildfires. However, tree density and fuel loadings are increasing. There is a need to reduce tree density in order to improve vegetative ground cover in the understory and reduce the fuel loadings, which would then reduce the risk of high intensity fires. If this is properly done and the fire intensities are low to moderate and if the areas are treated over several years, the impacts to the watershed should be positive. If there were large contiguous blocks of high

fire intensities, this would cause a negative effect to the watershed.

Presently, Negrito Creek (Tularosa River to the confluence of the North and South Forks) below the Sheep Basin Project Area is in non-supporting status for high quality coldwater fishery for temperature. Water quality and sedimentation into the stream are important to the survival of aquatic species and watershed functions. By improving the riparian conditions through improved management, this should reduce the cumulative effects of the multiple uses of the watershed and improve the shading of the water and lower the temperatures. Most of the riparian areas in the watershed have been heavily impacted in the past but are improving through better management, although some areas remain in unsatisfactory condition.

Alternative 1

This is the No Action Alternative. There would be no direct impacts to the watershed from the project and on going activities would continue. Tree densities would continue to increase and the vegetative growth in the understory would continue to decline. The vegetative ground cover would decline. Fuel loadings would continue to increase. There would be an increased risk of a hot wildfire, which could affect the watershed and soils. Overall, with no treatments in the project area, the long-term watershed and soils condition would decline on some soil map units where over-story vegetation is shading out ground cover vegetation. On these units, ground cover decreases, water runoff would become more rapid, and there would be a decline in water quality.

Alternatives 2 and 3

If one of the action alternatives for the project is implemented over a 5-10 year period, it could have a small short-term (0 – 10 years) negative impact to the watershed. Alternative 2 would have a higher probability to cause a short-term negative impact due to the re-opening of existing closed roads. There would be some cumulative reduction in ground cover from timber treatment, treatment of pinyon-juniper woodland, and from prescribed burning. As a result of all projects occurring in the watershed a small temporary increase in sediment production is recognized as a problem. This would be mitigated through adherence to State and Forest Service BMPs. The time frame over which treatments occur will also moderate the impacts. With reasonable certainty, it can be said that water quality would not degrade and is expected to improve. There would not be any long lasting detrimental effects on the 5th code watershed and there would be many positive, erosion-reducing effects as a result of the implementation of projects associated with the treatments in the Six Shooter and Black Deer analysis area.

Overall from a long-term aspect, the combined effects of actions occurring in the watershed should have a positive impact to the watershed. The watershed conditions should improve with fewer trees competing for light, soil moisture and nutrients, a long-term reduction in open road miles, and the area having less risk of catastrophic fires due to the reduction in fuel loadings.

Wildlife Cumulative Effects

Special Status Species (Federally Listed and Region 3 Sensitive Species)

In conjunction with past, present, and foreseeable future management activities, the following cumulative effects are predicted to occur:

Mexican spotted owl: Substantial acreage of suitable nesting habitat occurs within the Negrito 5th Code Watershed. Most of this nesting habitat is comprised of dense mixed conifer stands although the owls occasionally nest in pine-oak stands. There are currently at least 30 Mexican spotted owl Protected Activity Centers that are completely or partially within the watershed. Much of the occupied mixed conifer habitat has been selectively logged and thinned in the past, followed by prescribed fires. Based on aerial photo comparisons, mixed conifer habitat and other vegetation types are currently much denser than they were in 1935 (USDA 1997).

Acreage of suitable and potential habitat degraded or eliminated in the watershed by wildfire is small. Due to ladder fuels in and near suitable habitat, the risk of habitat degradation or elimination due to catastrophic wildfire in the watershed is high.

Alternative 1 (no action) would continue existing environmental conditions and trends and the risk of degradation or elimination of potential Mexican spotted owl nesting, roosting, foraging, wintering, migration, and dispersal habitat due to catastrophic wildfire would increase. If a large-scale catastrophic wildfire were to occur, the consequences would result in a detectable effect on the population trends of Mexican spotted owls in the Gila National Forest.

Alternatives 2 and 3 would have insignificant and discountable cumulative effects to Mexican spotted owl potential nesting, roosting, foraging, wintering, migration, and dispersal habitat in the watershed in the near term.

Restricted/protected habitat and target/threshold stands silviculturally and fire treated would be in accordance with the Mexican spotted owl Recovery Plan and Amended Forest Plan. The vegetation treatments would maintain and create owl habitat where appropriate and provide a diversity of stand conditions and sizes.

Management ignited fires following vegetation management projects, as well as management ignited fires elsewhere in the watershed, would have negligible effects on potential nesting, roosting, wintering, migration, and dispersal habitat as loss of trees would be minimal. Over time, the cumulative effects would be positive as target/threshold conditions in selected stands would be reached sooner than taking no action, restricted habitat would be maintained, improved, or restored, and the risk of degradation or elimination of habitat due to catastrophic wildfire would decrease.

The cumulative effects would not result in a detectable effect on the population trends of Mexican spotted owls in the Gila National Forest.

Loach minnow, spikedace, Chiricahua leopard frog, Arizona southwestern toad, narrow-headed garter snake: The entire Negrito 5th code watershed drains into Negrito Creek where numerous aquatic species occur. Occupied loach minnow habitat is located from the confluence of Cerco Canyon and Negrito Creek downstream to the San Francisco River. Unoccupied spikedace habitat occurs in the

San Francisco River beginning at, and continuing downstream of, its confluence with Negrito Creek. The Chiricahua leopard frog, Arizona southwestern toad, and narrow-headed garter snake have been documented as occurring in Negrito Creek and the Chiricahua leopard frog has been documented in the San Francisco River.

The Six Shooter/Black Deer Project covers approximately 12,426 acres or nearly 10% of the watershed and would temporarily open and recondition about 24.8 miles of currently closed roads in Alternative 2. The Sheep Basin Project proposed action covers approximately 6,143 acres or 5% of the watershed and would temporarily open nearly 4.0 miles of currently closed roads and, at project conclusion, would decommission over 8.0 miles of roads. The Apache Forest Health Project covers approximately 203 acres or 0.15% of the watershed and would not temporarily open any closed roads and road obliteration would not occur. This project would remove ponderosa pines up to 16.0" dbh followed by prescribed burns. The Burro Project contains approximately 27,360 acres or 21% of the watershed. The proposed treatments in the Burro Project would likely be similar to those planned in the Sheep Basin and Six Shooter/Black Deer Projects but the acreages of the proposed treatments have not been determined. It has likewise not been determined how many miles of roads would be needed to implement treatments.

About 45% of the Six Shooter/Black Deer Project (Alternative 2) would be silviculturally treated and more than 83% would be prescribed burned. About 24.8 miles of closed roads would be temporarily reopened under the proposed action for this project. The Six Shooter/Black Deer, Sheep Basin, and Apache Forest Health Projects adjoin each other in the western portion of

the watershed and all but approximately 130 acres in the Six Shooter/Black Deer Project drain into Negrito Creek by way of mainly ephemeral drainages. The Burro Project is in the northeastern portion of the watershed and likewise drains into Negrito Creek. Occupied loach minnow habitat is located in Negrito Creek at least 7.0 miles downstream from these ephemeral drainages and unoccupied spokedace habitat occurs at least 12.0 miles downstream in the San Francisco River.

The cumulative effects watershed analysis prepared by the Project Hydrologist analyzed the effects in the watershed caused by ungulate grazing, roads and trails, fire history, timber/fuelwood treatment, watershed condition, water yield, and water quality. In conjunction with past, present, and foreseeable future management activities in the watershed, the following cumulative effects are predicted to occur:

Alternative 1(no action): The Watershed/Soils Report prepared by the Project Hydrologist concluded that with no action, tree densities would continue to increase and the vegetative understory and ground cover would continue to decline. As ground cover decreases, water runoff would become flashier and there would be a decline in water quality.

Fuel loadings would continue to increase as would the risk of a stand replacing, high intensity/severity wildfire that would negatively impact soil and water resources through both the increase in sediment delivery to stream channels and loss of large organic material recruitment for soil productivity.

The result would be adverse short- and long-term impacts to all of the aquatic species and their habitats. The primary constituent

element of unpolluted water in loach minnow and spokedace habitat would be adversely affected. The loach minnow would be adversely affected, as would spokedace habitat. The Chiricahua leopard frog, Arizona southwestern toad, and narrow-headed garter snake would also be adversely impacted. The effects would be to a degree that there would be a detectable effect on the population trends of these species in the Gila National Forest.

Alternatives 2 and 3: There would be short term cumulative impacts to soils due to skidding of removed trees and increases in soil erosion if road maintenance, opening and reconditioning on the Six Shooter/Black Deer Project occurred concurrently with the Sheep Basin and Burro Projects (if an action alternative was implemented) or shortly thereafter. This scenario is unlikely to occur due to the projected 5-10 year period to complete each of the projects. Road decommissioning activities in the Sheep Basin Project would include ripping, reshaping, and seeding of the roadbed with the resultant exposure of bare soils. Ripping, reshaping, and seeding of roadbeds would not occur in the Six Shooter/Black Deer and Apache Forest Health Projects. Treatment of roads in the Burro Project has not been determined.

Slash would be lopped to about a two-foot height to reduce flame height and scattered prior to prescribed burns for all three vegetation management projects. Where excessive residual fuels may occur in the Six Shooter/Black Deer Project and possibly the Burro Project, whole or partial tree yarding may be used to reduce ground fuels. Management-ignited fires following vegetation management projects, as well as management-ignited fires elsewhere in the watershed, combined with any prescribed natural fires, may also affect these species

through habitat modification. These fires are unlikely to occur simultaneously. Burn intensities should be low to moderate with minimal cumulative impacts to the watershed due to these fires.

Existing conditions such as inherently stable soils, no perennial flow in the project area, no mechanical treatment of vegetation in ephemeral drainages, and a history of fire in the area would help minimize effects to downstream riparian and aquatic habitat. Best Management Practices (BMPs) would be implemented for the Six Shooter/Black Deer, Sheep Basin, Apache Forest Health, and Burro Projects to mitigate accelerated soil erosion, soil compaction, and off-site soil loss. Combined with the temporal scale involved in implementation of these three projects, the cumulative downstream sedimentation into occupied loach minnow habitat and unoccupied spokedace habitat would be low with resultant insignificant and discountable effects to both the primary constituent element of unpolluted water and the species.

Likewise, cumulative impacts to Arizona southwestern toads, and narrow-headed garter snakes and their habitats would not result in a trend toward Federal listing or loss of viability.

The cumulative effects to potential Chiricahua leopard frog habitat in Negrito Creek would also be insignificant and discountable.

Several stock tanks in the Six Shooter/Black Deer Project, one stock tank in the Sheep Basin Project, and other stock tanks in the watershed contain Chiricahua leopard frogs. Mitigation measures for the Six Shooter/Black Deer, Sheep Basin, Apache Forest Health, and Burro Project (if occupied habitat is found) in addition to

implementation of BMPs, include the delineation of no treatment areas or installation of sediment traps upstream of occupied stock tanks where appropriate to reduce or eliminate sediment and ash deposition into these habitats. These mitigation measures would reduce to insignificant or discountable, the cumulative effects to Chiricahua leopard frogs that occupy stock tanks in the watershed.

In the long-term, the Six Shooter/Black Deer, Sheep Basin, Apache Forest Health, and Burro Projects, as well as implementation of other management-ignited fire projects in the watershed, would have positive cumulative impacts to the watershed and downstream aquatic habitat due to fewer trees competing for light, soil moisture and nutrients, increased herbaceous ground cover, fewer miles of open roads, and the overall reduced risk of catastrophic fire. The cumulative effects would not result in a detectable effect on the population trends of these species in the Gila National Forest.

Northern goshawk: (See also Mexican spotted owl analysis)

Northern goshawk protocol inventory surveys have been completed within and 0.5 miles beyond the boundaries of the Six Shooter and Black Deer, Sheep Basin, and Apache Forest Health, and Burro Projects, as well as, other substantial acreage within the watershed. Northern goshawks have been observed during surveys, but intensive nest searches have not located any nesting pairs.

Much of this higher quality habitat is within Mexican spotted owl Protected Activity Centers and restricted stands. Potential goshawk nesting habitat is limited in the Burro Project. The silvicultural treatments

proposed for Six Shooter/Black Deer Project, with its retention of most or all yellow ponderosa pines regardless of diameter, would likely result in higher quality goshawk habitat sooner than taking no action. The Sheep Basin Project with its retention of all yellow pines regardless of diameter would also result in higher quality goshawk habitat sooner than taking no action.

Management ignited fires following vegetation management projects, as well as management ignited fires elsewhere in the watershed, combined with any prescribed natural fires, may temporarily affect some goshawk prey species through habitat modification. The modification would likely occur due to the consumption of some snags, downed logs, and other woody debris. Mortality of large diameter trees is predicted to be minimal although some snags (and future downed logs) would be created.

Grasslands and small, grassy openings burned by fires should recover their pre-fire structure in a relative short-term. Managed fires should, in the long-term, increase prey species diversity and abundance.

Alternative 1 (no action) would continue existing environmental conditions and trends and the risk of degradation or elimination of potential northern goshawk nesting, roosting, and foraging habitat due to catastrophic wildfire would increase.

Alternatives 2 and 3 would have negligible cumulative effects to northern goshawk potential nesting, roosting, and foraging habitat in the near term. Over time, the cumulative effects would be positive as the desired mature and overmature vegetation structural stages would be reached sooner than taking no action, goshawk habitat would be maintained, improved, or restored,

and the risk of degradation or elimination of habitat due to catastrophic wildfire would decrease.

American peregrine falcon: (See also *Mexican spotted owl analysis*)

No eyries or suitable nesting habitat occur within the Six Shooter and Black Deer Project Area and two eyries are known to occur within the Negrito 5th Code Watershed. These eyries are also located outside of the Apache Forest Health, Sheep Basin, and Burro Projects, and are in steep, rugged terrain. A substantial amount of peregrine falcon foraging habitat occurs within the watershed and encompasses all four projects.

The most detrimental impact to foraging habitat in the short term is the removal of large trees/future snags that affect peregrine falcon prey species that are dependent on them. The Six Shooter/Black Deer Project contains more mature and overmature trees than the Sheep Basin Project. Much of this higher seral stage habitat is within Mexican spotted owl Protected Activity Centers and restricted stands. The Sheep Basin Project contains relatively small acreage of mature and overmature ponderosa pine stands. This holds true for the Apache Forest Health Project. The acreage of mature and overmature ponderosa pine stands has not been determined for the Burro Project, but it is likely that a similar impact to foraging habitat would occur should an action alternative be implemented.

The Six Shooter/Black Deer and Sheep Basin Projects, with their retention of most or all yellow ponderosa pines regardless of diameter, would result in higher quality habitat relative to no action. This would likely hold true for the Burro Project. The Apache Forest Health Project, with no tree

larger than 16.0” dbh removed, would eventually result in increased acreage of mature trees.

Management-ignited fires following vegetation management projects, as well as management-ignited fires elsewhere in the watershed, combined with any prescribed natural fires, may also affect some peregrine falcon prey species through habitat modification.

Alternative 1 (no action) would continue existing environmental conditions and trends and the risk of degradation or elimination of stands surrounding eyries and foraging habitat due to catastrophic wildfire would increase.

Alternatives 2 and 3 would have no effect on nesting habitat due to lack of management activities in close proximity, and would have negligible cumulative effects to peregrine falcon foraging habitat in the near term. Over time, the cumulative effects would be positive as the acreage of mature stands with larger trees would be increased sooner than taking no action, and the risk of degradation or elimination of habitat due to catastrophic wildfire would decrease.

Gila groundsel, Mogollon clover, Grama grass cactus:

Gila groundsel and Mogollon clover potential habitat in the uplands, and grama grass cactus may have been impacted by silvicultural activities, prescribed fires, and other management activities in the past but this has not been verified. Silvicultural and prescribed fire activities that would occur in the Sheep Basin and Apache Forest Health Projects, and may occur in the Burro Project, as well as other similar activities that are likely to occur in the watershed, may also affect individuals of these species,

but the risk is low that the impacts would be substantial. Management-ignited fires elsewhere in the watershed, combined with any prescribed natural fires, may also affect these species individually and through habitat modification.

Alternative 1 (no action) would continue existing environmental conditions and trends and the risk of degradation of potential habitat due to catastrophic wildfire would increase.

Alternatives 2 and 3 would have negligible cumulative effects to potential Gila groundsel, Mogollon clover, and grama grass cactus habitat in the near term. Over time, the cumulative effects would be positive, as the risk of degradation of habitat due to catastrophic wildfire would decrease.

Management Indicator Species

The vegetation types and seral stages within the Negrito 5th Code Watershed that pertain to the 17 management indicators species evaluated include low to high elevation riparian areas, low to high seral stage grasslands, moderate to high seral stage woodlands, low to high seral stage ponderosa pine and mixed conifer stands, and high seral stage wet meadows. Forest Plan use of the relative terms “low”, “moderate”, and “high” equate to the early, mid, and late seral stages respectively.

The cumulative effects of past, present, and foreseeable future management activities in the watershed were analyzed to determine impacts on vegetation cover types and seral stages. The analysis concluded that with implementation of Alternative 1 (no action) existing environmental conditions and trends would continue and the risk of degradation or elimination of habitat for most management indicator species due to

catastrophic wildfire would increase. If large-scale catastrophic wildfires were to occur, the loss of habitat would result in detectable effects on the populations' trends of most management indicator species.

Alternatives 2 and 3 Effects

Rocky Mountain elk: Implementation of either alternative would not cumulatively result in substantial changes in the acreages of existing vegetation seral stages. There would be a relatively short-term cumulative increase in foraging habitat with a corresponding decrease in thermal and hiding cover. The effects would be positive, as there would be an overall improvement in habitat. The cumulative actions would not have a detectable effect on the population trends of Rocky Mountain elk in the Gila National Forest.

Mule deer: Implementation of either alternative would not cumulatively result in substantial changes in the acreage of existing pinyon-juniper woodland moderate seral stage habitat. There would be a cumulative increase in the amount of browsing and foraging habitat with a corresponding decrease in thermal and hiding cover. The cumulative effects would be positive, as there would be an overall improvement in deer habitat. The cumulative actions would not have a detectable effect on the population trends of mule deer in the Gila National Forest.

Mexican spotted owl: (See previous Mexican spotted owl analyses, page 78)

Merriam's wild turkey: Implementation of either alternative would over time cumulatively result in an increase in the acreage of moderate to high seral stage ponderosa pine and moderate seral stage

pinyon-juniper woodland. There would be a loss of potential roost trees but an increase in the acreage of created openings in the forest canopy. There would be an increase in herbaceous biomass that would improve habitat quality for both poult and adults. The cumulative effects would be positive, as there would be an overall improvement in Merriam's wild turkey habitat. The cumulative actions would not have a detectable effect on the population trends of Merriam's wild turkey in the Gila National Forest.

Blue grouse: Implementation of either alternative would promote the acreage of moderate and high seral stage mixed conifer habitat in the Six Shooter and Black Deer Project. This may hold true for the Burro Project. The other two vegetation management projects would not alter mixed conifer habitat.

Management-ignited fires following vegetation management projects, as well as management-ignited fires elsewhere in the watershed, combined with any prescribed natural fires, may also affect blue grouse through habitat modification. The cumulative actions would not have a detectable effect on population trends of blue grouse in the Gila National Forest.

Common [northern] flicker: Implementation of either alternative would cumulatively increase the acreage of high seral stage pinyon-juniper habitat, as pinyon-juniper woodlands would be thinned leaving most of the largest available trees. The cumulative effects would be positive, as there would be an overall improvement in northern flicker habitat. The cumulative actions would not have a detectable effect on the population trends of northern flickers in the Gila National Forest.

Hairy woodpecker: Implementation of either alternative would have negligible cumulative effects to hairy woodpecker habitat in the near term. Over time, the cumulative effects would be positive as the acreage of mature and overmature trees most preferred by this species would be increased sooner than taking no action. The cumulative actions would not have a detectable effect on the population trends of hairy woodpeckers in the Gila National Forest.

Long-tailed vole: Implementation of either alternative would have positive cumulative effects to long-tailed vole habitat in both the near term and over time, as the acreage of preferred habitat would increase. The cumulative actions would not have a detectable effect on the population trends of long-tailed voles in the Gila National Forest.

Mexican [Mogollon] vole: Implementation of either alternative would have positive cumulative effects to Mexican vole habitat in both the near term and over time. The cumulative actions would not have a detectable effect on the population trends of Mexican voles in the Gila National Forest.

Abert's squirrel: Implementation of either alternative would have negligible cumulative effects to Abert's squirrel habitat in the near term. Over time, the cumulative effects would be positive as the acreage of mature and overmature trees used by this species would be increased sooner than taking no action. The cumulative actions would not have a detectable effect on the population trends of Abert's squirrel habitat in the Gila National Forest.

Red squirrel: Implementation of either alternative would promote the acreage of moderate and high seral stage mixed conifer habitat in the Six Shooter/Black Deer

Project. As the other foreseeable future vegetation management projects would not alter mixed conifer habitat, cumulative impacts to this habitat would not occur. Therefore, cumulative actions would not have a detectable effect on population trends of red squirrels in the Gila National Forest.

Black-tailed jackrabbit: Throughout the watershed, approximately 11,000 acres of grasslands currently occur. The amount of grasslands has declined an estimated 9,000+ acres since 1935 due to conifer (mainly pinyon and juniper) encroachment (USDA 1997).

With implementation of either alternative, removal of encroachment conifers from grasslands would marginally increase the acreage of this habitat type. The cumulative effects would be positive, as there would be an overall increase in black-tailed jackrabbit habitat. The cumulative actions would not have a detectable effect on the population trends of black-tailed jackrabbits in the Gila National Forest.

Mearns' (Montezuma) quail:

Implementation of either alternative would have negligible cumulative effects to Mearns' quail, as the opening of the woodland canopy would alter the current condition of the habitat in the short-term. Over time, the cumulative effects to Mearns' quail and its habitat would be positive as the grasslands would marginally increase and an increased acreage of moderate and high seral stage pinyon-juniper woodland would be attained. The cumulative actions would not have a detectable effect on the population trends of Mearns' quail in the Gila National Forest.

Horned lark: With implementation of either alternative, removal of encroachment conifers from grasslands would marginally

increase the acreage of this habitat type. These alternatives combined with other foreseeable vegetation management projects would have negligible cumulative effects to horned larks and in their habitat in the short-term. Over time, the cumulative effects to habitat would be positive as grassland restoration occurs across the watershed. The cumulative actions would not have a detectable effect on the population trends of horned larks in the Gila National Forest.

Plain (Juniper) titmouse: Implementation of either alternative would have negligible cumulative effects to plain titmice in the short-term due to the alteration of current condition habitat. Over time, the cumulative effects to the plain titmouse and its habitat would be positive, as more acreage of high seral stage pinyon-juniper woodlands would be attained. The cumulative actions would not result in a detectable effect on the population trends of plain titmice in the Gila National Forest.

Sonora sucker and desert sucker: The effects would be similar to those for the loach minnow as previously described. The cumulative effects would not result in a detectable effect on the population trends of these species in the Gila National Forest.

Migratory Birds

Migratory bird habitat types, for those species documented in or near the Six Shooter/Black Deer Project, range from open to closed canopied ponderosa pine and mixed conifer stands, moderately closed to closed canopied pinyon-juniper woodlands, and mountain grasslands. These and other habitat types occur within the Burro Project and elsewhere in the Negrito Watershed. Except for mixed conifer stands, these habitat types also occur in the Sheep Basin Project proposed action. Pinyon-juniper

woodlands and grasslands do not occur in the Apache Forest Health Project. Riparian habitat occurs downstream of all three projects.

Negative impacts occurred to many migratory birds when even-aged management was emphasized and numerous mature and overmature trees were removed in past commercial timber sales throughout the watershed. These activities resulted in temporary habitat fragmentation and likely lowered densities of migratory birds that are dependent on later seral stage forests. Even-aged management removed most of a stand that in turn resulted in the turnover of the majority of the breeding birds present. Pole-sized and mid-successional ponderosa pine stands are now predominant in the watershed. Breeding bird densities are often lowest in these stands (Conner and Adkisson 1975, et al., referenced by Martin and Finch 1995).

The expansion and increased density of pinyon-juniper woodlands and subsequent contraction of grasslands have been due mainly to fire suppression. Pinyon-juniper woodlands have increased an estimated 6,000+ acres in the watershed since 1935, primarily through encroachment into grasslands. Approximately 11,000 acres of grasslands currently occur in the watershed.

The amount of grasslands has declined an estimated 9,000+ acres since 1935 due to conifer encroachment (USDA 1997). As a result, the densities of breeding birds dependent on open woodlands and grasslands have likely declined.

Acreage of habitat affected by stand-replacement wildfires in the watershed is small. Where these fires occurred, the result was increased acreage of snag habitat. Due to ladder fuels in forested stands, the risk of

habitat degradation or elimination due to catastrophic wildfires in the watershed is high. Management ignited fires have been used to remove excess slash and reduce overall ground fuel loading. Burn intensities have been low to moderate with minimal loss of larger trees and likely resulted in somewhat improved migratory bird habitat.

The silvicultural treatments in the Six Shooter/Black Deer Project, with its retention of most or all yellow bark ponderosa pines regardless of diameter would be similar to the Sheep Basin Project. These projects manage in varying degrees, towards a better distribution of tree size and age classes with an emphasis on the mature and overmature seral stages and would likely result in more acreage of later seral stage habitat compared to taking no action. The Apache Forest Health Project, with no tree larger than 16.0" in diameter removed, would likely result in increased acreage of mature forest stands in the future. If an action alternative was implemented, the Burro Project would also likely result in more acreage of moderate and high seral stage ponderosa pine habitat compared to taking no action.

If thinning occurred in these projects and uneven-aged silvicultural treatments would be implemented in two projects. Uneven-aged management would maintain a specific tree-diameter distribution and therefore, there would be less change in stand structure and bird communities than under even-aged management. Stands selectively treated not only retain much of the mature forest-bird community, but also provide habitat for some species that use the ground-shrub-sapling layer (Martin and Finch 1995).

Thinning in pinyon-juniper stands would occur in the both the project area and in the Sheep Basin Project. These treatments

would result in a semblance of the open woodlands that historically occurred. The removal of conifers from grasslands in these projects would have positive cumulative effects on migratory birds associated with this habitat type.

Management ignited fire would be used to remove excess slash. Slash would be lopped to about a two-foot height to reduce flame height and scattered prior to broadcast burns in portions of all three timber management projects. These prescribed burns as well as other management ignited fires, and prescribed natural fires in the watershed are unlikely to occur simultaneously. Burn intensities should be low to moderate with minimal loss of larger trees.

Alternative 1 (no action) would continue existing environmental conditions and trends and the risk of degradation or elimination of most migratory bird habitat due to catastrophic wildfire would increase.

Alternatives 2 and 3 - Due to the large acreage in the project and watershed that would not be silviculturally treated because of Mexican spotted owl PACs and steep slopes, a mosaic of closed canopy, moderately closed canopy, and open canopy forested stands would remain following project implementation. The tree size class diversity, canopy cover, and spatial array of different age stands would tend to promote a variety of suitable habitats for migratory birds in both the short- and long-term. The cumulative effects of implementing either alternative would be positive for some migratory birds and negative for others in the short-term.

Over time, the cumulative effects would be positive as habitat diversity would be increased and the risk of degradation or

elimination of habitat due to catastrophic wildfires would decrease.

8. The degree to which the action may adversely affect districts, sites, highways, structures, or objects listed in or eligible for listing in the National Register of Historic Places or may cause loss or destruction of significant scientific, cultural, or historical resources.

The latest edition of the National Register of Historic Places has been consulted. No National Register sites are located in the project area. Heritage consultation was initiated during the scoping process, with responses from three tribal entities and the New Mexico State Historic Preservation Office (SHPO). No concerns regarding general issues or issues specific to Traditional Cultural Properties have been raised. In the event that an issue is raised, it would be dealt with on a case-by-case basis, following current laws, guidelines, understandings, and agreements.

Two heritage resource inventories were conducted. The Six Shooter Archaeological Survey (Project Record 3) encompassed 7,524 acres, and the Black Deer Archaeological Survey (Project Record 11) 4,903 acres. The inventory reports are available for review, but due to the sensitive nature of heritage resource sites, actual disclosure of site locations is exempt from the Freedom of Information Act. A total of four heritage resources were reported. None fit the criteria for inclusion in the National Register of Historic Preservation, but all would be avoided by ground disturbing activities and from the intense heat associated with pile burning. The SHPO has concurred with the survey results and avoidance measures.

With the implementation of the avoidance measures, this activity would not adversely affect cultural resource sites, and may actually prove beneficial to the long-term preservation of the sites. By following the recommendations, the activities proposed in conjunction with the Six Shooter and Black Deer Vegetation Management Project would comply with the provisions of the National Historic Preservation Act of 1966, as amended; Executive Order 11593; and the Archaeological Resources Protection Act of 1979.

A determination of no effect was made in the Historical and Cultural Resources Report and effects described above.

9. The degree to which the action may adversely affect an endangered or threatened species or its habitat that has been determined to be critical under the Endangered Species Act of 1973 (ESA). USFS Region 3 Sensitive Species are also included here.

Federally Listed Species

In compliance with requirements of ESA, the Forest Service prepared a Biological Assessment (BA) of this project's possible impacts on threatened and endangered species; that assessment is hereby incorporated by reference. The determinations reached in the BA are as follows:

- Mexican Spotted Owl – may affect not likely to adversely affect
- Bald Eagle – no effect
- Southwestern willow flycatcher – no effect
- Loach minnow– may effect not likely to adversely effect
- Spikedace – may effect not likely to adversely effect

Chiricahua leopard frog – may effect not likely to adversely effect

Mexican gray wolf – not likely to jeopardize.

Ocelot – no effect.

Jaguar – no effect.

The US Fish & Wildlife Service has not delineated critical habitat for any species within the project area, except the Mexican spotted owl, which has proposed critical habitat delineated.

Mexican Spotted Owl

An analysis of Mexican spotted owl habitat has been completed within the 127,930 acre Negrito Creek Watershed as well as within the Six Shooter and Black Deer Project. Currently, approximately 4,856 acres (39% of the project) have the potential to experience a crown fire. Two Protected Activity Centers are completely in the project and four PACs are partially in the project. Most PACs within the project area are vulnerable to passive crown fires where individual groups of trees torch out but solid flaming in the canopy cannot be maintained except for short periods. Appropriate treatments to abate fire risk in one PAC would occur.

Within the project area, approximately 6,417 acres meets the criteria for mixed conifer and pine/oak restricted habitat outside of PACs. None of this habitat currently meets target/threshold condition as identified in the Mexican spotted owl Recovery Plan. A total of approximately 8,762 acres (70% of the project) is Mexican spotted owl habitat. Of this restricted habitat, approximately 733 acres is mixed conifer habitat and 5,684 acres is pine/oak habitat. A minimum of 10% of pine/oak restricted habitat and 25% of mixed conifer restricted habitat would be managed towards target/threshold condition.

In the action alternatives, restricted habitat would be treated by a variety of methods that include pre-commercial thinning, commercial thinning, group selection/thinning, fuel treatment, and prescribed burning only. Prescribed burning would follow all silvicultural activities. All yellow ponderosa pines would be retained in Alternative 2 and most yellow pines would be retained in Alternative 3. No tree larger than 23.9 inch dbh would be treated in restricted habitat. Approximately 213 acres of mixed conifer and 584 acres of pine/oak restricted habitat have been designated to be managed toward target/threshold condition. Hardwoods, large down logs, large trees (18.0+ inch dbh) and snags would be retained to an extent that does not significantly impede the overriding objective of reducing the risk of catastrophic fire in Mexican spotted owl habitat. Less acreage would be silviculturally treated in Alternative 3 than in Alternative 2.

Implementation of the action alternatives would be in compliance with the Mexican spotted owl Recovery Plan and the Amended Forest Plan.

Alternative Effects Determinations:

Alternative 1 would have no direct or indirect effects on the Mexican spotted owl and its habitat in the short-term. In the long-term, the risk of severe degradation or elimination of habitat due to catastrophic wildfires would increase.

Alternatives 2 and 3

Direct Effects: Activities associated with the opening, maintenance, and closing of roads (Alternative 2), vehicular use of existing roads, prescribed burning, and silvicultural treatments may directly affect any Mexican spotted owls that forage in the project area outside of PACs. There may be direct

effects on Mexican spotted owls within the PAC treated to abate fire risk. These disturbances are likely to be insignificant and discountable.

Indirect Effects: The action alternatives would alter the condition of future potential nesting and roosting habitat and current foraging, wintering, migration, and dispersal habitat by implementation of silvicultural activities and prescribed fire. These activities would change current habitat structure including the amount of woody debris, snags, and downed logs present, and modify canopy cover. The alteration of habitat may be detrimental to some prey species and their habitats in the short-term but in the long-term the diversity of vegetative conditions and habitat should increase and result in a more diverse prey base. Stands designated to be managed toward target/threshold condition may reach that condition sooner than if no action were taken.

These alternatives may affect the Mexican spotted owl and its protected, restricted, foraging, wintering, migration, and dispersal habitat. As the effects would be insignificant and discountable, they would not likely be adverse. In the long-term, these alternatives would have a beneficial effect on Mexican spotted owl habitat as the risk of severe degradation or elimination of habitat due to catastrophic wildfires would decrease and target/threshold conditions may be attained sooner than taking no action.

Loach Minnow

Loach minnow preferred habitat is described as turbulent, rocky riffles. One of the main threats to the loach minnow is accelerated erosion and subsequent excessive sediment deposition into their habitat that fills the interstitial spaces of cobble and rubble

substrates that are essential for successful reproduction. Activities that affect those habitat components that are essential for the primary biological needs of foraging, sheltering, dispersal, and reproduction, such as removal of riparian cover, sedimentation, or control of water levels, can affect the quality of loach minnow habitat. Loach minnows use the spaces between, and in the lee of, larger substrates for resting and spawning (Propst et al. 1988, Rinne 1989). The species is rare or absent from habitats where fine sediments fill the interstitial spaces (Propst and Bestgen 1991).

Nearly all of the project area is in the Negrito 5th Code Watershed. About 130 acres are in the Middle San Francisco Watershed and drain into Deep Creek, a distance of approximately 1.5 miles.

Deep Creek contains ephemeral and interrupted-perennial reaches and drains into the San Francisco River on private land approximately 15.0 miles downstream. Occupied loach minnow habitat occurs in the San Francisco River. Drainage from the remainder of the project area, by way of mainly ephemeral Bull Basin, Naranjo, Potato Patch, Shotgun, and Sign Camp Canyons, is into Negrito Creek where loach minnow occupied habitat occurs approximately 7.0 miles downstream. The closest stands are about 2.0 miles from Negrito Creek, which drains into the San Francisco River.

Alternative Effects Determinations:

Alternative 1: The Project Hydrologist concluded that with no action, tree densities would continue to increase and the vegetative understory and ground cover would continue to decline as ground cover decreases, water runoff would become flashier and there would be a decline in

water quality (Project Record 55). Fuel loadings would continue to increase as would the risk of a stand replacing, high intensity/severity wildfire that would negatively impact soil and water resources through both the increase in sediment delivery to stream channels, and loss of large organic material recruitment for soil productivity. This alternative would not have any direct or indirect effects on the loach minnow or its designated habitat in the short-term.

Alternatives 2 and 3

Direct Effects: The Project Hydrologist determined that if these alternatives are implemented over a 5-10 year period, small, short-term (0 - 10 years) negative impacts to the watershed could occur. There would be some reduction in ground cover from timber treatment, treatment of pinyon-juniper, and from prescribed burning.

Short-term sediment and ash deposition into Negrito Creek, which should be minor, would occur by way of mainly ephemeral drainages. It is an additional 7.0 miles to occupied habitat in Negrito Creek. Due to the small acreage in the Middle San Francisco Watershed and the distance to occupied habitat, there should be minimal to no sediment or ash deposition into the San Francisco River.

There would be no direct effect on the loach minnow or its designated habitat in the short term. The mechanical treatment of vegetation, the opening, maintenance, and closing of roads, and prescribed burning would not take place adjacent to any perennial streams, or any suitable, occupied, or designated loach minnow habitat. All proposed work would take place at least seven miles upstream of loach minnow habitat.

Indirect Effects: The indirect effects are predicted to be insignificant and discountable and would not likely be adverse for either the species or its habitat. Alternative 3 effects would be similar to, but less than, those predicted under Alternative 2 as currently closed roads would not be re-opened and less acreage would be treated.

These alternatives may affect the loach minnow and its habitat in the short-term. In the long-term, these alternatives should have a beneficial effect on the loach minnow and its habitat as the risk of degradation of habitat due to catastrophic wildfires would decrease.

Spikedace (*See also loach minnow evaluation for watershed and habitat effects by alternative.*)

Spikedace occupy flowing waters, usually less than a meter deep, and as adults often aggregate in shear zones along gravel-sand bars, quiet eddies on the downstream edge riffles, and broad, shallow areas above gravel-sand bars (Propst and Bestgen 1986, Rinne and Kroeger 1988). Smaller, younger fish are found in quiet water along pool margins over soft, fine-grained bottoms. Major threats include dams, water diversion, groundwater pumping, channelization, introduction of non-native predatory and competitive fishes and watershed deterioration.

Activities that affect those habitat components that are essential for the primary biological needs of foraging, sheltering, dispersal, and reproduction, such as removal of riparian cover, sedimentation, or control of water levels, can affect the quality of spikedace habitat.

Unoccupied spikedace habitat occurs in the San Francisco River. Drainage from the project area, by way of mainly ephemeral

Bull Basin, Naranjo, Potato Patch, Shotgun, and Sign Camp Canyons, is into Negrito Creek. The spikedace does not now and did not historically occur in Negrito Creek. The San Francisco River from its confluence with Negrito Creek downstream to its mouth at the Gila River in Arizona is Spikedace habitat. Spikedace habitat in the San Francisco River is approximately 12.0 miles downstream from where the project area drains into Negrito Creek. The spikedace has been extirpated from the San Francisco River (Minckley 1973).

Alternative Effects Determinations:

Alternative 1 effects would be similar to the loach minnow effects (*Alternative 1* above) only to a lesser degree as critical spikedace habitat is further removed from the project area along the San Francisco River. This alternative would have no direct or indirect effects on the spikedace and its habitat in the short term. However, in the foreseeable future, the risk of degradation of habitat due to catastrophic wildfires would increase.

Alternatives 2 and 3

Direct Effects: Alternatives 2 and 3 would have no direct effects on the spikedace as the species has been extirpated from the San Francisco River.

Indirect Effects: The indirect effects of these alternatives on habitat would be similar to the loach minnow habitat effects described in the previous section, only to a lesser degree as critical spikedace habitat is further removed from the project area along the San Francisco River.

The mechanical treatment of vegetation, the opening, maintenance, and closing of roads (*Alternative 2*), vehicular use of existing roads, and prescribed burning would not take place adjacent to any perennial streams,

or any suitable, occupied, or spikedace habitat.

These alternatives may affect spikedace habitat in the short-term but the effects are predicted to be insignificant and discountable and would not likely be adverse. In the long-term, these alternatives should have a beneficial effect on spikedace habitat, as the risk of degradation of habitat due to catastrophic wildfires would decrease.

Chiricahua Leopard Frog (*See also loach minnow and spikedace evaluation for watershed and habitat effects by alternative.*)

The Chiricahua leopard frog is known currently and/or historically from cienegas, pools, livestock tanks, lakes, reservoirs, streams, and rivers at elevations of 3,000 to 9,000 feet in central and southeastern Arizona, west-central and southwestern New Mexico, and in portions of Mexico. These habitats generally range from the pinyon-juniper and pine oak woodland belts into forests of ponderosa pine. It likely feeds on a variety of insects and other invertebrates.

Population declines are attributed in many cases to habitat loss or predation by introduced predaceous fishes, amphibians, and crayfish. A fungal disease, chytridiomycosis, has been linked to Chiricahua leopard declines in Arizona and New Mexico. Deterioration of watersheds, and erosion and/or siltation of stream courses are also threats.

The Chiricahua leopard frog has been found along the San Francisco River and was located in South Fork Negrito Creek in 2002. The project area does not drain into South Fork Negrito. The Chiricahua leopard frog has not been documented in Negrito Creek although the creek is potential habitat.

Eight stock tanks in the project area have been confirmed as occupied or likely occupied by the Chiricahua leopard frog. High mortality has been documented in some of these tanks with the fungal disease chytridiomycosis, the confirmed cause (C. Painter, pers. comm. 2004).

Confirmed occupied habitat in the San Francisco River is several miles upstream of its confluence with Negrito Creek and over 20 miles downstream.

Alternative Effects Determinations

Alternative 1 would not directly or indirectly affect the Chiricahua leopard frog and its habitat in the short-term. However, in the foreseeable future, the risk of degradation of habitat due to catastrophic wildfires would increase.

Alternatives 2 and 3

Direct Effects: Short-term sediment and ash deposition into Negrito Creek, which should be minor, would occur by way of ephemeral drainages. Due to the small acreage in the Middle San Francisco Watershed and the distance to occupied habitat, there should be minimal to no sediment or ash deposition into the San Francisco River.

Since larval and adult Chiricahua leopard frogs occur in stock tanks, ponds, and streams, the mechanical treatment and prescribed burning proposed in all action alternatives would have no direct effects on Chiricahua leopard frog eggs, larvae, or adults.

Indirect Effects: Effects of the action alternatives on the Chiricahua leopard frog are indirect and may result from soil or ash inflow into occupied habitat. An inflow of ash and sediment into occupied habitat is

capable of smothering eggs and tadpoles with a resultant change in the number of individuals (cite). Reproduction may also be affected. Sediment and ash inflow can also inhibit respiration in macro-invertebrates resulting in reduced density and composition of macro-invertebrates. Reductions in the amount of prey species can ultimately also affect Chiricahua leopard frog numbers and reproduction.

Stands along ephemeral drainages would either not be treated or would have a no-cut buffer. Management prescribed fires would not be ignited in drainages near occupied habitat. Treatment buffers, as described in the alternatives section, would aid in reducing sediment and ash deposition that may be generated from management activities in the surrounding forested stands and would reduce to insignificant or discountable, the effects to Chiricahua leopard frog numbers, reproduction, and distribution.

Alternatives 2 and 3 may affect individual Chiricahua leopard frogs and their habitat in the short-term. Project design features would be implemented to lessen impacts and Best Management Practices would be implemented to protect soil and water resources.

The effects are predicted to be insignificant and discountable and would not likely adversely affect the species. In the long-term, these alternatives should have a beneficial effect on the Chiricahua leopard frog and its habitat, as the risk of degradation of habitat due to catastrophic wildfires would decrease and watershed conditions would improve.

Region 3 Sensitive Species

Table 3-13. Forest Service Region 3 Sensitive Species considered in analysis of the Six Shooter and Black Deer Project: S= Forest Service Region 3 Sensitive Species.

Status	Species	Status	Species
S	Northern goshawk (<i>Accipiter gentilis</i>)	S	Gila groundsel (<i>Senecio quaerens</i>)
S	American peregrine falcon (<i>Falco peregrinus anatum</i>)	S	Mogollon clover (<i>Trifolium longipes</i> , var. <i>neurophyllum</i>)
S	narrow-headed garter snake (<i>Thamnophis rufipunctatus</i>)	S	grama grass cactus (<i>Toumeyia papyracantha</i>)
S	Arizona southwestern toad (<i>Bufo microscaphus</i>)		

Northern Goshawk (See also Mexican spotted owl analysis for effects on goshawk foraging habitat within restricted/protected habitat.)

Over 98% of the project area had an open canopy based on interpretation of 1935 aerial photos (USDA 1997). Currently, less than 20% of the project area has an open canopy. The distribution of vegetative structural stages has been evaluated across the Negrito 5th Code Watershed, and at the mid- and small-scale levels within the project area. Forest plan guidelines for northern goshawk habitat for the Six Shooter and Black Deer Project include forested stands where 60% of the stands should be in a VSS 4 structural stage or greater.

Contract Region 3 protocol surveys were conducted between 1999 and 2002 within the Six Shooter and Black Deer Project and included 0.5 miles beyond the project boundaries. Although goshawks were sighted at various times, nesting goshawks were not detected in any surveys conducted within or beyond the project boundaries. Therefore, post-fledgling family areas were not delineated.

The project area contains suitable goshawk nesting habitat primarily within Mexican spotted owl Protected Activity Centers and prey availability is likely sufficient to support nesting goshawks. A total of approximately 8,762 acres (70% of the project) is potential Mexican spotted owl habitat. In accordance with the Mexican spotted owl Recovery Plan and Amended Forest Plan, silvicultural and other constraints are placed in these habitat types. Northern goshawk standards and guidelines apply to management of approximately 3,349 acres of forest and woodland stands within the project.

Alternative Effects Determinations:

Alternative 1 would not impact the northern goshawk and its habitat in the short-term. However, in the foreseeable future, the risk of degradation or elimination of habitat due to catastrophic wildfires would increase.

Alternatives 2 and 3

Direct Effects: Alternatives 2 and 3 may impact individual northern goshawks and their habitat in the short-term. Goshawk habitat outside of Mexican spotted owl habitat would be commercially thinned, group selection/thinned, pre-commercially thinned, and treated by group selection only. Prescribed burns would follow all silvicultural treatments. Several hundred acres would be treated by prescribed fire only.

Activities associated with the opening, maintenance, and closing of roads (Alternative 2), vehicular use of existing roads, prescribed burning, and silvicultural treatments can directly affect northern goshawks. These disturbances can disrupt activities such as breeding, feeding, and perching. Adult and fledged young may be flushed from their nesting areas if these

activities occur during the breeding season. The result may be nest abandonment or reduced reproductive success. As goshawks are not known to nest in the project area, nest abandonment would likely not occur.

Indirect Effects: Prescribed burning or silvicultural activities may indirectly affect the northern goshawk by changing habitat structure (large trees, snags, multi-storied canopies, downed logs, dense canopy cover, etc.). These activities may change the structure of prey species' habitat and affect the composition and abundance of prey species. Although these activities may have negative effects on some prey species and their habitat in the short-term, they should increase the diversity of vegetative conditions that would result in a more diverse prey base.

Tree size class diversity, canopy cover, and spatial array of different age stands would promote suitable goshawk habitat. In the long-term, these alternatives would have a beneficial effect on northern goshawk habitat, as the risk of degradation or elimination of habitat due to catastrophic wildfires would decrease. In the long-term, both alternatives would have beneficial impacts on the northern goshawk and its habitat due to a decreased risk of severe degradation or elimination of habitat due to catastrophic wildfires.

Commercial thinning would concentrate on the removal of trees in the young and mid-aged structural stages. Thinning in these structural stages would, in time, lead to larger size classes and encourage structural development, and enhance stand health and vigor. Where group selection would occur, irregular shaped openings up to a maximum of four acres would be created, no larger than 200 feet wide. Openings created that would be one acre in size or larger would

retain three to five of the largest trees available, preferably those with interlocking crowns.

In Alternative 2 shifts in canopy closure category caused by treatment occur in VSS 3 and 4. There would be an increase of approximately 580 acres in VSS 3A, and 887 acres in VSS 4A. VSS 3B would decrease by approximately 48 acres, VSS 3C would decrease by 661 acres, and VSS 4B would decrease by 909 acres. No changes in canopy closure would occur in VSS 4C and higher. The shifts into VSS 1A are due to small group selection cuts. An average canopy closure of 40%+ would remain in VSS classes 4 and 5.

In Alternative 3 there would be an increase of approximately 679 acres in VSS 3A, and 696 acres in VSS 4A. VSS 3B would decrease by approximately 313 acres, VSS 3C would decrease by 435 acres, and VSS 4B would decrease by 715 acres. No changes in canopy closure would occur in VSS 4C and higher. The shifts into VSS 1A are due to small group selection cuts. An average canopy closure of 40%+ would remain in VSS classes 4 and 5.

Implementation of either alternative would be in compliance with the Amended Forest Plan and Management Recommendations for the Northern Goshawk in the Southwestern United States. As the habitat within the project area is currently unoccupied by nesting goshawks, and due to the spatial scale involved, the impacts would not likely result in a trend toward Federal listing or loss of viability.

American Peregrine Falcon (*See also Mexican spotted owl and northern goshawk evaluation for current condition and alteration of forest stands and woodlands by alternative.*)

No eyries or suitable nesting habitat exist within the project area although an eyrie has been reported within approximately 1.5 miles of one boundary (Pat Zenone, USFWS, pers. comm.). The remainder of the project area is considered foraging habitat. Foraging habitat contains commonly taken prey species such as jays, woodpeckers, mourning doves, band-tailed pigeons, flickers, and various songbirds. The current condition of foraging habitat is the same as northern goshawk foraging habitat and Mexican spotted owl habitat previously described.

Alternative Effects Determinations:

Alternative 1 would have no direct or indirect effects on American peregrine falcon foraging habitat in the short-term as existing environmental conditions and trends would continue. In the foreseeable future, the risk of degradation or elimination of habitat due to catastrophic wildfires would increase.

Alternatives 2 and 3

Direct Effects: Alternatives 2 and 3 may affect individual American peregrine falcons and their foraging habitat. Two Mexican spotted owl PACs are within the 1.5-mile boundary zone and no treatments are proposed in them. Within 2.0 miles of the eyrie, thinning would mechanically treat approximately 100 acres just outside of the PACs. Over one half of this acreage occurs in a pinyon-juniper stand and the remaining acreage is in a young, open-canopied, pure ponderosa pine stand. Both stands would be prescribed burned following thinning.

Activities associated with the opening, maintenance, and closing of roads, vehicular use of existing roads, prescribed burning, and silvicultural treatments can directly

affect peregrine falcons. The disturbances created can disrupt activities such as breeding, feeding, and perching. Adult and fledged young may be flushed from their nesting areas if these activities occur during the breeding season. The result may be nest abandonment or reduced reproductive success. As peregrine falcon eyries do not occur in the project area, nest abandonment or reduced reproductive success would likely not occur.

Indirect Effects: Prescribed burning or silvicultural activities may indirectly affect the peregrine falcon foraging habitat by changing habitat structure (large trees, snags, multi-storied canopies, downed logs, dense canopy cover, etc.). These activities may change the structure of prey species' habitat and alter the composition and abundance of some prey species. Although these activities may have negative effects to some prey species and their habitat in the short-term, they should increase the diversity of vegetative conditions that would result in a more diverse prey base.

Due to the large acreage that would not be silviculturally treated due to PACs and steep slopes, a mosaic of closed canopy, moderately closed canopy, and open canopy forested stands would remain following project implementation. The tree size class diversity, canopy cover, and spatial array of different stand ages would tend to promote suitable peregrine falcon foraging habitat in both the short- and long-term. Most of the project area exclusive of PACs would be prescribed burned.

Due to the spatial scale involved, the impacts are not likely to result in a trend toward Federal listing or loss of viability. In the long term, these alternatives should have a beneficial effect on American peregrine falcon habitat, as the risk of degradation or

elimination of habitat due to catastrophic wildfires would decrease.

Narrow-headed Garter Snake and Arizona Southwestern Toad (*See also loach minnow evaluation for watershed effects by alternative.*)

Narrow-headed garter snake - This highly aquatic species is closely associated with clear, rocky streams where streamside vegetation is abundant. It is frequently found in association with riffles and deep pools and often lives in the interstitial spaces of partially submerged rocks and boulders. Its diet consists mainly of fish but also includes toads, frogs, tadpoles, and larval salamanders. The narrow-headed garter snake has been found along Negrito Creek (C. Painter, pers. comm.).

The primary threat is accelerated sediment deposition due to watershed and riparian deterioration that results in the alteration or diminishment prey habitat.

Arizona southwestern toad - This toad is usually associated with perennial rocky streams with relatively shallow water flowing over sandy or rocky bottoms. It is generally found in unaltered riparian areas grown to sycamore or cottonwood, and riparian areas in grasslands, pinyon-juniper woodlands, or ponderosa pine forests. This toad has been found along Negrito Creek and elsewhere in the Negrito Watershed (C. Painter, R. Jennings, D. Miller, pers. comm.). Unlike many toads in New Mexico, it does not depend upon spring or summer rains to stimulate breeding activity. Its diet likely consists of a wide variety of arthropods.

Nearly all of the project area is in the Negrito 5th Code Watershed. About 130 acres are in the Middle San Francisco Watershed and drain into Deep Creek a distance of approximately 1.5 miles. Deep

Creek contains ephemeral and interrupted-perennial reaches and drains into the San Francisco River on private land approximately 15.0 miles downstream.

The narrow-headed garter snake and Arizona southwestern toad may occur in the San Francisco River. Drainage from the remainder of the project area, by way of mainly ephemeral Bull Basin, Naranjo, Potato Patch, Shotgun, and Sign Camp Canyons, is into Negrito Creek where occupied habitat for these two species occurs approximately 2.0 miles downstream of the closest project boundary. One of the prime threats to the Arizona southwestern toad is hybridization with a sympatric toad species (*Bufo woodhousii*) increased by modification of habitat that benefits the latter species. Watershed degradation is a threat as excessive sedimentation may alter riffles and runs and increase reaches of slow moving water that favors *Bufo woodhousii* (C. Painter pers. comm.). It may also result in a decline in the prey base.

Alternative Effects Determinations:

Alternative 1: Effects to habitat are similar to the loach minnow (Alternative 1) and would not impact the narrow-headed garter snake and Arizona southwestern toad and their habitats in the short-term. However, in the foreseeable future, the risk of degradation of habitat due to catastrophic wildfires would increase.

Alternatives 2 and 3

Direct Effects: Since the narrow-headed garter snake and Arizona southwestern toad are associated with perennial streams, the mechanical treatment and prescribed burning proposed in both action alternatives would have no direct effects on either species.

Indirect Effects: Effects to the narrow-headed garter snake and Arizona southwestern toad in the action alternatives are indirect and may result from soil or ash inflow into occupied habitat.

Alternatives 2 and 3 may impact the narrow-headed garter snake and Arizona southwestern toad and their habitats in the short-term. The effects are similar to the effects on loach minnow habitat (Alternatives 2 and 3) only somewhat greater as occupied habitat in Negrito Creek is closer to the project area than loach minnow occupied habitat.

The impacts are not likely to result in a trend toward Federal listing or loss of viability. In the long-term, these alternatives should have a beneficial effect on the habitats of these species, as the risk of degradation of habitat due to catastrophic wildfires would decrease and watershed conditions would improve.

Gila Groundsel, Grama Grass Cactus, and Mogollon Clover (*See also loach minnow evaluation for watershed effects by alternative.*)

Optimal habitat for Gila groundsel is along banks or meadows of permanent and intermittent creeks. It also occupies well-drained micro sites such as hummocks, meadow edges, high creek banks, dry creek beds, and dried meadows. It is often associated with alders, shrubs, boulders, and fallen logs. Low potential habitat may occur near seeps in the uplands but the best potential habitat is along Negrito Creek. It was not located in the Negrito Watershed during floristic surveys conducted in 1994.

Mogollon clover is generally found along permanently wet meadows, springs, and along streams at elevations of 8,000-9,000 feet in mixed conifer forests. The best potential habitat is along Negrito Creek and

limited low potential habitat may occur near seeps in the uplands. It was located in the Negrito Watershed during floristic surveys conducted in 1994.

Gramma grass cactus occupies open flats in grama grass grasslands and pinyon-juniper woodlands, often on sandy loam soils at elevations of 5,000 to 7,300 feet. These habitat types occur in the project area but this species was not located in the Negrito Watershed during floristic surveys conducted in 1994 and its occurrence in Catron County has not been documented.

Alternative Effects Determinations:

Alternative 1 would not impact Gila groundsel, Mogollon clover, and grama grass cactus and their habitats in the short-term. In the long term, the risk of degradation of habitat due to catastrophic wildfire would increase.

Alternatives 2 and 3

Direct Effects: Gila groundsel and Mogollon clover potential habitat in the uplands may be impacted by silvicultural activities and management ignited fire but the risks would likely be low and limited to individual plants. Short-term direct effects may occur due to silvicultural activities, road opening, road maintenance, and road closure, vehicular use of existing roads, and management ignited fires that cause individual plant mortality. With project implementation over a five to ten year period, short-term negative impacts to plant species habitats and the watershed would be small although they would be higher the more volume removed.

Indirect Effects: The reduction in the risk of catastrophic wildfire and the reintroduction of fire into the ecosystem should have beneficial effects. In the long-term, the

action alternatives would have beneficial impacts to these species and their habitats. Effects to suitable habitat along Negrito Creek, such as increased stream sedimentation and scouring of potential habitat due to increased runoff, should also be minimal. Most of the soils in the project area and surrounding terrain are formed from basalt parent material that tends to be fairly stable from an erosion standpoint due to the high amount of cobble and stone sized rock on the surface and in the profile. Potentially occupied grama grass cactus habitat would most likely be affected by grassland restoration and woodland treatments.

As the current condition of potentially occupied habitat within the project would be altered, and mortality of individual plants could occur, it is determined that implementation of these alternatives may impact individual Gila groundsel, Mogollon clover, and grama grass cactus plants and their habitats in the short-term, but the impacts are not likely to result in a trend toward Federal listing or loss of viability.

Other Species

The following Federally listed/warranted but precluded, and Region 3 sensitive species may occur, or historically occurred within or near the Six Shooter and Black Deer Project. A brief description of their habitat location is given for each species in the synopsis. Implementation of any alternative would not affect, impact, or jeopardize any of these species or their habitats.

Southwestern willow flycatcher (<i>Empidonax trailii extimus</i>)	Bell's vireo (<i>Vireo belli</i>)
Bald eagle (<i>Haliaeetus leucocephalus</i>)	Common black-hawk (<i>Buteo anthracinus</i>)
Mexican gray wolves (<i>Canis lupus baileyi</i>)	Western yellow-billed cuckoo (<i>Coccyzus americanus</i>)
Jaguar (<i>Panthera onca arizonensis</i>)	Chiricahua dock (<i>Rumex orthoneurus</i>)
Mountain silverspot butterfly (<i>Speyeria nokomis nitocris</i>)	

Synopsis:

Southwestern willow flycatcher potential habitat occurs in lower Negrito Creek approximately 8.0 miles from where drainage from the closest silviculturally treated stands enters the creek. The species is not known to nest within any potential habitat on the Reserve District.

Bald eagle wintering habitat occurs along Negrito Creek where they generally occur from late November to mid-March.

Mexican gray wolves may occur at various times within the project area. According to the U. S. Fish and Wildlife Service, no free-ranging Mexican gray wolves exist in the United States and only one experimental non-essential population exists. Human activities during project implementation would not preclude occupancy of the project area. In the long-term, the prey base of mule deer and elk should increase in the project area.

Jaguar habitat that supports prey species including mule deer and elk occurs with the project area. Human activities during project implementation would not preclude occupancy of the area. In the long-term, the prey base of mule deer and elk should increase in the project area.

Mountain silverspot butterflies may occur along Negrito Creek but moist meadows and marshes do not occur within the project area. The closest documented occurrence is approximately 10.0 miles to the southwest.

Bell's vireo potential or occupied habitat occurs in the riparian corridor along Negrito Creek.

Common black-hawk habitat may occur in lower Negrito Creek as it has been reported nesting there in the last two decades.

Western yellow-billed cuckoo potential habitat occurs in the riparian corridor along Negrito Creek although the species was not located there during surveys conducted in 2002.

Chiricahua dock may occur along Negrito Creek, but to date, the only *Rumex* found have been other species.

The Six Shooter and Black Deer Project would have no effect/no impact on, or would not jeopardize the following Federally threatened, endangered, proposed listed, or Region 3 sensitive species (Table 3-14) for one or more of the following reasons:

- a) The project area is not within the described historic or current range of the species
- b) The species has been extirpated from the project area.
- c) Potential habitat does not occur in the project area.
- d) No State-accepted sight records since 1970 have been reported for the mountain range where the project is located.
- e) No animal damage control programs are in effect or proposed in the project area.
- f) The species has not been located during surveys.

10. Whether the action threatens a violation of Federal, State, or local law or requirements imposed for the protection of the environment.

The action alternative does not threaten violation of Federal, State, or local law or requirements imposed for the protection of the environment. The action alternative in this analysis is fully consistent with the

National Forest Management Act, National Environmental Policy Act, Endangered Species Act, Clean Water Act, Historic Preservation Act, Clean Air Act, Multiple Use Sustained Yield Act.

Local, State and Federal Air Quality Regulations and standards

The New Mexico Environmental Department, Air Quality Bureau, is the regulatory and permitting agency providing statewide enforcement and air quality standards. The Gila National Forest is a signatory of the New Mexico Smoke Management Memorandum of Understanding (MOU). The MOU defines how land management agencies and the New Mexico Environmental Department work together in preventing smoke and particulate emissions from prescribed burning adversely affecting air quality and visibility.

Open burning, which includes pile burning and underburning for forest management, is regulated through the state by a permit (Environmental Improvement Act, NMSA 1978, Section 74-1-8(A) (4) and (7), and Air Quality Control Act, NMSA 1978, Sections 74-2-1 et seq., including specifically, Section 740205(A), (B), and (C) [11-30-95]). By obtaining a burning permit the Reserve Ranger District is agreeing to abide by the state prescribed fire and smoke management guidelines. Coordination of prescribed burns on the Gila and adjacent forests in Arizona is conducted through the Gila National Forest Supervisor's Office to manage air quality in Arizona, which has haze (PM2.5) requirements.

Table 3-14. Federally threatened, endangered, proposed listed, or Region 3 sensitive species with no impact/no effect in the Six Shooter Black Deer project area.

Ocelot - (<i>Felis pardalis</i>)	Yaqui chub - (<i>Gila purpurea</i>)
Black-footed ferret - (<i>Mustela nigripes</i>)	Rio Grande cutthroat trout (<i>Oncorhynchus clarki virginalis</i>)
Lesser long-nosed bat - (<i>Leptonycteris curasoae yerbabuena</i>)	Yaqui topminnow - (<i>Poeciliopsis occidentalis sonoriensis</i>)
Mexican long-nosed bat - (<i>Leptonycteris nivalis</i>)	Chihuahua chub - (<i>Gila nigrescens</i>)
Western red bat (<i>Lasiurus blossevilli</i>)	Gila topminnow - (<i>Poeciliopsis occidentalis occidentalis</i>)
Western yellow bat (<i>Lasiurus xanthinus</i>)	Gila trout - (<i>Onchorhynchus gilae</i>)
New Mexico jumping mouse (<i>Zapus hudsonicus luteus</i>)	Arizona agave - (<i>Agave arizonica</i>)
Mt. Graham red squirrel - (<i>Tamiasciurus hudsonicus grahamensis</i>)	Arizona cliffrose - (<i>Purshia subintegra</i>)
Coati (<i>Nasua nasua</i>)	Arizona hedgehog cactus - (<i>Echinocerus triglochidiatus arizonica</i>)
Northern aplomado falcon - (<i>Falco femoralis septentrionalis</i>)	Arizona willow - (<i>Salix arizonica</i>)
Brown pelican - (<i>Pelecanus occidentalis</i>)	Goodding's onion (<i>Allium gooddingii</i>)
Cactus ferruginous pygmy owl - (<i>Glaucidium brasilianum cactorum</i>)	Hess's fleabane (<i>Erigeron hessii</i>)
Least tern - (<i>Sterna antillarum athalossos</i>)	Holy ghost ipomopsis - (<i>Ipomopsis sancti-spiritus</i>)
Mountain plover - (<i>Charadrius montanus</i>)	Keunzler's hedgehog cactus - (<i>Echinocerus fendleri kuenzleri</i>)
Thick billed parrot - (<i>Rhynchopsitta pachyrhyncha</i>)	Lloyd's hedgehog cactus - (<i>Echinocerus fendleri lloydii</i>)
Whooping crane - (<i>Grus americana</i>)	Mimbres figwort (<i>Scrophularia macrantha</i>)
Yuma clapper rail - (<i>Rallus longirostris yumaensis</i>)	Mogollon death camas (<i>Zigadenus mogollonensis</i>)
New Mexico ridgenosed rattlesnake (<i>Crotalus willardi obscurus</i>)	Parish's alkali grass (<i>Puccinellia parishii</i>)
Lowland leopard frog (<i>Rana yavapaiensis</i>)	Pima pineapple cactus - (<i>Coryphantha scheeri</i> var. <i>robustispina</i>)
Roundtail chub – (<i>Gila robusta</i>)	Pinos Altos flame flower (<i>Talinum humile</i>)
Headwater chub – (<i>Gila nigra</i>)	Porsild's starwort (<i>Stellaria porsildii</i>)
Beautiful shiner - (<i>Cyprinella formosa</i>)	Sacramento Mountains thistle - (<i>Cirsium vinaceum</i>)
Boneytail chub - (<i>Gila elegans</i>)	Sacramento prickly poppy - (<i>Argemone pleiacantha pinnatisecta</i>)
Colorado squawfish - (<i>Ptychocheilus lucius</i>)	Santa Fe cholla (<i>Opuntia viridiflora</i>)
Desert pupfish - (<i>Cyprinodon macularius macularius</i>)	San Francisco Peaks groundsel - (<i>Senecio franciscanus</i>)
Humpback chub - (<i>Gila cypha</i>)	Sentry milk vetch - (<i>Astragalus cremnophylax</i> var. <i>cremnophylax</i>)
Little Colorado spinedace - (<i>Lepidomeda vittata</i>)	Sneed pincushion cactus - (<i>Hedeoma todsenii</i>)
Pecos gambusia - (<i>Gambusia nobilis</i>)	Wooton's hawthorn (<i>Crategus wootoniana</i>)
Pecos bluntnose shiner - (<i>Notropis simus pecosensis</i>)	Zuni (rhizome) fleabane - (<i>Erigeron rhizomatus</i>)
Razorback sucker - (<i>Xyrauchen texanus</i>)	Alamosa springsnail - (<i>Tryonia alamosae</i>)
Rio Grande silver minnow - (<i>Hybognathus amurus</i>)	Gila spring snail (<i>Fontelicella [Pyrgulopsis] gilae</i>)
Sonora chub - (<i>Gila ditaenia</i>)	Iron Creek woodland snail (<i>Ashmunella mendax</i>)
Woundfin - (<i>Plagopterus argentissimus</i>)	New Mexico hot spring snail (<i>Fontelicella [Pyrgulopsis] thermalis</i>)
Yaqui catfish - (<i>Ictalurus pricei</i>)	Oreohelix chloride (<i>Oreohelix pilsbryi</i>)
	Blue silverspot butterfly (<i>Crotalus willardi obscurus</i>)

Monitoring and Control Strategies

The Gila/Las Cruces Zone Smoke Management Coordinator, located in the Gila National Forest Supervisor's Office, is responsible for coordinating and scheduling prescribed fire smoke production within the Zone, as well as coordination with the State Air Quality Division. Basic smoke management responsibilities are to establish and maintain close communications with Federal, State and local air quality groups regarding the status of prescribed fire projects, and to monitor smoke plumes as appropriate to provide some advance warning of deteriorating air quality conditions. When air sheds become saturated, the Zone Coordinator allocates and schedules what projects can continue.

The general public is informed of the status of prescribed fires, including smoke management contingencies, through the local press, radio, and television stations. Updates are provided daily. A prescribed burn has a Prescribed Fire Manager and Prescribed Fire Burn Boss. When conducting prescribed fire near sensitive areas, they use management techniques that minimize smoke production and other impacts, as outlined in the Prescribed Fire Smoke Management Guide 420-1.

Water Quality Regulatory Environment

There are no 303d listed water bodies within the project area (State of New Mexico 2002). The nearest listed water body which could potentially be affected by the project is the main stem of Negrito Creek (Tularosa Creek to the confluence of the North and South Forks of Negrito Creek) (New Mexico list ID #- NM-2603.A_42, which is about two miles from the project area). Other downstream water bodies include the Tularosa River (San Francisco River to Apache Ck-New Mexico list ID #NM-2603.A_40) and the San

Francisco River (Whitewater Creek to Largo Canyon-New Mexico list ID #NM-2601_20). Negrito Creek (cause of impairment is temperature) and Tularosa River (San Francisco River to Apache Creek) (cause of impairment is conductivity) are listed for not supporting Cold Water Fisheries. The South Fork of Negrito Creek is also listed as a stream with water quality degradation due to elevated water temperature (State of New Mexico 2002); however, this impaired waterbody is located upstream in the watershed in relation to the Six Shooter and Black Deer Project and would not be affected by project activities.

Environmental Justice

The local economy of Catron County primarily relies on local/state/federal government jobs, livestock production, mining, and small business. The percentage of families living below the poverty level in 1990 was 21%. The racial demographics are as follows: 39% White, 44% Hispanic, and other races at 17%. These are the latest estimates based on 1990 US Census data (SWNMCOG 1998).

Catron County's percentage of low income and ethnic minority communities surpass the threshold for Environmental Justice considerations. Either action alternative is likely to provide some job opportunities in Catron County. In Alternative 1, there would be no such benefit. An environmental issue could be involved should the project not be implemented. Leaving a poor and/or minority at increasing risk of facing catastrophic wildfire (and denying the opportunity for meaningful employment concomitantly) may constitute an issue of environmental justice.

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Appendix 1: Roads

The following list of roads and mileages are required for project access. All roads were compared to the 2003 January roads list supplied by the Gila National Forest Supervisor's Office.

Alternative 2								
Open			Closed			Decommissioned		
Road	Miles	Current Status	Road	Miles	Current Status	Road	Miles	Current Status
141	6.4	Open	4043	.378	Closed	4042W	1.219	Decom.
153	2.428	Open	4162N	2.821	Closed	4042X	2.129	Closed
179	2.012	Open	4163A	.647	Closed	4045T	1.363	Decom.
181	.367	Open	4163E	.753	Closed	4045W	.324	Decom.
182	1.209	Open	4163G	.365	Closed	4163Q	.562	Decom.
4042V	2.167	Closed	4163H	.298	Closed	4163S	.141	Decom.
4162P	1.778	Closed	4163I	.744	Closed	4164B	.111	Decom.
4162Q	.497	Closed	4163J	.450	Closed	4164K	.407	Decom.
4162R	.377	Closed	4163L	1.329	Closed	4164L	.235	Decom.
4162S	.643	Closed	4163M	1.194	Closed	4164M	.342	Decom.
4163D	.590	Open	4163N	.607	Closed	4164N	.281	Decom.
4163F	1.080	Open	4163P	.502	Closed	4164R	.333	Decom.
4163K	.645	Closed	4163R	.242	Closed	4164T	.509	Decom.
4163T	.345	Open	4163S	.141	Closed	4164U	.610	Decom.
4163Y	.243	Open	4163X	.029	Closed	4164W	1.146	Decom.
4164A	.882	Open	4163Z	.033	Closed	4164X	.207	Decom.
4164C	1.831	Closed	4164D	.040	Open	4165P	.010	Decom.
4164F	.785	Closed	4164E	.965	Closed	4174X	.312	Decom.
4164H	1.156	Closed	4164G	.397	Closed	4174Y	.401	Closed
4164I	.142	Open	4164J	.079	Closed	4313Q	.499	Decom.
4164P	.231	Open	4164O	.249	Closed	4313Z	.306	Closed
4164P	1.648	Closed	4165C	.436	Closed	4314	.240	Decom.
4164Q	.152	Open	4165D	.426	Closed	633	.100	Decom.
4164S	.890	Open	4174S	.398	Closed			
4164V	.290	Open	4174T	.070	Closed			
4164X	.237	Open	4174U	.684	Closed			
4164Y	.297	Closed	4174W	.544	Closed			
4164Z	.475	Closed	4043	.378	Closed			
4165A	.944	Closed	4174Z	.088	Closed			
4165B	.818	Closed	4175	.117	Closed			
4165E	.249	Open	4223S	.304	Closed			
4165E	1.287	Closed	4307A	.363	Closed			
4165F	.454	Closed	4307N	.046	Closed			
4165G	.480	Open	4307O	.293	Closed			
4174V	.627	Closed	4307Q	.362	Closed			
4174X	1.247	Closed	4313H	.217	Closed			
4174X	1.086	Open	4313I	.128	Closed			
4223T	.071	Open	4313K	.250	Closed			
4223T	.198	Closed	4313L	.399	Closed			
4307P	.778	Closed	4313P	.339	Closed			
4313J	.251	Open	4313S	.160	Closed			
4313M	.243	Open	4313T	.421	Closed			
4313N	.440	Closed	4313U	.138	Closed			
4313O	.213	Closed	4313V	.131	Closed			
4313R	1.756	Closed	4313X	.331	Closed			
4313W	.290	Closed	4313Y	.426	Closed			
4314A	.260	Open	4314B	.084	Closed			
4314C	.320	Open	4314F	.153	Closed			
4314D	.499	Open	4314G	.257	Closed			
4314E	.152	Closed	4314H	.118	Closed			
4314J	.663	Closed	4314I	.540	Closed			
4314K	.794	Closed	4314M	.212	Closed			
4314L	.122	Closed	4314P	.112	Closed			
625	2.093	Open	626A	.671	Closed			
626	1.944	Open						
626A	3.455	Open						
626B	.159	Closed						
633	1.264	Open						
924	2.078	Open						
924	1.104	Closed						
999	.453	Closed						
Total	56.6			21.8			11.8	

Six Shooter Black Deer EA
Appendix I

Alternatives 1 and 3								
Open			Closed			Decommissioned		
Road	Miles	Current Status	Road	Miles	Current Status	Road	Miles	Current Status
141	6.4	Open	4042V	2.167	Closed	4042W	1.219	Decom.
153	2.428	Open	4043	.378	Closed	4042X	2.129	Closed
179	2.012	Open	4162N	2.821	Closed	4045T	1.363	Decom.
181	.367	Open	4162P	1.778	Closed	4045W	.324	Decom.
182	1.209	Open	4162Q	.497	Closed	4163Q	.562	Decom.
4163D	.590	Open	4162R	.377	Closed	4163S	.141	Decom.
4163F	1.080	Open	4162S	.643	Closed	4164B	.111	Decom.
4163T	.345	Open	4163A	.647	Closed	4164K	.407	Decom.
4163Y	.243	Open	4163E	.753	Closed	4164L	.235	Decom.
4164A	.882	Open	4163G	.365	Closed	4164M	.342	Decom.
4164I	.142	Open	4163H	.298	Closed	4164N	.281	Decom.
4164P	.231	Open	4163I	.744	Closed	4164R	.333	Decom.
4164Q	.152	Open	4163J	.450	Closed	4164T	.509	Decom.
4164S	.890	Open	4163K	.645	Closed	4164U	.610	Decom.
4164V	.290	Open	4163L	1.329	Closed	4164W	1.146	Decom.
4164X	.237	Open	4163M	1.194	Closed	4164X	.207	Decom.
4165E	.249	Open	4163N	.607	Closed	4165P	.010	Decom.
4165G	.480	Open	4163P	.502	Closed	4174X	.312	Decom.
4174X	1.086	Open	4163R	.242	Closed	4174Y	.401	Closed
4223T	.071	Open	4163S	.141	Closed	4313Q	.499	Decom.
4313J	.251	Open	4163X	.029	Closed	4313Z	.306	Closed
4313M	.243	Open	4163Z	.333	Closed	4314	.240	Decom.
4314A	.260	Open	4164C	1.831	Closed	633	.100	Decom.
4314C	.320	Open	4164D	.040	Open			
4314D	.499	Open	4164E	.965	Closed			
625	2.093	Open	4164F	.785	Closed			
626	1.944	Open	4164G	.397	Closed			
626A	3.455	Open	4164H	1.156	Closed			
633	1.264	Open	4164J	.079	Closed			
924	2.078	Open	4164O	.249	Closed			
			4164P	1.648	Closed			
			4164Y	.297	Closed			
			4164Z	.475	Closed			
			4165A	.944	Closed			
			4165B	.818	Closed			
			4165C	.436	Closed			
			4165D	.426	Closed			
			4165E	1.287	Closed			
			4165F	.454	Closed			
			4174S	.398	Closed			
			4174T	.070	Closed			
			4174U	.684	Closed			
			4174V	.627	Closed			
			4174W	.544	Closed			
			4174X	1.247	Closed			
			4174Z	.088	Closed			
			4175	.117	Closed			
			4223S	.304	Closed			
			4223T	.198	Closed			
			4307A	.363	Closed			
			4307N	.046	Closed			
			4307O	.293	Closed			
			4307P	.778	Closed			
			4307Q	.362	Closed			
			4313H	.217	Closed			
			4313I	.128	Closed			
			4313K	.250	Closed			
			4313L	.399	Closed			
			4313N	.440	Closed			
			4313O	.213	Closed			
			4313P	.339	Closed			
			4313R	1.756	Closed			
			4313S	.160	Closed			
			4313T	.421	Closed			
			4313U	.138	Closed			
			4313V	.131	Closed			
			4313W	.290	Closed			
			4313X	.331	Closed			
			4313Y	.426	Closed			
			4314B	.084	Closed			
			4314E	.152	Closed			
			4314F	.153	Closed			

Six Shooter Black Deer EA
Appendix I

Alternatives 1 and 3								
Open			Closed			Decommissioned		
Road	Miles	Current Status	Road	Miles	Current Status	Road	Miles	Current Status
			4314G	.257	Closed			
			4314H	.118	Closed			
			4314I	.540	Closed			
			4314J	.663	Closed			
			4314K	.794	Closed			
			4314L	.122	Closed			
			4314M	.212	Closed			
			4314P	.112	Closed			
			626A	.671	Closed			
			626B	.159	Closed			
			924	1.104	Closed			
			999	.453	Closed			
Total	31.8			46.6			11.8	

23.67 miles were estimated in the Scoping Letter. Changes are due to the following: Roads or segments thereof considered open are in fact closed; roads 4163 A, 4164 D, G and W, and 4314 F, G, L, M, and P had the potential to affect stream sedimentation, duplicated access, or were previously decommissioned; roads or segments had to be added to provide access due to the above changes.

ROADS PROPOSED FOR DECOMMISSIONING: 2.8 miles of currently closed roads are proposed for decommissioning under Alternatives 2 and 3. Road 4042 X (2.13 miles) is located within the Bull Basin drainage and leads to Bull Basin Tank. Roads 4313 Z (.30 mile) and 4174 Y (.40 mile) are located at the terminus of Road 4042 X and have no other access. Each road is heavily overgrown. No additional treatments or action other than listing as “decommissioned” are proposed.

Appendix 2: Definitions

Canopy base height

The lowest height above the ground at which there is a sufficient amount of canopy fuel to propagate fire vertically into the canopy. Canopy base height is an effective value that incorporates ladder fuels such as shrubs and understory trees.

Canopy bulk density

The mass per unit volume of combustible crown biomass, including foliage, twigs, and branches.

Clumping

Clumping is the retention of small groups of trees that are of differing age or size classes from their immediate neighbors. The objective of this treatment is to provide or enhance vertical and/or horizontal diversity within a stand of trees.

Fireline Construction

Firelines are control lines designed to stop the spread of a surface fire. A handline is constructed with hand tools, exposing mineral soil. The width is determined by the existing vegetation and predicted flame length. Generally it is 1-3 feet wide. A blackline is a control line constructed using fire. It consumes surface fuels and creates the boundary for the prescribed burn. It is generally completed prior to overall ignition of the prescribed burn. Natural and man-made barriers such as rocky areas, roads, and skid trails would be used as firelines whenever possible and safe. Dozer line construction is not anticipated.

Fuel Treatment

Fuel treatments can be anticipated in most stands proposed for burning. This is an initial fuel modification preparation for Underburning. It involves hand felling, pruning, or limbing of small trees and brush surrounding the bases and growing into the crowns of larger trees and snags. Most of the debris is removed into the burn unit. It includes thinning or pruning vegetation along the control lines to ensure the safety of prescribed fire personnel and equipment.

These treatments are most effective at reducing torching on steeper slopes and where residual trees are too dense to accommodate mechanized equipment. It would also be used in areas with sensitive resource and visual issues.

Group Selection

These units would receive silvicultural treatment on 10% of the stand acreage. Group cuts, essentially small seed tree cuts no larger than 4 acres in size would be scattered throughout the stand. The remainder of the stand would be uncut at this entry. Silvicultural activity would be followed by some type of fuel treatment such as lop and scatter or jackpot burning. This activity

would increase the proportion of Grass/Forbs/Seedlings Vegetative Structural Stage (VSS 1) found throughout the project area.

Group Selection/Thinning

These units would receive a combination of two activities. An estimated 10% of the stand acreage would receive the group cut similar to the Group Selection prescription. Small seed tree cuts no larger than 4 acres in size would be scattered throughout the stand. Some type of fuels treatment such as lop and scatter or prescription burning would follow silvicultural activity. This activity would increase the proportion of Grass/Forbs/Seedling Vegetative Structural Stage (VSS 1) found throughout the project area. The remainder of the stand would be thinned to about 50-70 sq. ft. of basal area throughout the unit. This represents about a 30 % average reduction of existing stems. Some type of fuels treatment such as lop and scatter or prescription burning would follow silvicultural activity.

Improvement Cutting

The removal of less desirable trees, of any species in a stand of poles or larger trees, primarily to develop composition and quality.

Jack Pot Burning

Jack Pot Burning can be used prior to underburning to reduce fuel loading. It is generally accomplished during cooler moister conditions when small patches of fuel accumulations can be burned, preventing widespread burn patterns. Fuel concentrations (jack pots) are lit and allowed to burn out. This is particularly useful in reducing the intensity of the underburn, when high risk of mortality in the over-story is a concern. This treatment may be used in pre-commercially thinned or commercially thinned areas of extensive slash.

Meadow Restoration

Merchantable competing conifer trees (other than yellow pine or any conifer greater than 18" dbh) within and around edges of selected meadows would be removed. Prescribed fire would maintain these openings. Meadow boundaries would be defined using historical information from the 1935 photo base.

Pile Burning

Pile Burning is the burning of large piles created from mechanically piling slash, and from yarding whole trees. Smaller piles are created from hand felling trees and brush. It is used primarily during cooler, moister, weather conditions.

Pinyon-juniper Treatment

These stands are usually a mixture of alligator juniper/pinyon/ponderosa pine occurring on drier sites. Selected units would receive silvicultural treatment designed to improve the health and vigor

of the ponderosa pine through thinning and release while reducing the amount of pinyon and juniper on the site. The stands would be thinned from below to about 20-40 sq. ft. of basal area, with most of the ponderosa pine retained on the site. Pinyon pine would also be utilized as a leave tree species. Each stand would be treated as an entire unit, with the prescription applied to all acreage within the stand. No strip treatments or fuel break type cuttings would be applied to units. Any selected unit lacking access would not have commercial material removed. Slash will be lopped/scattered and retained on site for 3-4 years to encourage grass and forb establishment and protection.

Restricted habitat

As used in the Mexican Spotted Owl Recovery Plan, refers to areas that are not protected, but where specific guidelines for management activities are required.

Under the Recovery Plan for the Mexican Spotted Owl all mixed conifer and pine-oak stands, as defined in the Recovery Plan, are managed as restricted areas. Within the restricted habitat, 25% of mixed conifer and 10% of pine-oak of the stands must be managed either as target/threshold stands or managed so that they can reach the target/threshold conditions.

Road Decommissioning

Activities that result in the stabilization and restoration of unneeded roads to a more natural state (36 CFR 212.1) (FSM 7703). Decommissioning includes applying various treatments, which may include one or more of the following:

- Reestablishing former drainage patterns, stabilizing slopes, and restoring vegetation;
- Blocking the entrance to a road, installing water bars;
- Removing culverts, reestablishing drainage ways, removing unstable fills, pulling back road shoulders, and scattering slash on roadbeds;
- Completely eliminating the roadbed by restoring natural contours and slopes.

Target/threshold conditions

Target/threshold criteria are provided by the Mexican Spotted Owl Recovery Plan to define the proportion of the landscape that should be or is approaching conditions suitable for nesting and roosting. The plan uses tree basal area, large tree (>18 in dbh) density, and tree size-class distribution as the variables to define target/threshold conditions

Thinning

These units would receive a commercial thinning activity designed to reduce stand stocking and improve growing conditions for trees remaining on the site. The stands would be thinned from below to about 50-70 sq. ft. of basal area, with tree removal primarily in young and mid-aged structural stages. This thinning would remove an estimated 37 % of the existing stems. Fuels treatment such as prescribed burning would follow silvicultural activity.

Due to the tendency of alligator juniper to sprout following treatment, these stands would receive additional mechanical treatment such as bulldozing, to remove a juniper-sprouting source on these sites. Mechanical treatment would attempt to reduce sprouting by 60-80 percent. This activity would be limited to those stands that occur on gentler ground, with no mechanical activity on slopes exceeding 30 per cent. Those stands identified to receive pinyon-juniper treatment, which exceed 30 per cent slope, may receive a prescription burning activity.

Following initial treatment, sprouting levels should be maintained through prescribed burning on a 5 to 7 year return interval.

Underburning

This is a prescribed fire technique designed to reduce fire behavior and negative effects from wildfire. Underburning consumes litter, duff and smaller (≤ 3 inch diameter) forest debris, as well as the above described fuel treatment materials. It generates enough heat to kill the smaller shade tolerant trees, such as fir, that can act as ladder fuels. With the removal of litter and duff, Underburning encourages the establishment of grass and forbs.

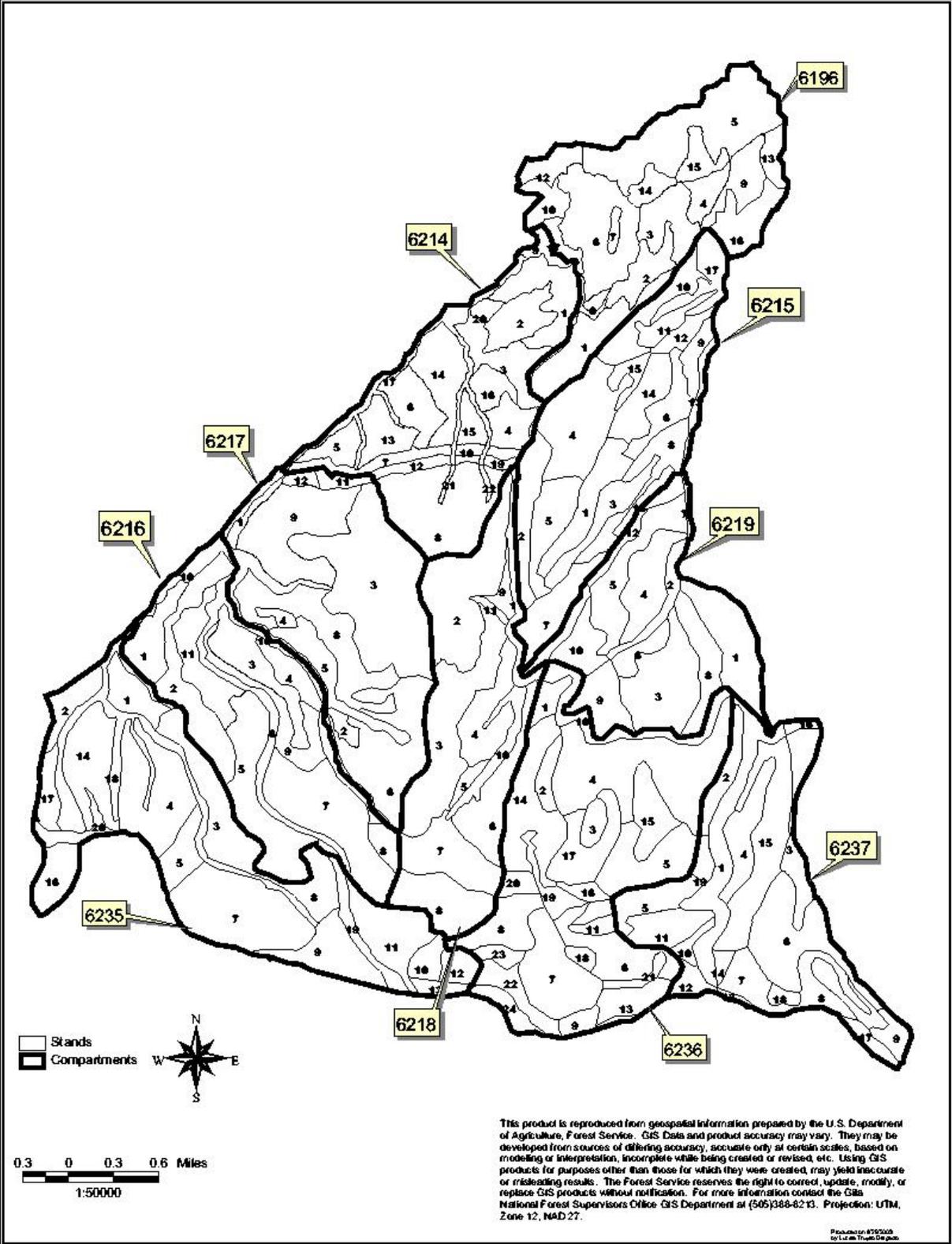
In combination with Group Selection patches, Underburning is used to consume duff and prepare the area for natural ponderosa pine regeneration. In combination with Thinning it is used to reduce fuel loading from naturally occurring materials and materials associated with mechanical activities. In combination with Meadow Restoration, Underburning is used to reduce activity fuels created by felling conifers and to discourage the re-sprouting of juniper.

Yellow pine

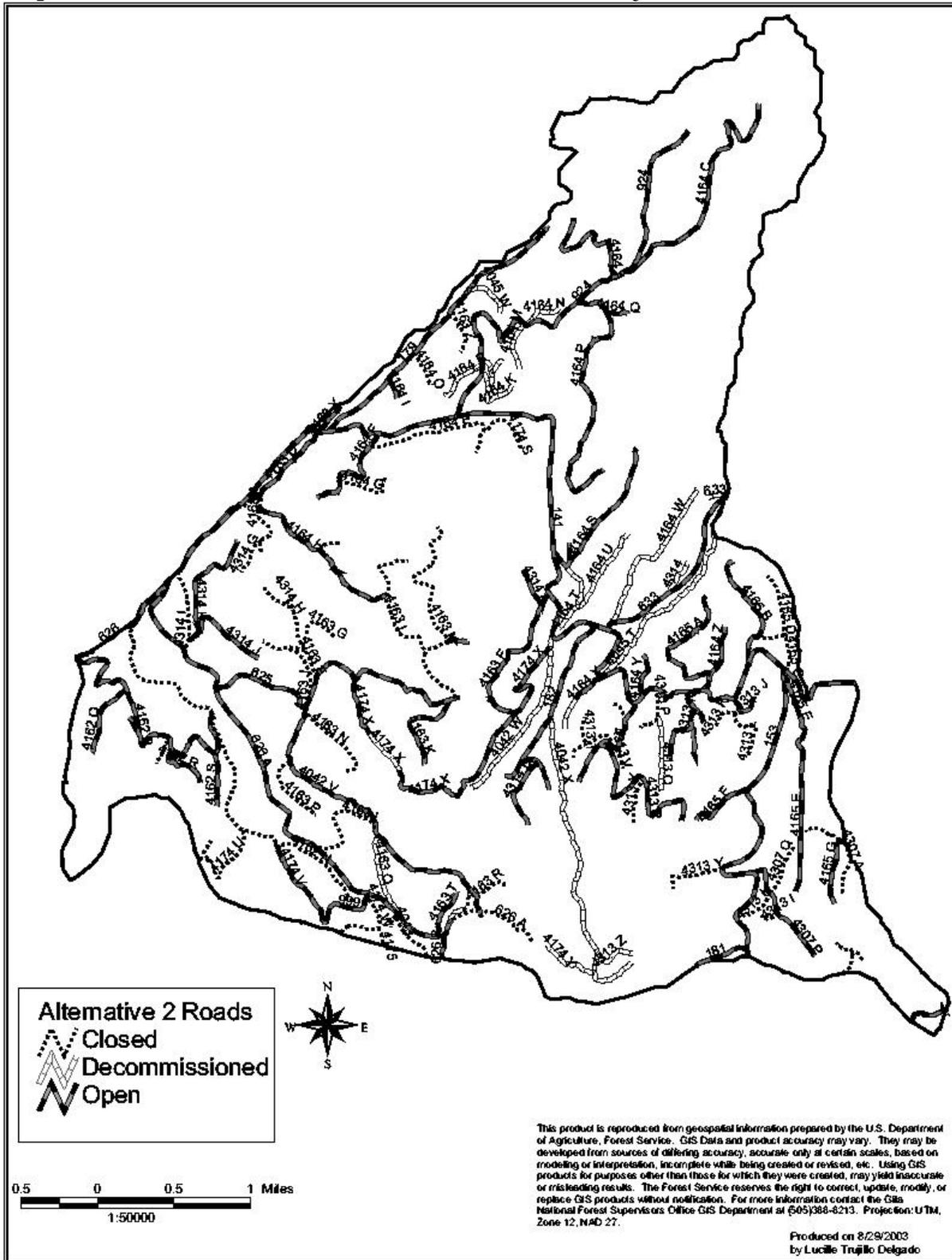
Ponderosa pine that exhibits at least two of the following characteristics: yellow/reddish plated bark, little taper, and/or flattened crowns with horizontal branch structure.

Appendix 3: MAPS

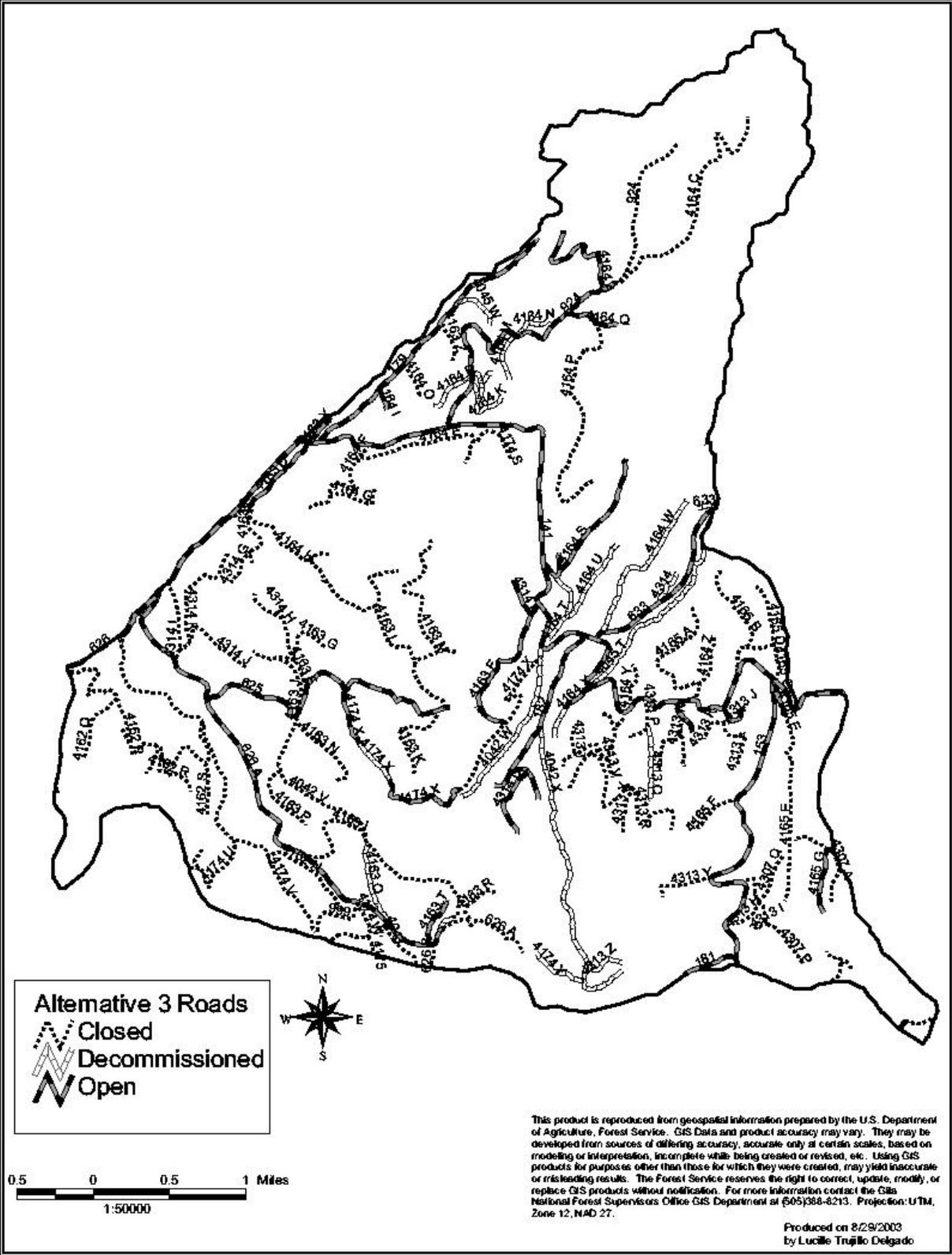
Map 1. Stands and compartments in the Six Shooter Black Deer Project Area.



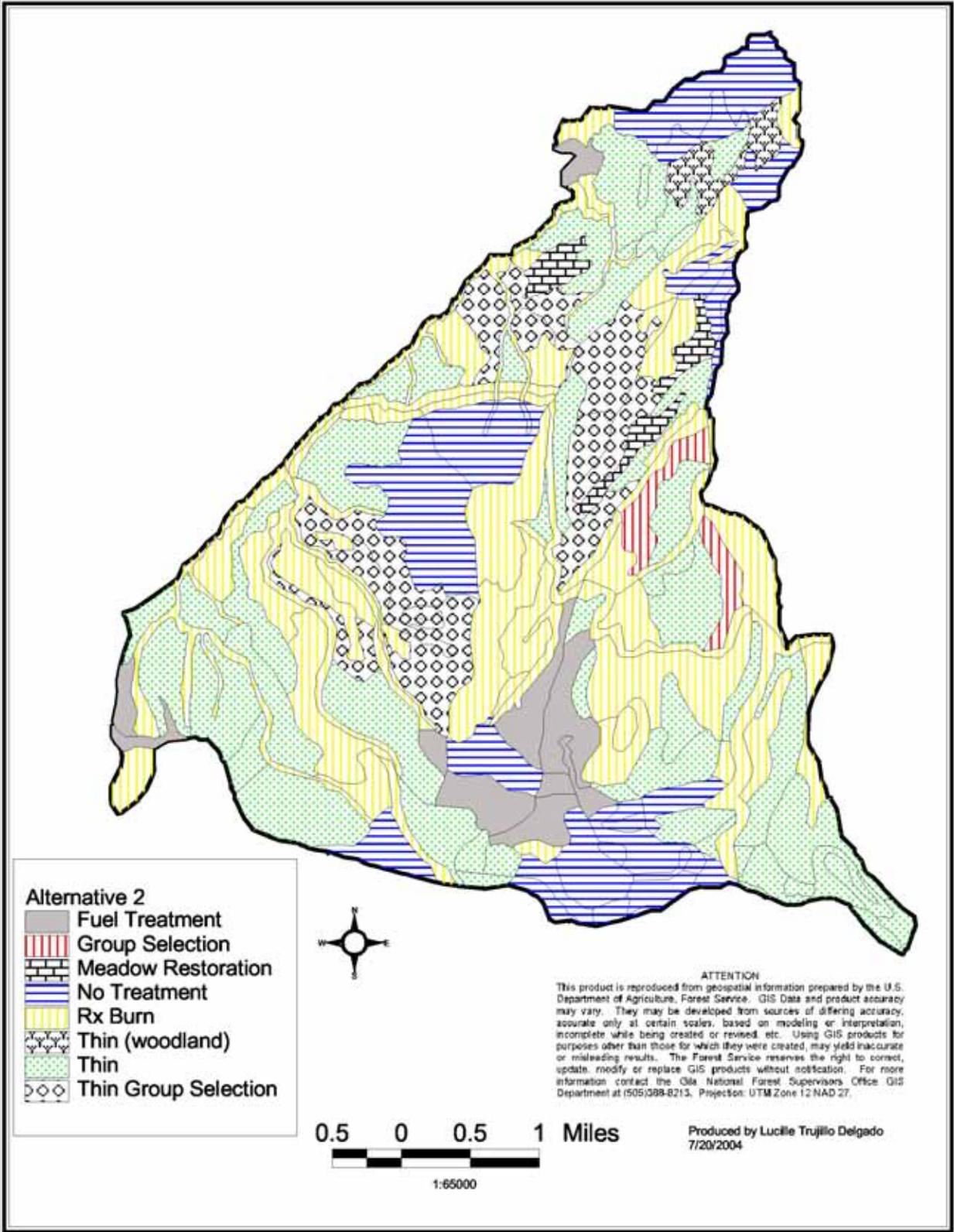
Map 2. Alternative 2 roads in the Six Shooter Black Deer Project Area.



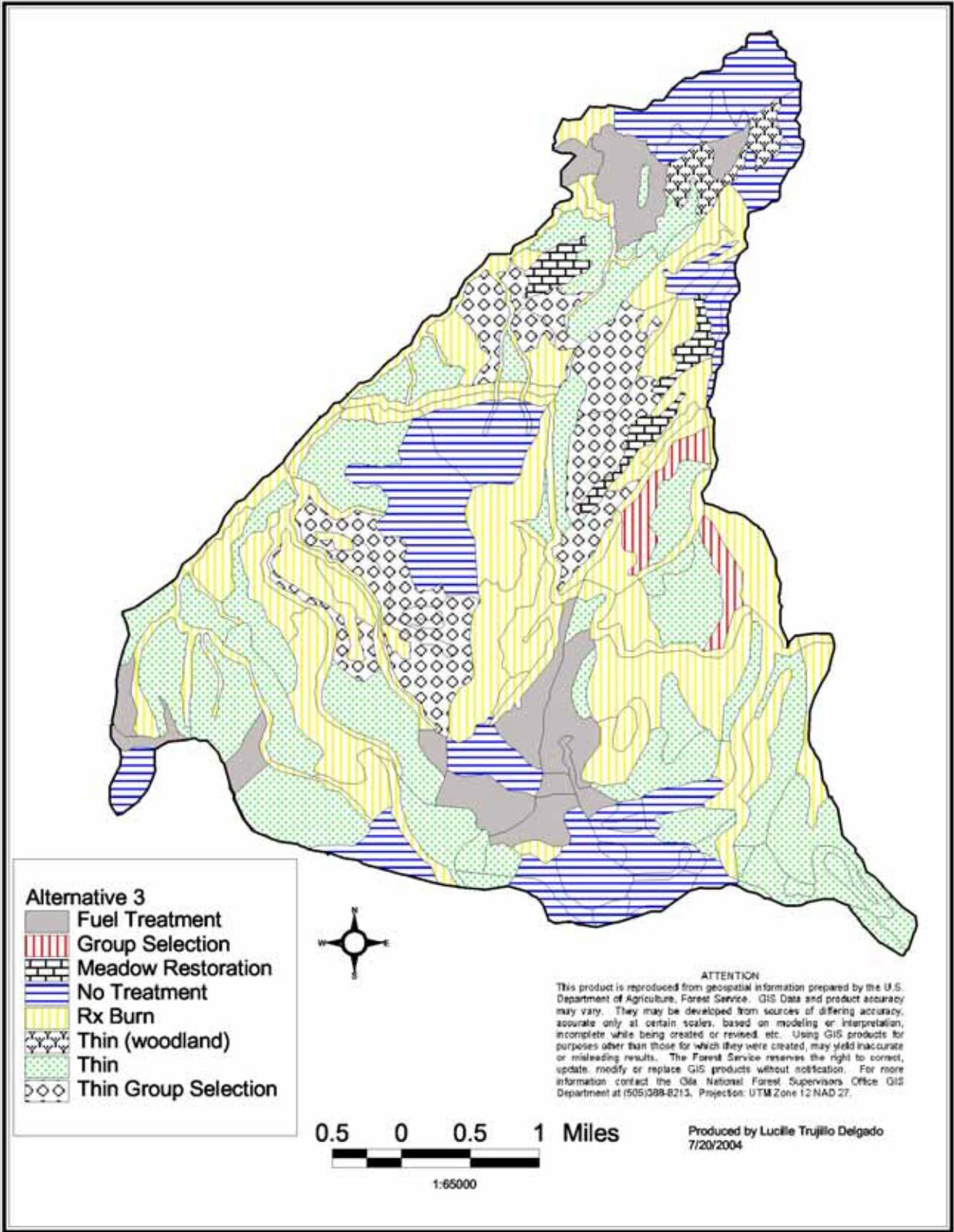
Map 3. Alternative 1 and 3 roads in the Six Shooter Black Deer Project Area.



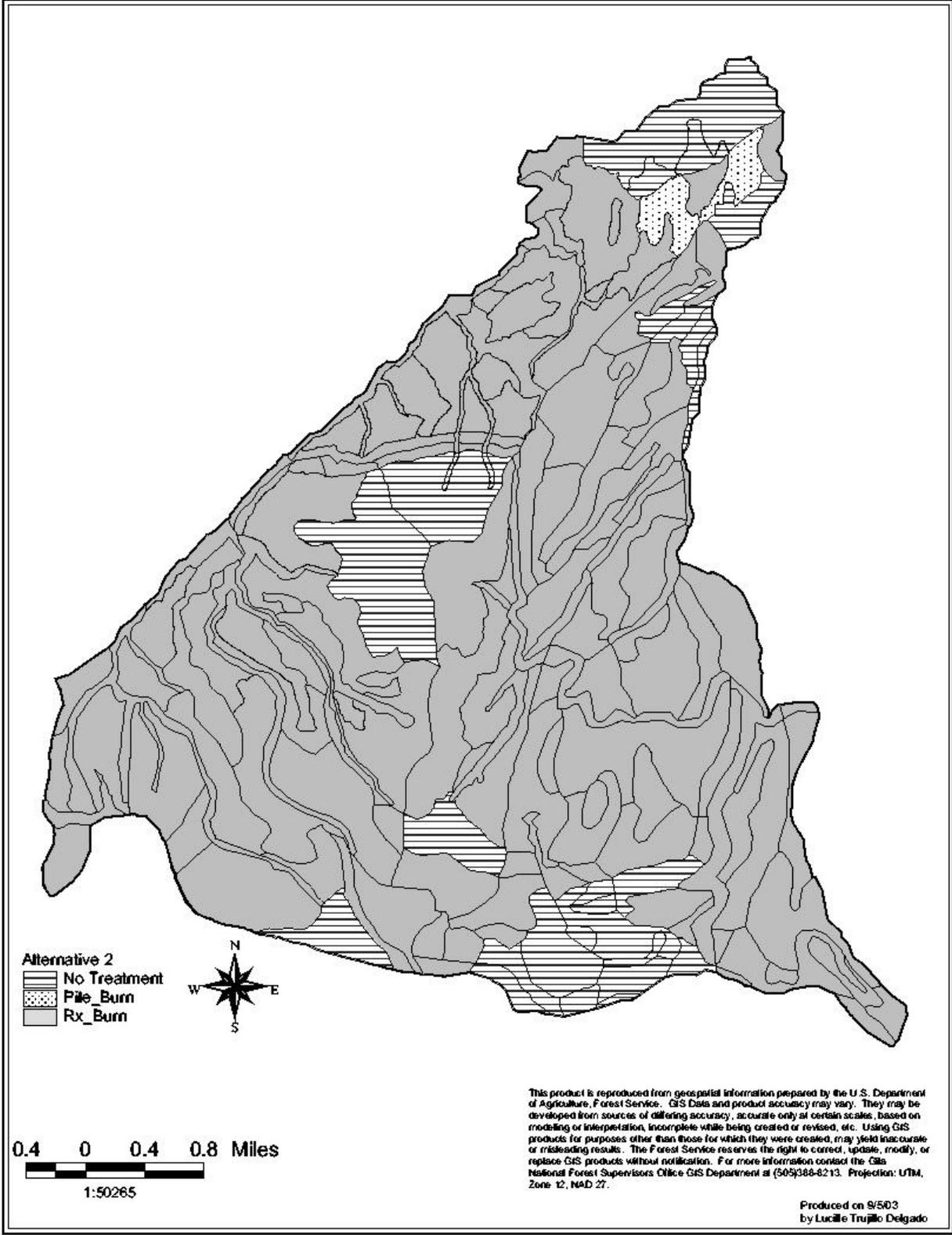
Map 4. Alternative 2 treatments in the Six Shooter Black Deer Project Area.



Map 5. Alternative 3 treatments in the Six Shooter Black Deer Project Area.



Map 6. Alternative 2 follow-up treatments, Six Shooter Black Deer Project Area.



Map 7. Alternative 3 follow-up treatments, Six Shooter Black Deer Project Area.

