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Forest
Service

**Southwestern
Region**



Environmental Assessment for the Woody Ridge Forest Restoration Project

Coconino National Forest

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CHAPTER 1 – PURPOSE AND NEED

Location

The Woody Ridge Forest Restoration Project (Woody Ridge FRP) is located southwest of the community of Flagstaff. Communities immediately adjacent to the project area include: Westwood Estates, Flagstaff Ranch Golf Club, Equestrian Estates, Soggy Bottom, and Black Springs. Several private, county, city, and federal facilities are within or adjacent to the Woody Ridge Project Area and include: The Arboretum at Flagstaff, Naval Observatory, Gore Facilities, Fort Tuthill fairgrounds, Frontier property, Monterola property, and Miller’s property near Rogers Lake/Woody Mountain. In total, there are approximately 31,000 acres within the project boundary. This analysis applies to National Forest lands only; the ownership patterns are described as follows,

Table 1 Acres by Ownership

OWNERSHIP	ACRES
Forest Service	13031.6
State	14117.7
Private	3668.2
County	398.4
City	14.1
NAD (slivers)	19.8
Other Federal	299.4
TOTAL	31549.1

Background Information

Greater Flagstaff Forests Partnership Vision

The Greater Flagstaff Forests Partnership (GFFP) (a nonprofit organization) and the Coconino National Forest have established a Cooperative Agreement to work together to demonstrate new forest management approaches in improving and restoring the ecosystem health of the ponderosa pine forest ecosystem where urbanized areas interface with National Forest lands (Flagstaff Urban/Wildland Interface). This cooperative effort seeks to involve the greater Flagstaff community extensively to develop a community-based solution to local forest health problems. This cooperative project is called the **Grand Canyon Forests Partnership**.

The Woody Ridge FRP is the third 10,000-acre area the Partnership has studied in detail.

The GFFP developed the following vision for the wildland/urban interface around Flagstaff communities.

“In the near future, the wildland/urban interface will be a mosaic of open, park-like forests containing scattered timber stands with higher densities, interspersed with natural

parks which approximate - although do not duplicate - conditions present before Euro-American settlement. Forests and woodlands will be dominated by open growing clumps of large and/or old trees in a matrix of native bunchgrasses, wildflowers, and shrubs. Parks (meadows) will be dominated by native grasses and wildflowers. Periodic low-intensity fires will maintain open habitats, cycle nutrients, and keep wildland fuel levels low, reducing the hazard of catastrophic crown fires. The presence of introduced species will be greatly diminished and native wildlife species will occupy their original niches within the ecosystem, moving freely through established wildlife corridors. A broad spectrum of uses - based upon science and adaptive ecosystem management principles - will be enjoyed by Northern Arizona residents and visitors. Although the majority of the landscape will be restored to more natural conditions, some will be retained in basically its current condition to address specific, well - defined management goals.”

Forest Service Region Three Strategic Action Plan

The Woody Ridge FRP fits within regional priorities for action described in the Forest Service Region Strategic Action Plan. Three key elements of the action plan are,

Restore Ecological Functionality of Southwestern Forests and Rangelands

Current forest and rangeland conditions indicate that these systems are not functioning properly due to impacts on forage from ungulate use and tree densities that far exceed site capacities on a landscape scale within pinyon/juniper, ponderosa pine and mixed conifer vegetation types. Symptoms of ecosystem illness are listed as the current beetle infestations across the pinyon juniper and ponderosa pine types, expansion of invasive plants across the landscape and the increasing frequency of large stand replacement fires.

Proposed regional actions include developing regional strategy to allow for accelerated planning of NEPA sufficient acreage, which addresses tree density issues, have at least 10,000 acres of NEPA sufficient acres ready for treatment on each National Forest with priority on wildland urban interface by September 30, 2004. The Woody project contributes to these regional goals.

Contribute to the Economic Vitality of Communities

Many communities are dependent on forests and rangelands for social, cultural and economic vitality. Proposed regional actions related to this topic include identifying a thinning acreage schedule, which focuses on treatment efforts on wildland/urban interface, and using stewardship contracting authority to accelerate the number of acres thinned in Region 3.

Assist in Protecting Communities Adjacent to National Forests

We (FS) have a responsibility to assist and support communities adjacent to National Forests in achieving a reasonable level of protection from wildfire (and other ‘incidents’), crime, and forest disease/pests, to name some of the primary safety threats. Proposed Regional actions include identifying opportunities for hazardous fuel reduction with the WUI on both federal and private lands.

Greater Flagstaff Forest Partnership Woody Ridge Project Desired Conditions Report

During 2002 the Forest Service and GFFP members reviewed the existing conditions on the Woody landscape, reviewed the Coconino Forest Plan direction and developed a report that outlined needed changes and management opportunities for making those changes. This process included multiple meetings, field trips, and use of survey data collected in 2001 and 2002 (multiple PRD documents).

The Desired Condition Report (PRD#72), shows the Woody Ridge project area experiencing deleterious trends in forest health and is susceptible to disturbances¹ from which it is likely unable to recover. One of these is a stand replacing wildfire.

The Forest Service Interdisciplinary (ID) Team took the Desired Future Conditions and conducted a set of discussions about the Woody landscape that resulted in different emphases in different areas. The purpose and need descriptions below, show the reasons behind placing emphasis on certain objectives in certain places, and gives specific, quantifiable needs statements.

Forest Restoration

The ponderosa pine forest ecosystem historically had relatively benign, low intensity surface fires, which kept more of the landscape in open, park like structures. Many decades of fire exclusion, in combination with past grazing and timber management practices, have allowed these fire-adapted ecosystems to grow to overly crowded stands. With high levels of biomass and high levels of ground fuels, wildfires increasingly result in catastrophic, stand –replacing fires. These conditions threaten both urban dwellings and infrastructure and the forested values people treasure for recreation and spiritual well being.

There is a need to ‘restore’ the Woody area to a condition it once held under natural disturbance processes such as historical low intensity fires. However, the unique climatic conditions, which produced the historical forest, may never be repeated, especially in light of the uncertainty of the global climate. In addition, there are current objectives for the landscape based on the demands of people that are different from (or did not exist) in the historical past.

In 1996, Region 3 Forest Plans were adjusted to include a set of goals, objectives, standards and guidelines that progress the forests towards a desired condition aimed at northern goshawk and Mexican spotted owl habitat. This future condition more closely resembles the historical presettlement landscape (and the vision described by the GFFP above) when low intensity fires were more frequent.

The Management Recommendations for the Northern Goshawk in the Southwestern United States - Executive Summary page 5 states “The present conditions in southwestern ponderosa pine and mixed-species forests reflect the extent of human interference with natural processes.

¹ Disturbance is a natural part of a forest ecosystem.

Given the improbability of returning to the previous frequencies of natural disturbances, some active management (mainly thinning and prescribed fire) will be necessary to produce and maintain the desired conditions for sustaining goshawks and their prey.”

Before low intensity broadcast burning can be implemented, tree cutting is necessary.

Designing Treatments for Forest Restoration

The first GFFP project, Fort Valley, designed treatments to change current conditions toward patterns and environmental functions more like presettlement. The direct evidence of presettlement forest structure was used as a template for guiding the restoration thinning. The end result was very dependent on the forest structure today, the amount of evidences found, and the number of trees retained. Based on these factors, the same treatment could have different results. In some areas objectives to recreate the tree/grass patterns that previously existed were achieved and in some places not (preliminary monitoring comments from FS, GFFP, and Researchers located at Peaks District Office). Eventually, low intensity broadcast burning can occur thus restoring this natural disturbance to the forest ecosystem. A variety of other treatment types were also used on demonstration/research blocks and these included uneven age management and several blends of different treatments.

The next large project area, Kachina Village Forest Health Project, moved away from the use of presettlement evidences to guide thinning and developed specific stand objectives (desired conditions). Treatments were designed to meet each objective. Some examples of objectives included fire hazard reduction near communities and building future northern goshawk and Mexican spotted owl habitat. Stand location (juxtaposition) played a role in setting objectives. For example stands near communities had a greater emphasis on fire hazard reduction objectives. In addition, some objectives were set for the landscape overall for example, a certain percentage of openings. Like the Fort Valley model, this project will result in some areas recreating the tree/grass patterns that previously existed when fire occurred in its natural role and some will not. Eventual maintenance burning will achieve low intensity fire as a more natural disturbance. Most of the Kachina project focused on a thin-from-below even aged treatment design.

The Woody project builds on the methods used in Kachina FHP. Like the Kachina project, the Woody area is also located southwest of Flagstaff communities, increasing the priority for effective fire hazard reduction. The purpose and need section below, describes desired conditions/objectives in more detail. The Woody Ridge FRP includes more acres of uneven age management objectives than either Fort Valley or Kachina FHP.

A note on uneven age management

There are two ways to manage a forest 1) even age – where stands² contain trees of the same age (give or take 30-40 years) or 2) uneven age, with varying numbers and proportions of age classes represented in a single stand. The current condition is primarily even age.

² Stands range in size from about 20 to 200 acres in size

For restricted habitat, the Forest Plan says to emphasize uneven-aged management systems, however, both even-aged and uneven-aged systems may be used where appropriate to provide variation in existing stand structure and species diversity. For the remainder of the of the Woody Ridge FRP area (outside of MSO PACs and woodlands) the Forest Plan also says to manage for uneven age stand conditions.

In developing the Proposed Action, the IDT felt that moving towards an uneven age forest was appropriate where emphasis is placed on fuels reduction modified for Turkey, Northern Goshawk, MSO, and Bear habitat. However, this type of future forest is less appropriate in areas with a highest priority for fire hazard reduction. This is because an even-age system that is open beneath a more uniform canopy provides the greatest reduction in fire hazard. Nor is uneven aged management suited for the Antelope emphasis areas where treatments are designed to provide open grassy corridors interspersed with pine stringers and groups.

Purpose and Need for Action

The overall purpose for the project is to restore forest health³ and decrease the potential for catastrophic stand-replacing wildfire.

One objective for the project area as a whole is to progress towards the Vegetative Structural Stage (VSS) distribution outlined in the Forest Plan. Vegetation Structural Stage (VSS) is a generalized description of the forest growth and aging stages based on the majority of trees in the specific diameter in the stand. Goshawk guides utilize 6 growth and ages stages. If the majority of the stems of a stand (based on basal area) were in the 12-18 inch diameter class, the stand would be classified as a VSS4. The diameter range and description for the vegetation structural stages are:

Table 2 Diameter Range by Vegetative Structural Stage and Description

Stage	DBH Range (inches)	Description
1	0-.9	Grass-forb shrub
2	1.4.9	Seedling-sapling
3	5-11.9	Young forest
4	12-17.9	Mid-aged forest
5	18-23.9	Mature
6	24+	Old forest

³ One definition of forest health used for this analysis includes a forest has the capacity across the landscape for renewal, for recovery from a wide range of disturbances, and for retention of its ecological resiliency while meeting current and future needs of people for desired levels of values, uses, products and services. (America’s Forests 2001 Health Update USDA FS May 2003).

The current VSS distribution is,

Table 3 Current VSS Distribution

VSS	1	2	3	4	5	6
Existing %	<1	<1	59	37	4	0

The desired VSS distribution is,

Table 4 Desired VSS Distribution

VSS	1	2	3	4	5	6
Desired %	10	10	20	20	20	20

One measure of forest health is the amount of time that stands are below density risk threshold⁴.

Currently most of the stands in the area either exceed, or are close, to a level of stocking that has been established as the threshold above which increasing mortality occurs.

The Desired condition is for the project area to be below density risk threshold.

Overall fire hazard is quantified based on height to live crown, dead and down fuel, canopy closure, fuel type, stems per acre, slope and aspect. These factors combine to show fire hazard as extreme, very high, high, moderate, etc.

The current condition is,

Table 5 Current Fire Hazard

Level of Fire Hazard	Existing Condition (acres)
Low	1,206
Moderate	4,132
High	3,152
Very High	2,551
Extreme	1,961

⁴ Another part of natural disturbance patterns is stress related mortality. Stress related mortality risk operates more at the threshold level than as a continuum. In other words, risk does not operate as a continuum whereby some density reduction produces some risk reduction and more density reduction produces more risk reduction. Treatments that reduce densities to 150-300+ trees per acre likely do not lower stress related mortality risks below a significant risk threshold, these stands are still at risk of stand replacement wildfire and stress related insect and mortality losses. Such losses are the result of competition between trees for sunlight, moisture and nutrients. Treatments that reduce densities below 150 trees per acre are at a lower risk for stress related mortality.

The desired condition is fewer acres in extreme, very high and high condition and more acres in low to moderate condition. The location of these objectives is described in more detail below.

Below is background information and specific need statements for three general areas on the landscape 1) Fuels Reduction with a Fire Hazard Reduction Emphasis 2) Fuels Reduction adjusted for MSO, Northern Goshawk, Turkey and Bear Emphasis and 3) Fuels Reduction and Antelope Habitat Emphasis. A map follows with colors that match the treatment objectives.

Fuels Reduction and Forest Health with a Fire Hazard Reduction Emphasis

Dark green on map

Areas immediately adjacent to communities and areas between communities and the base of Woody Ridge and along Hwy 89A should emphasize low wildfire hazard.⁵ Flat to rolling topography within these areas should be managed to transform a “running crown fire” to a “ground fire” where suppression efforts can be more effective⁶. The areas on the following map were chosen for this emphasis by considering common wind direction and speeds, fire behavior and fire suppression resources. These areas were also chosen for a fire risk reduction emphasis, because Woody Ridge itself, located further south, provides important habitat for northern goshawk, Mexican spotted owl, turkey and bear. Maintaining a more dense forest condition on Woody Ridge, increases the importance of providing low wildfire hazard potential between Woody Ridge and the communities. Another factor considered was the presence of numerous roads, trails, and dispersed camping within these areas. Higher recreation use levels occur along the Hwy 89A corridor and adjacent to communities. The desired condition includes continuing to provide for trail linkages between Fort Tuthill, the Arboretum, Rogers Lake and communities, roads for recreation access and dispersed camping. Human use of this part of the Woody Ridge area increases the risk of a human caused fire start.

The fire suppression forces making the initial attack on wildfires that may occur within the project area are wildland fire engines. These initial attack forces can generally take effective suppression action against wildfires with flame lengths of less than 4 feet. Fires with flame lengths longer than 4 feet generally require bulldozers and even air tankers. It might even require an indirect-attack strategy, which requires considerably more distance and time to control the fire. Flame length is also a reliable indicator of fire intensity and the probability of tree mortality. Hence it can indicate how effectively the action alternative meets the other fire-related objectives

Specifically,

Flame lengths – existing condition average 6 feet.

Flame lengths – desired condition average 4 feet or less.

⁵ This area was called URIZ in the Proposed Action Document an explanation of the URIZ follows in the Forest Plan Compliance section.

⁶ Another feature was to establish treatments that would remain effective for 20 years so maintenance burning schedules could be achieved as the entire wildlife urban interface becomes treated.

A side-benefit of reducing wildfire hazard potential is a forest condition that supports future foraging habitat for northern goshawks, promotes grasses and shrubs that support voles and mice, a variety of insects and small birds. Created openings and interspaces between trees allow for regeneration of seedlings and saplings in an environment that more closely resembles historical fire frequency and intensity and progresses towards the mix of size classes as directed in the Forest Plan. Current tree growth is slow and resistance to insect and disease outbreaks is low. To lower competition between trees means faster growth, more large trees for the future and greater resistance to insects and disease.

There are currently no Forest Service system trails within the Woody Ridge FRP area. The desired recreation management for the Woody Ridge Project area is to develop a primary system of non-motorized trails that interconnect with regional trail plans. The desired condition includes continuing to provide for trail linkages between Fort Tuthill, the Arboretum, Rogers Lake and communities, roads for recreation access and dispersed camping.

Specifically,

Trails – Existing Miles of Trails is 0

Trail – Desired Miles of Trails is enough to create linkages to the four features (Fort Tuthill, Arboretum, Rogers Lake and communities).

In the Dry Lake Caldera there is a need for an interpretive trail is to provide for protection of the wetland and wildlife habitat while providing a quality hiking experience, interpretive education, and wildlife viewing opportunities. Currently, there are no access routes into the caldera, and social trails are developing.

Specifically,

There are currently 2-3 miles of poorly located social trails along the caldera rim

The desired condition is a well-located foot trail that provides for use while maintaining the site.

Within the Fire Risk Reduction emphasis areas and along the Hwy 89A corridor, the current number and location of dispersed campsites indicates a fire risk from human caused ignitions. These same sites are causing resource damage such as soil compaction, loss of ground vegetation, and unsightly fire rings. There is a need to reduce the overall number of dispersed campsites and locate remaining sites to lessen fire risk and resource damage.

Specifically,

Dispersed Campsites – existing condition is over 600 dispersed campsites in project area

Dispersed Campsites – desired condition is fewer sites along Hwy 89A and FR535, located for recreation experience, wildlife habitat and watershed values.

Fuels Reduction and Forest Health adjusted for MSO, Northern Goshawk, Turkey and Bear Emphasis

Area of Pink, Orange, Red and Light Green on Map

Landscape level review determined that areas on the slopes and top of Woody Ridge and Fry Canyon should emphasize northern goshawk, Mexican spotted owl, turkey and bear habitat⁷. This is because these areas already contain many of the habitat components required by these species such as large and small oak, slopes and rock outcrops, dense forest, some multistoried stands, and some down logs and snags. In addition, Woody Ridge and Fry Canyon are located further away from Hwy 89 and communities, and receive a low to moderate level of recreation use. There is more opportunity on Woody Ridge and Fry Canyon, for wildlife to use areas undisturbed by human presence, an important factor for nesting and rearing young. Woody Ridge provides for bear and other large animals to travel to outlying areas. The dense forest conditions can support a “running crown fire” which could cause a total loss of habitat for these species.

In order to maintain wildlife habitat now and in the future and to retain important habitat components, there is a need to decrease wildfire hazard potential. The objective is to create some stands where a wildfire cannot transition into a “running crown fire” and other places where a “crown fire” can be forced back into a surface fire. In order to retain denser vegetative features recommended by biologists, there will still be stands where a “crown fire” could initiate and spread through the forest canopy.

Specifically,

Initiate a crown fire – current condition most stands

Initiate a crown fire - desired condition fewer stands.

Limiting motor vehicle access in this emphasis area greatly reduces the probability of human caused fires occurring. Since we are retaining denser forest conditions in much of this area to enhance habitat for certain species of wildlife, it is critical to mitigate that tree density with a reduced probability of human caused fires.

Specifically,

Current condition is semiprimitive nonmotorized settings on portions of Woody Ridge.

Desired condition is to maintain semiprimitive nonmotorized settings in these areas.

Some habitat components are missing or scarce such as large old trees and grassy openings. Current tree growth is very slow and resistance to insect and disease outbreaks is low. Trees that become infected or infested tend to increase fire hazard. The dense forest conditions can support a “running crown fire” which could cause a total loss of habitat for these species. In order to increase resistance to insect and disease outbreaks, there is a need to decrease competition for sunlight and moisture. In order to grow large trees in the future and develop a greater diversity of tree sizes and ages, there is a need to decrease competition, create openings, and promote regeneration of seedlings.

⁷ These areas were referred to as the ‘Forest Restoration Zone’ in the Proposed Action document this name is not used hereafter in the analysis. All treatment areas progress towards a type of ‘restoration’ as described in the Background section of this chapter.

Specifically,

Mexican Spotted Owl Protected Activity Centers (*light green on map*) and northern goshawk post fledgling family areas (*red on map*).

Current Condition: - Susceptible to stand replacing fire.

Desired Condition –Reduce fire hazard within guidelines for these species that guide maintenance of this nesting habitat.

Turkey Habitat (*orange on map*)

Current Condition: Turkey emphasis areas are lacking the optimum mix of forage and cover for turkey and are susceptible to loss from wildfire.

Desired Condition: Increase forage interspersed with cover in a manner that improves turkey habitat. Conduct fuels reduction in a manner that maintains habitat.

Uneven Age Emphasis (*pink on map*)

Existing Condition: Areas are progressing towards even age stands though there is some within stand variability. Currently provides foraging habitat for northern goshawk. The mix of VSS classes is lacking in VSS1, 2,5 and 6 when compared to guidelines for northern goshawk habitat.

Desired Condition: progress towards all sizes and ages represented within a stand (uneven age management). Improve vegetative structural stage distribution.

Fuels Reduction and Antelope Habitat Emphasis

Yellow on map

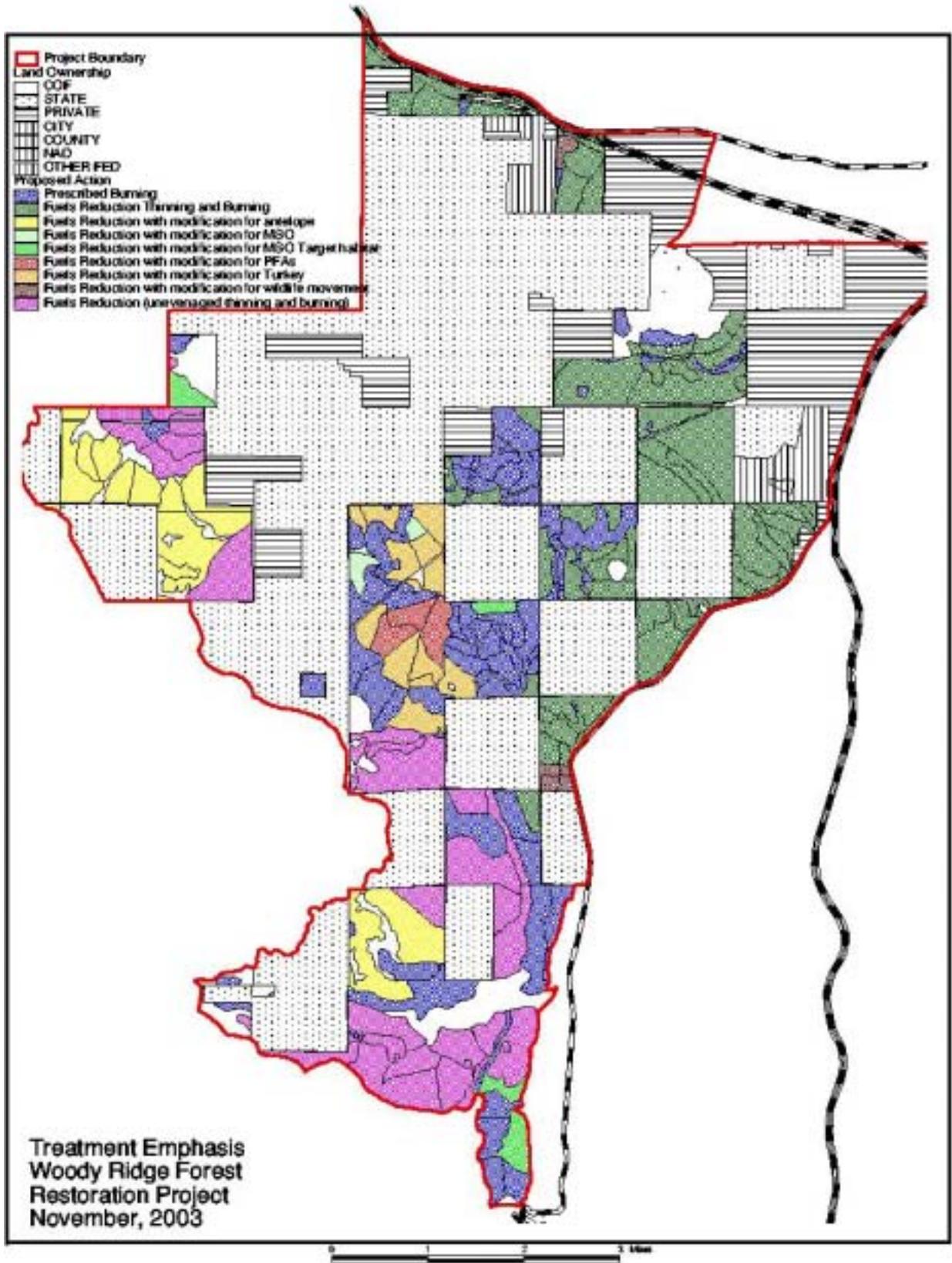
A review of the Woody landscape determined that two areas, one south/southwest of Rogers Lake and the other north and south of Fry Canyon, should emphasize antelope habitat. This is because current conditions include long interconnected mountain meadows that provide open grassy corridors for antelope travel between Rogers Lake and areas south of the Woody Project Area. Radio-telemetry data from Game and Fish Department has shown antelope currently use these areas. The current condition is not at its full potential for meeting antelope needs. Many of the meadows no longer interconnect, there is encroachment of small pines, and the surrounding forested stands are too dense to support grasses and shrubs needed for browse.

A side benefit of meeting antelope objectives in these areas is a reduced wildfire hazard potential, and increased resistance to insect and disease and faster tree growth yielding more large trees in the future. Some of the open areas may regenerate with seedlings and saplings and add to diversity and sustainability to this portion of the Woody landscape.

Antelope areas current canopy cover is 62% distributed fairly evenly across the area. Desired canopy cover is 30% distributed so that long thin stringers of pine trees and scattered groups of trees lie between grassy open corridors and grassy openings and interspaces.

Map of Treatment Emphasis Areas

The following map shows the treatment emphasis areas.



Road System (Common to all three areas described above)

The currently inventoried system contains 78 miles. This inventory contains all roads within the project boundary regardless of jurisdiction and the mileage of the roads that form the boundary of the project. Roads frequently cross over between National Forest and State and private lands. Additional work is required to inventory the user created or non-system roads within the Woody Ridge boundary, which will result in a slightly higher road density.

The desired future condition is a transportation system that provides a quality recreational experience, reduces fire risk, enhances, and protects forest resources is in line with the agency's budget reduces impacts to riparian and meadow habitats and contributes to Forest Plan recreation setting objectives. The recreation setting objectives were developed for Amendment 17 with consideration of wildlife habitat and watershed needs as well as to provide a variety of recreation opportunities on the landscape.

Specifically,

The current road system contains 78 miles of forest service road and additional social roads.

The desired condition is fewer miles in keeping with FS ability to maintain, Forest Plan recreation setting objectives and Forest Plan criteria for roads.

Proposed Action

The proposed action PRD#82 describes actions to be taken to meet the needs for the project area and progress towards desired conditions. Alternative A describes the proposed action.

Decision Framework

This Environmental Assessment documents the results of analyses of the Proposed Action and Alternatives. The District Ranger of the Peaks Ranger District is the Forest Service official responsible for deciding whether or not, where and how to implement vegetation treatments, prescribed fire, recreation trail construction and camping changes, road maintenance and road decommissioning within the Woody Ridge FRP. The District Ranger may select any of the alternatives analyzed in detail, or may modify and select an alternative, as long as the resulting effects are within the range of effects displayed in this document.

This document is not a decision document. Rather, it discloses the environmental consequences for implementation of the Proposed Action (Alternative A) and alternatives to that action.

An EA means a concise public document for which as Federal agency is responsible that serves to: 1) briefly provide sufficient evidence and analysis for determining whether to prepare an environmental impact statement (EIS) or a finding of no significant impact, 2) aid an agency's compliance with the (NEPA) Act when no EIS is necessary and 3) Facilitate preparation of a

statement when one is necessary. (40CFR1500). Additionally an EA can serve as a tool for informing the public of the project thereby meeting the twin aims of NEPA to analyze and disclose information.

A Decision Notice and Finding of No Significant Impact, signed by the Peaks District Ranger will document the decisions made as a result of this analysis.

This project does not propose to amend the Forest Plan. A detailed discussion of Amendment 11 requirements and how this project progresses towards those requirements is displayed in chapter

Public Involvement

This project was listed in the Schedule of Proposed Actions. One Proposed Action Scoping Letter was mailed in May of 2002 to a mailing list of people who expressed interest in the project, or who were otherwise determined to be interested or affected (adjacent landowners, organizations, agencies). One Open House was held at City Hall on Wednesday, May 21st from 6:30 to 8:30. A short article and notice for the meeting printed in the Arizona Daily Sun on May 9th. Twelve people signed in at the Open House. A powerpoint presentation was given (PRD#86) and Forest Service staff were on hand to answer questions and review maps.

Eighteen letters and e-mails were received. One individual from MCS Stables visited the Peaks District Office to discuss the project and pick up a copy of the proposed action.

Issues

No Significant Issues were identified. Comment Analysis is located in PRD#110. Many of the nonsignificant questions and concerns were incorporated into the specialist reports and Chapter 3 of this EA as well as being addressed in the comment analysis.

No comment suggested a different juxtaposition of treatment emphasis (placing an Antelope emphasis on Woody Ridge as an example).

Although the issue of diameter limits (16 inch cap) was determined to be nonsignificant, the Peaks District Ranger chose to carry forward an alternative related to this issue.

CHAPTER 2 - ALTERNATIVES

Alternative Development

One tentative issue was raised about the effects of the proposed action on squirrel habitat. The Interdisciplinary (ID) team conducted further review and an alternative related to squirrel habitat was considered, but eliminated from detailed study as described in the section below.

Alternatives Eliminated from detailed study apply to the range of alternatives described in NEPA (CEQ Forty Most Asked questions Concerning CEQ NEPA Regulations – printed in Federal Register, Volume 46, Number 55, pages 18038-18038 3/23/81).

One commenter requested an alternative be considered to implement a cap on tree cutting to limit the removal of trees greater than 16 inches in diameter. The ID team reviewed this idea and determined a nonsignificant issue under NEPA. However, this alternative was developed and analyzed in detail because of social/political concerns. The comment suggested this alternative implement a cap on areas outside of ½ mile from private land. However, analysis of the Woody area determined that objectives for fire hazard reduction go well beyond ½ mile. Therefore the alternative includes a cap for the entire project area.

Another commenter requested an alternative that, 1) uses funds for homeowner education, technical assistance, low-interest loans and grants to clear flammable vegetation from around homes, 2) thins heavily within ½ mile of structures to achieve 40% canopy closure, 3) conducts prescribed burning in the fall 4) reduces nonnative and invasive weeds, closes roads, suspends grazing and bans off road vehicles until understory recovery occurs after thinning treatment. This alternative would not use road construction or reconstruction nor use heavy equipment. This suggested alternative was not considered by the ID team for the following reasons, 1) other agency and private efforts are underway to reduce fire hazard on private lands, 2) analysis has shown that protecting structures requires fire hazard reduction in an area greater than ½ mile especially southwest of communities, 3) prescribed burning is already a key part of Alternative A, 4) nonnative and invasive weed control is a part of all alternatives, suspending grazing is not necessary for understory recovery and standard procedures are in place to ensure grazing occurs only when appropriate, 5) objectives cannot be achieved without using heavy equipment as appropriate.

Other commenters requested FR75 remain open. Amendment 17 of the Forest Plan described a semiprimitive nonmotorized setting for the area surrounding FR75. This comment was not analyzed further.

Another comment requested that livestock grazing management be considered as part of the Woody decision and that grazing be deferred for a set number of years after treatment. This comment was considered outside the scope of this analysis and not significant. Livestock grazing can occur regardless of the treatment chosen, and livestock grazing does not preclude the thinning and burning treatments. There are separate processes in place for managing livestock to maintain understory plants. For example, range readiness inspections are conducted prior to livestock entering an allotment each year. If the understory in recently thinned or burned stand

has not become established then livestock may skip that pasture that year. In addition, 35% utilization standard is applied and monitoring occurs related to this standard. Vegetative recovery is weather dependent and any limit set on grazing may not be adequate and/or necessary given weather conditions.

As a result of some comments and additional ID teamwork after the Proposed Action was released, refinements were made to the design of the Proposed Action as it was developed in more detail to become Alternative A. These adjustments are noted in the Alternative A description.

Alternatives Considered and Eliminated from Detailed Study

Squirrel Habitat

An alternative to leave more trees in some areas for squirrel habitat was considered but not analyzed in detail because review of environmental effects were not found to be significant because squirrel habitat guidelines in the Forest Plan are met on the project area as a whole.

Public Comment:

Closed canopied ponderosa pine forest with interlocking crowns is optimum habitat for tassel-eared squirrels. Dodd et al. (1998) warn that aggressive thinning combined with implementation of the goshawk management guideline (Reynolds et al. 1992) could harm tassel-eared squirrel habitat and jeopardize its genetic viability, especially if high quality squirrel population source areas are inadvertently logged because surveys have not been done.

Analysis: A review of estimated VSS distribution after treatment under the proposed action suggests there will be some nonfunctional habitat after treatment in the fire hazard reduction and antelope emphasis areas. The determination of nonfunctional habitat was based on a squirrel traveling 1/3 from closed canopy areas to open canopy areas to forage (phone call to Norris Dodd by Deb McGuinn). For this exercise we also assumed the State lands would, in the future, mimic National Forest land patterns with more dense forests in the canyons and steep slopes and less dense forest on the flat to rolling terrain.

For the Woody project area overall, the Proposed Action is estimated to meet the minimum Forest Plan requirement of 20% of potential habitat capability for Abert squirrels in 10K Blocks as determined by habitat capability monitoring using the Regional Habitat Quality Index Model.

Squirrels are expected to continue to occupy the Woody Ridge FRP area. There will be some negative effects to nesting habitat and some loss of habitat in portions of the Woody Ridge area.

An alternative that would increase tree density and canopy closure in the fire hazard reduction emphasis and antelope emphasis areas was considered but not analyzed in detail. Additional information about effects to squirrel habitat is located in chapter 3 of this EA.

Alternatives Considered In Detail

Three alternatives are considered in detail, Alternative A (proposed action) and Alternative B (No-action) and Alternative C (16 inch cap).

Alternative A (Proposed Action)

Alternative A – Vegetation Treatments

Approximately 8597 acres will have vegetation treatments where activities include thinning and one or more of the following, slash piling, slash removal, chipping, and pile burning.

All treated areas have objectives for decreasing wildfire hazard potential and improving resistance to insects and disease. In some areas there is an emphasis on wildfire risk reduction. In others, wildfire risk reduction was tempered to provide for a variety of wildlife species in the Woody Ridge and Fry Canyon areas. A few areas have an emphasis on antelope habitat, which matches fire risk reduction goals.

There were a few adjustments from the Proposed Action document that was mailed on May 1st, 2003. In the Proposed Action, some of the stands on Woody Ridge with an emphasis on turkey habitat had a wildlife hiding/thermal cover objective of 15%. In Alternative A these stands will have a cover objective of 30%. One stand, north of Fry Canyon was changed from an uneven age emphasis to no treatment⁸.

Terminology Change: In the Proposed Action document, areas with a fire risk reduction emphasis were called part of an “Urban Rural Influence Zone (URIZ)” that extended beyond the ½ mile area described as the URIZ in Amendment 17 of the Forest Plan. The Forest Plan allows for treatments with a fire risk reduction emphasis on MA3 lands outside of the ½ mile URIZ described in Amendment 17. However, because this term is causing confusion, Alternative A will use the term Fire Hazard Reduction Emphasis.

The Proposed Action described the Woody Ridge area as the Forest Restoration Zone. For Alternative A, each emphasis is described (turkey, owl, uneven age, goshawk).

⁸ When the 100-300 yard buffer around Fry Canyon was applied, the majority of this stand was found to be within the no-thin, no-burn buffer.

Acres by treatment emphasis are,

Table 6 Acres by Treatment Emphasis

ALTERNATIVE A	ACRES
Antelope Thin/Burn	1286.0390
Burn Only	2945.3900
MSO PAC Thin/Burn	70.7320
PFA Thin/Burn	227.6870
Target Thin/Burn	251.5760
Turkey Thin/Burn	659.6710
Fire Risk Reduction Thin/Burn	3493.5000
Wildlife Movement Thin/Burn	88.9370
Uneven Thin/Burn	2519.4420

MSO PAC = Mexican Spotted Owl Protected Activity Center
 PFA = northern goshawk post fledgling family area
 Target = Mexican Spotted Owl Target Threshold habitat

Where vegetative management is practiced, reentries into mechanically treated areas are generally not planned for long periods of time (ranging from 15 to 30 years between treatments). Any prescriptions initiated during the planning period (two years) would likely carry through until the next entry cycle (15 to 30 years). Reentry occurs under separate site-specific NEPA analysis.

Forest product removal (of any kind) is designed to maintain or restore ecosystem health and desired conditions. The use of National Forest land products, are a means for achieving ecosystem management objectives.

Additional information about vegetation treatments is in the Design Features and Mitigation Measures section. The table below describes the various treatment emphasis areas. An explanation of Stand Density Index follows the table.

Table 7 Woody Forest Restoration Project – Alternative A - General Description of Treatment Types – All Stands have objectives for decreasing fire risk., improving diversity and improving resistance to insect and disease. Treatment types are identified in this table by their emphasis.

Treatment Type	Opening Size (Acres)	Opening % ⁹	Cover patch size (unthinned patches)	Cover %	Matrix Description
Fire Reduction Emphasis (3,494 acres) <i>Dark Green on map</i>	½-4	20%	Variable depending on fire management needs	0% within ½ mile 0-15% remainder of these stands ¹⁰ which fall outside of the ½ mile urban/rural influence zone but inside the Fire Management Analysis Zone 1U.	30-40% canopy cover (cc) 40-80 basal area (BA) Even-age management 15-35% Stand Density Index (SDI) Uneven spacing – leave clumps have very little interlocking crowns Leave clumps mostly upper range of size and age Fastest progression to large trees
Wildlife movement within Fire Reduction emphasis area (89 acres) <i>brown on map</i>	½-4	20%	¼-4 connected to promote wildlife travelway as determined through coordination with G&F	0-15% connected to promote wildlife travel	Hand thin from below
MSO PAC (71 acres) <i>light green on map</i>	No new openings created Existing is 1/8 to 1/4	Existing is 1%	Most of stand is cover	Most of stand is cover	Thin up to 9 inches 60% cc 150+BA Estimate 45% max+ SDI Includes 100 acre nest deferral areas Proposed treatments within owl PACs are solely for fire risk abatement and improvement of MSO habitat.

⁹ Where 20% openings are listed they include 10%VSS1 Grass/Forb Shrub either nonstocked or over time containing seedlings less than 1 inch. An additional 10% openings are created to provide for future VSS2 seedling/saplings with trees 1 to 4.9 inches. There may be additional openings on the landscape in the form of mountain meadows (management area 9 in the Forest Plan). Meadows range in size from a few acres to a 100+ acres. Mountain meadows are maintained where they occur and pine encroachment may be removed from within mountain meadows. In addition, grass forbs and shrubs may grow in the interspaces between trees but these interspaces are not counted as part of the percent of openings. Openings may be designed in irregular shapes and aligned to be across the prevailing wind direction to enhance fire hazard reduction objectives.

¹⁰ Dense clumps may be retained only as it fits fire hazard reduction objectives.

Treatment Type	Opening Size (Acres)	Opening % ⁹	Cover patch size (unthinned patches)	Cover %	Matrix Description
MSO Target (252 acres) <i>medium green on map</i>	No new openings created – existing is 1/8 to 1/4	Existing is approximately 1%	Most of the stand is cover	Most of the stand is cover	Light thinning 60%+cc 150+ BA Estimate 45% max+ SDI Target/threshold habitat is managed for future nesting and roosting habitat, and is a subset of restricted habitat.
*Turkey Emphasis (660 acres) <i>orange on map</i> *some are also MSO restricted habitat ¹¹	1/4-2	20%	1/4-4	30%	40-60% cc on average 50-100 BA 25-35% max SDI Uneven age management Uneven spacing – leave clumps often have interlocking crowns Leave clump trees a variety of size and age
PFA (228 acres) <i>red on map</i>	1/2-4	20%	1/4-4	30%	50%+cc 80-100 BA 25-35% max SDI Uneven spacing – leave clumps often have interlocking crowns Leave clump trees a variety of size and age Thin from below smaller trees around the yellow pines to improve tree longevity.
*Uneven Age emphasis ¹² (2,519 acres) <i>Pink on map</i> *some are also MSO restricted habitat	1/2-4 (1/4 – 2 acres in restricted habitat)	20%	1/4-4	30%	40-60%cc 50-100 BA 25-35% SDI Uneven age – leave clumps often have interlocking crowns Leave clumps are a variety of size and age Leave clumps range in size form 1/2 to 4 acres Includes no-thinning buffer along the rim of Fry Canyon for approximately 300 feet.

¹¹ Restricted habitat is mixed conifer, pine-oak and riparian forests outside protected areas for MSO.

¹² There is a 100-300 foot buffer around Fry Canyon of no thinning or burning that falls within the unevenage stands.

Treatment Type	Opening Size (Acres)	Opening % ⁹	Cover patch size (unthinned patches)	Cover %	Matrix Description
Antelope Emphasis (1,286 acres) <i>yellow on map</i>	100-300 feet corridors using and connecting existing meadows ¹³	30-50%	¼-4	4% ¹⁴	10-30%cc Variable BA some 40 some unthinned SDI does not apply Connect existing meadows with wide and open corridors Remove meadow encroachment Scatter some lopped slash in meadows Improve bottom wire of fences for antelope
Burn Only ¹⁵ (steep slopes, unthinned stands) (2945 acres) <i>dark blue on map</i>	N/A	N/A	N/A	N/A	Re-introduce fire and reduce fire risk as much as possible using burn only techniques. Primarily on steep slopes.
No Treatment (Mountain Meadows ¹⁶ , Fry Canyon and the interior of the Dry Lake Caldera) <i>White on map</i>					Mountain meadows are not listed for treatment. However during implementation of broadcast burning there may be occasions with fire travels through all or a portion of some of these meadows. The Dry Lake Caldera and Fry Canyon are not burned.

¹³ Unlike other openings these areas may have occasional large trees within them.

¹⁴ Although not necessary for antelope – this cover will contribute to overall amount of cover on project area and help meet Forest Plan guide for 10% hiding cover on project area.

¹⁵ There is a 200-300 foot buffer of no burning around Fry Canyon. Fry Canyon and the Dry Lake Caldera (interior) are not part of these acres, as they will not be burned.

¹⁶ Mountain meadows are Management Area 9 in the Forest Plan.

Explanation of Stand Density Index

Maintaining sustainable forest conditions depends mainly on the density of trees. An effective approach to relative density is based on Reineke's (1933) stand density index (SDI) that integrates trees per acre and mean diameter. SDI expresses the actual density in a stand relative to the theoretical maximum density possible for trees of that size. Unless the number of trees is reduced by thinning or natural disturbance, relative density will eventually approach the maximum and density-related mortality results. What is useful about SDI is that it can be used to measure competition thresholds, which is very important in a moisture limiting system.

- Less than 25% MAX SDI = little competition for moisture, nutrients, sunlight. This would reflect "Pre-settlement condition."
- 25-35% MAX SDI= tree-to-tree competition begins. Within this range we can meet most of standard and guidelines, i.e. meeting Northern Goshawk guidelines and reducing fire potential.
- 35-60% tree-to-tree competition increases with less individual tree growth. Stands are at HIGH risk for bark beetle outbreak and stand replacing fire. Expect much lower growth rates.
- Above 60% tree-to-tree competition so great that individual trees not receiving enough moisture, nutrients, and sunlight. Stand is at EXTREME risk for bark beetle outbreak and stand replacing fire. Expect very little or no tree growth.

SDI is a guide not a target.

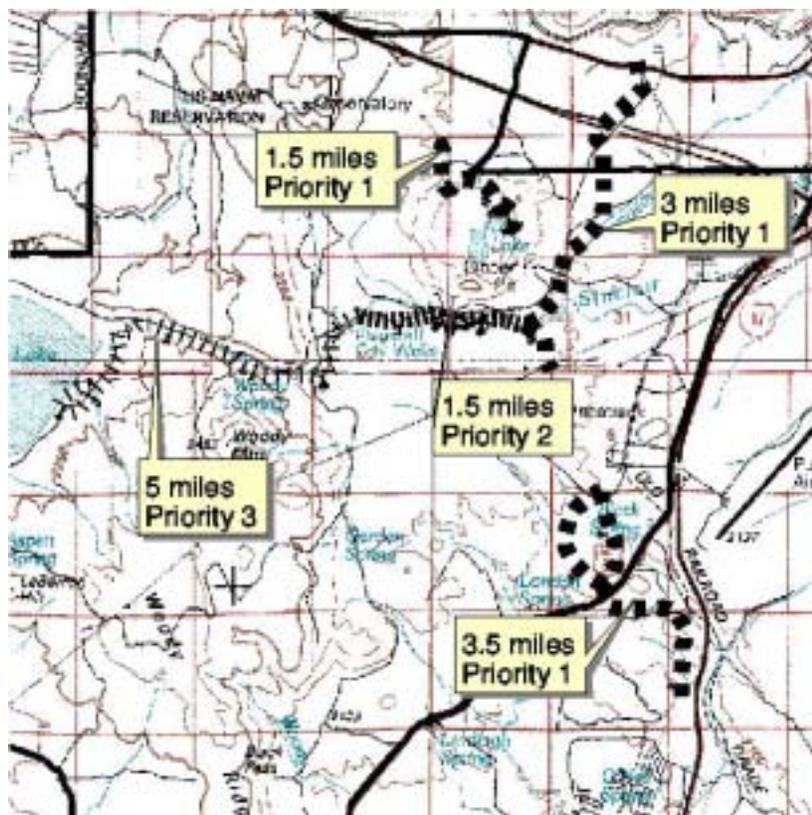
Alternative A – Prescribed Fire Treatments

Approximately 2945 acres are slated for broadcast burning¹⁷ only – see dark blue areas on map.

Approximately 8745 acres are slated for broadcast burning after thinning and slash disposal is complete. This low intensity prescribed burning would be conducted periodically (every 3 to 10 years) over many years as 'maintenance burning' to mimic fire's natural role to cycle nutrients and to maintain wildfire risk reduction objectives. We will attempt to burn 1,000 acres per year. Burn blocks are located on the ground using roads and topographic breaks. Burn blocks average 100-500 acres in size. Hand lines are used where needed. Burning may occur at any time of the year when winds, fuel moistures, humidity and other factors are suitable for burning. Aerial ignition techniques are not proposed.

Fry Canyon and the interior of the Dry Lake are excluded from burning. In addition, a 200-foot buffer around Fry Canyon is excluded from burning.

¹⁷ Broadcast burning is a low intensity ground fire over a fairly large area. Fire is laid down in strips and allowed to creep across the landscape.



Alternative A – Trails

The location of trails was adjusted from those shown in the May 1st proposed action to better meet the intent of creating community trail connections.

Approximately 14.5 miles of new trail will be constructed. This includes 1.5 miles of foot trail within the Dry Lake Caldera and approximately 13 miles of multi-use nonmotorized trail connecting communities to Fort Tuthill, the Arboretum and Rogers Lake.

Approximately 3 miles of social trail around the Dry Lake Caldera will be obliterated. In addition, where social trails

bisect the newly constructed multi-use trails, the social trails will be obliterated for a short distance where they intersect.

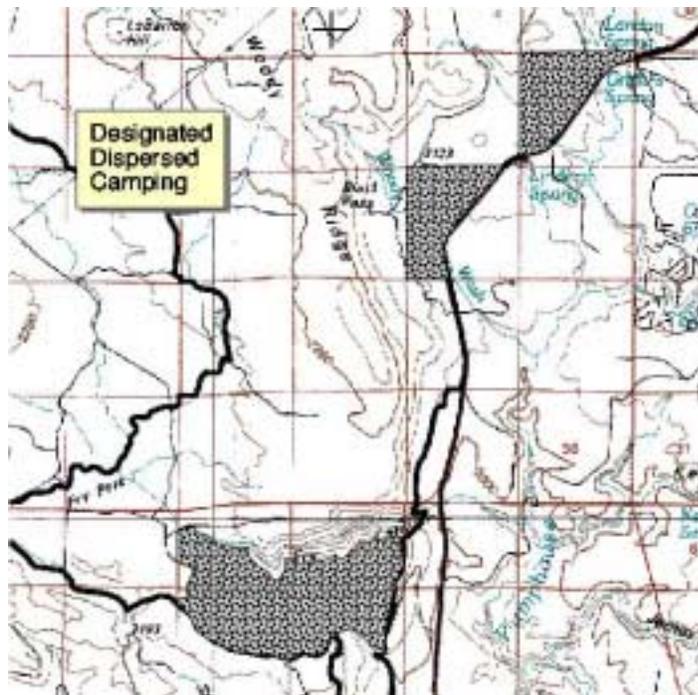
The location of the trail within the Dry Lake caldera begins at a parking area located along Kiltie Lane where the Flagstaff Ranch Development deeded a small parcel to the County. From the parking area, Flagstaff Ranch developers are requesting an easement for a trail from the Arizona State Land Department that would provide access onto National Forest Lands within the caldera. The Forest Service trail would be constructed across the far north end of the large meadow and then climb the eastern slope of the caldera. At a large rock outcropping, once marked as the 15th green and tee, the trail would loop back.

Motorized trail planning is not part of the scope of this analysis.¹⁸ Additional information on trail design is located in the Design Features and Mitigation Measures section of this chapter.

¹⁸ Motorized trail planning is outside of the scope of the Woody Ridge FRP. To adequately address motorized trail planning, which ideally and effectively requires 50-100 miles of trail, a landscape-scale effort is necessary. However, roads identified to remain open throughout the Woody Ridge FRP provide driving for pleasure opportunities, hunting access, and motorized users a chance to safely engage in their recreational activity and minimize impacts to sensitive habitat and forest resources.

Alternative A – Camping

Approximately 1068 acres will change from general dispersed camping to camping in designated sites only. See map.



Alternative A – Recreation Opportunity Spectrum (ROS)

Alternative A will progress towards the ROS objectives outlined in Amendment 17 of the Forest Plan by implementing road, trail and vegetation management actions that create the desired recreation settings. For example, within the Semiprimitive nonmotorized objective areas, some roads are administratively closed. Vegetation management results in a naturally appearing landscape where evidence management activities are subordinate to the landscape.

A portion of the project area does not have ROS objectives because it fell outside of the Flagstaff/Lake Mary Ecosystem Analysis area. Alternative A will set objectives for these acres as shown on the map.

Acres by ROS objective are listed below and shown on the map which follows, Roaded Natural¹⁹ – 4548 acres, Semiprimitive Motorized²⁰ – 3117 acres, Semiprimitive Nonmotorized²¹ – 5348 acres.

¹⁹ Roaded Natural (RN) - Paved or gravel all-weather roads, moderate number of encounters, moderate management presence, rustic facilities, moderate to high degree of “naturalness”.

²⁰ Semiprimitive Motorized (SPM) - Primitive roads and trails, low number of encounters with other people, subtle and limited management presence, rustic facilities constructed of native materials, high degree of “naturalness” with infrequent evidence of human activity.

Alternative A – Road Management

The Proposed Action included an administrative closure of the road to the Woody Mountain lookout tower. This included moving the gate from its current location down to the junction of FR231. Because this junction is located on State Trust lands, this proposal has been dropped and the gate will remain in its current location.

Under Alternative A, there are approximately 56 miles of open road, 38 miles of which are for high clearance vehicles (Level II roads that are generally not surfaced) and 17 miles for passenger car travel (Level III generally surfaced). Approximately 1.14 miles of open road per section will be maintained.

Approximately 5 miles of National Forest system road will be obliterated over time²². Over time, all non-system²³ roads in the area will be obliterated. Roads to be obliterated may be converted to trail if desirable to do so under a separate NEPA analysis. Road obliteration will include ripping, seeding, re-contouring in some situations, placing rocks, boulders, and slash on the obliteration to achieve the desired condition of not having vehicles drive the roads in the future.

Approximately 17 miles of road will be administratively closed either by gate, or by other methods that block the entrance of the road such as placing boulders, earthen berms or slash. Of the 17 miles of road closed by gate approximately 15 miles have gates currently in place. Closed roads would provide access for administrative purposes only unless otherwise permitted by the District Ranger or Forest Supervisor.

The area west of Westwood Estates accessed by the FR 68 will be gated and placed under an administrative closure.

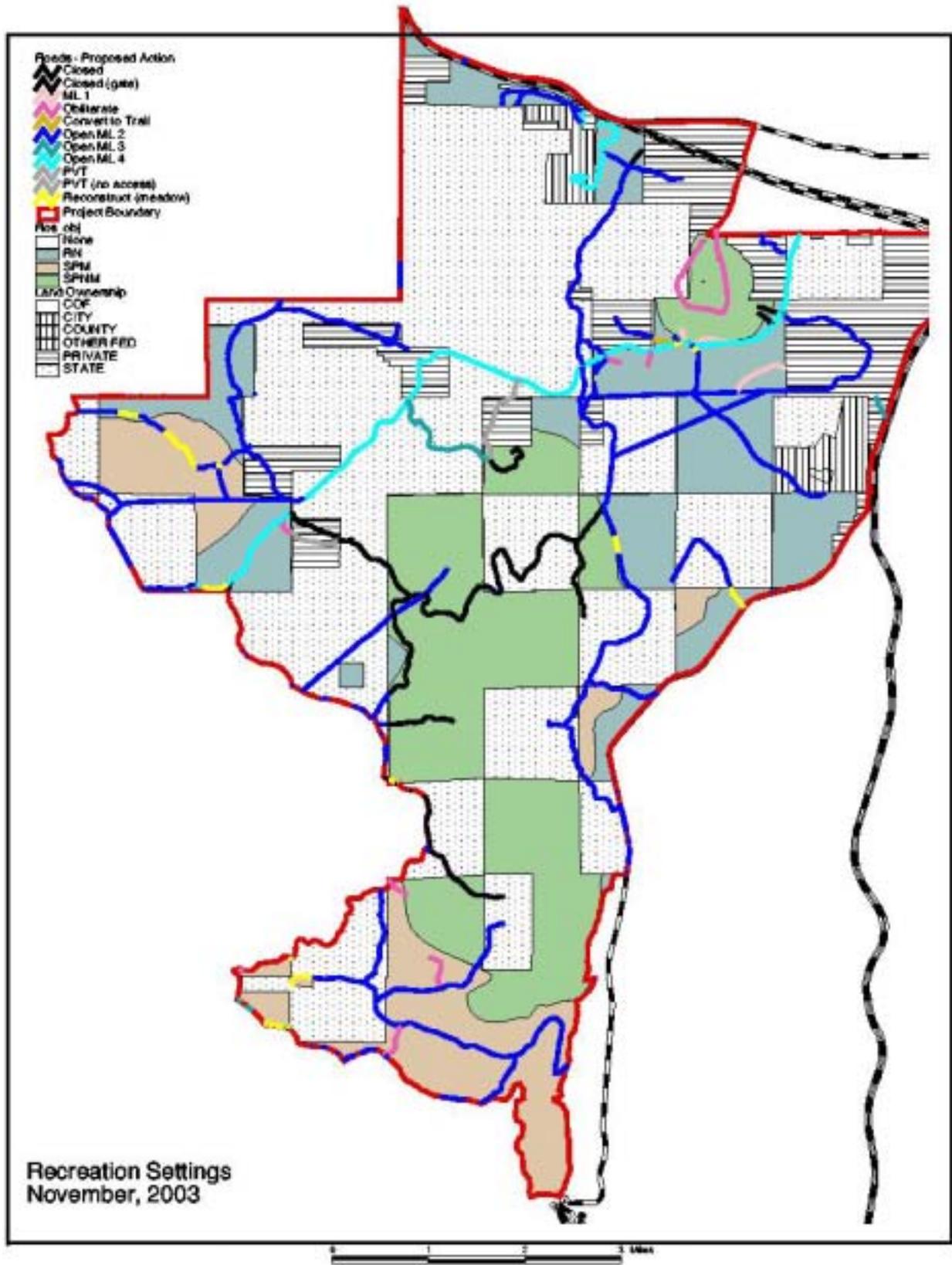
Multiple small segments of road that pass through meadows will receive ‘turnpiking’ and reconstruction to correct drainage (currently 2.4 miles of road reconstruction are identified).

The large powerline that runs through the project area will continue to have an open road underneath it that is very rocky and provides only unadvertised technical 4x4 opportunity. To date use of the powerline road is very low.

²¹ Semiprimitive Nonmotorized (SPNM) - Trail access only - no motorized vehicles, low number of encounters with other people, subtle and limited management presence, scarce rustic facilities constructed of native materials, high degree of “naturalness” with infrequent evidence of human activity.

²² Road obliteration may occur after thinning treatments are complete and as a part of the thinning work.

²³ Non-system roads are usually user-created or ‘social’ roads.



Alternative A – Nonnative and Invasive Plants

Treatment of nonnative and invasive weeds has been refined from the proposed action as described below. In addition, more refinements may occur throughout the life of the project, as weeds are located. A weeds risk assessment will be completed and added to the project file.

This project will meet the objectives of the Three Forest Invasive Weed Strategy (Coconino NF 1998) through mitigations of vegetation treatment timing, pre treatment control, and sound prevention practices. Invasive exotic plants (weeds) were documented on more than 50% of total transects in the 2001 Woody Ridge Forest Health Project Resource Assessment area (PRD#20). Individual species were mapped by occurrence on number of transects: *Bromus tectorum* on 48.6%, *Linaria dalmatica* on 44.4%, *Cirsium vulgare* on 3.1%, *Carduus nutans* on .2%, *Centaurea diffusa* on .2%, and *Marrubium vulgare* on .1%.

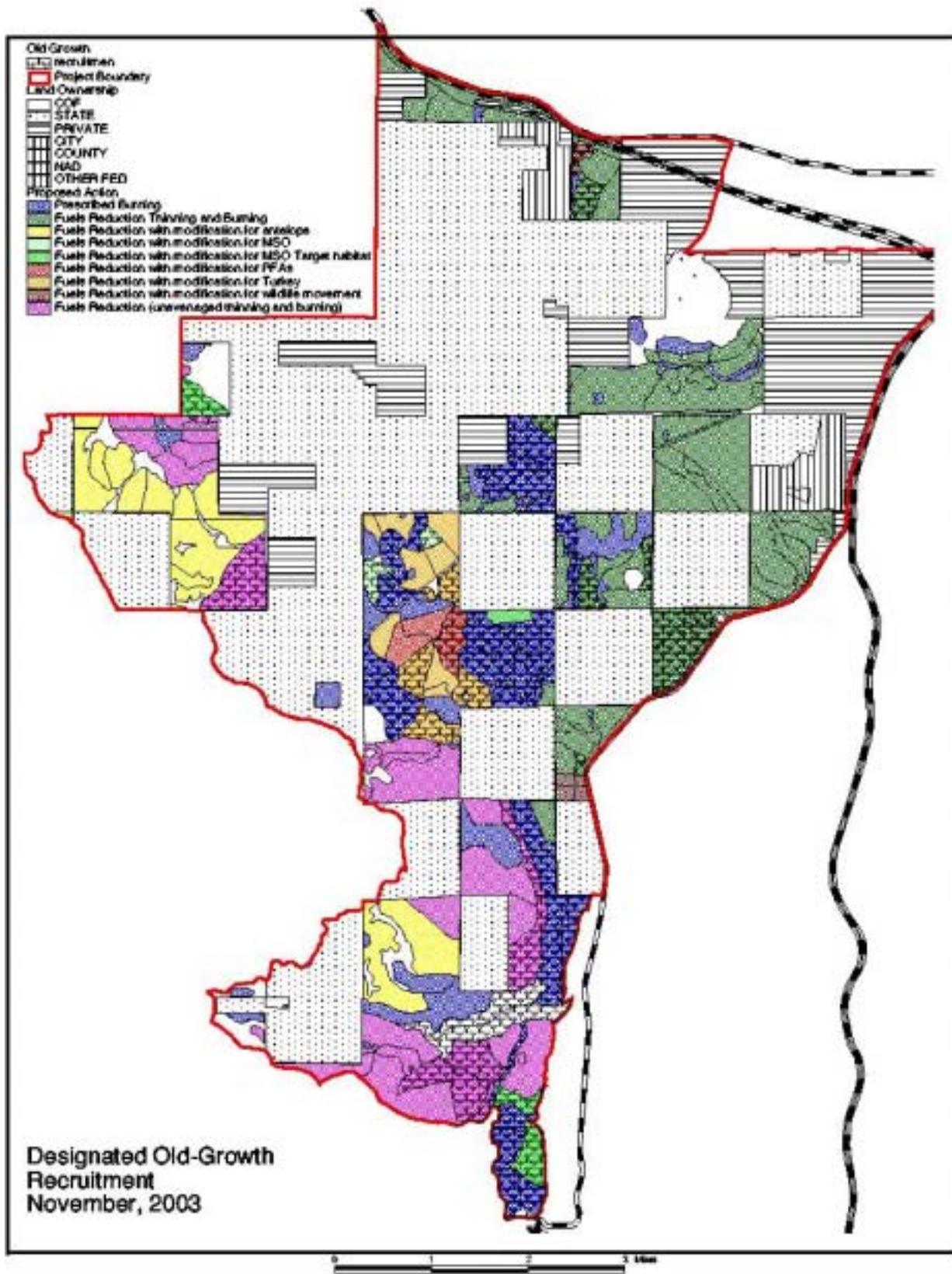
Based on species biology and site conditions, the species with the highest potential to cause environmental and economic damage under this project would be first *Carduus nutans* and *Centaurea diffusa* because they have been shown to be very invasive in similar areas and we have the best chance to eradicate them from this area. The second most damaging species are *Bromus tectorum* and *Linaria dalmatica*, due to the current extent of these populations this project would focus on containing these species and preventing further spread. It will be more efficient to control the *Cirsium vulgare* populations and prevent their spread and lastly only treat *Marrubium vulgare* in areas of rare or sensitive habitats.

Additional information is located in the Design Features and Mitigation Measures of this chapter.

Alternative A – Old Growth Designation

The Forest Plan states, seek to develop or retain old-growth function on at least 20 percent of the naturally forested areas by forest types in any landscape. Consider the effects of spatial arrangement on old-growth function, from groups to landscapes, including de facto allocations to old-growth such as goshawk nest sites, MSO PACs”. Twenty percent of the landscape has been designated for developing old growth in a manner that links stands and considers bear habitat needs as well as northern goshawk and MSO. The future condition of the designated old-growth areas will vary depending on the emphasis area, for example stands in the fire hazard reduction emphasis areas will have a large number of old trees but in a single story stand with grass/forbs and pockets of seedlings in the understory. Old-growth stands with an uneven age emphasis will have multistory, uneven age characteristics over time.

The following stands have been designated for old-growth as described in the forest plan.



Alternative B – No Action

Under Alternative B, no thinning or prescribed burning would occur throughout most of the project area. A few places would continue to have broadcast burning as approved under earlier NEPA decisions. New Forest Service trails would not be planned or constructed and all social trail use would likely continue. The current road network would be in place and maintenance of open Forest Service roads would take place as part of the regular District maintenance schedule. Few roads would be obliterated. The administrative closure gates would remain in place where they currently occur. Dispersed camping continues to occur throughout the project area. Some weed eradication may occur through forestwide volunteer efforts.

Alternative C – 16 inch cap

Alternative C would be the same as Alternative A except a 16-inch cap would be placed on all thinning activities.

Design Features and Mitigation Measures Common to Alternatives A and C

The following list of design features and mitigation measures was refined from the Proposed Action. Some items listed in the proposed action did not apply to this project. Some items have been added since the proposed action was developed. This list is to be used as a guide for implementation. Adjustments may be made on the ground as needed and with interdisciplinary coordination.

When 16 Inch Plus Trees Are Likely To Be Cut Under Alternative A.

Blackjack ponderosa pine greater than 16 inches may be cut under Alternative A only to meet objectives outlined in this EA. One example is to achieve canopy closure and opening objectives related to fire hazard reduction and forest health. Another example is to provide for regeneration and grassy openings for future within stand diversity. As described under Alternative A, uneven age systems are skewed towards retention of large trees.

Timing of Implementation

Prioritize project implementation by treating stands adjacent to communities first, and then progressing south and west thereafter.

When designing treatments consider wind direction, for example, openings or cover patches may be aligned against prevailing winds when appropriate.

When creating openings consider the swails, low spots along drainages that would promote the best grasses and understory plants.

Table 8 Summary of Timing Restrictions

Reason	Activity Restricted	Timing Restriction
PACs	All	March 1 through August 31
PFA's ²⁴	Thinning	March 1 through Sep 30
Turkey Nesting and Brood Sites	Thinning and Burning	April 15 through June 30
High Use Recreation Areas	All	Memorial Day, 4 th of July, Labor Day Weekends

Bald Eagle

To adequately address the timing of prescribed burning treatments near the roost in the Dry Lake caldera, conduct site visits during spring and autumn migration periods and during the winter roosting season to determine current occupancy and use of this roost. If the roost is not in use during that time period monitored, then broadcast burning may occur in sites 117/6 and 117/11 from September 1 through February 28 without affecting roosting bald eagles.

MSO Restricted Habitat

Each of the different treatment emphasis areas contains stands that are MSO restricted habitat because they contain pine with oak (≥ 10 sq.ft/ac) or mixed conifer. There is a total of 3,505 acres of restricted habitat. Where restricted habitat occurs, objectives include the following items, most of which are also applied outside of restricted habitat as a standard part of the project. Items include, manage to provide continuous replacement nest habitat over space and time, incorporate natural variation, such as irregular tree spacing and various stand/patch sizes, into management prescriptions and attempt to mimic natural disturbance patterns, maintain all species of native vegetation in the landscape, including early seral species, allow for variation in existing stand structures and provide species diversity, both uneven age and evenage systems may be used as appropriate, allow natural canopy gap processes to occur, thus producing horizontal variation in stand structure, emphasize retention of existing large oak and promote growth of additional oaks, retain all trees greater than 24 inches diameter, retain hardwoods, large down logs, large trees and snags.

Table 9 Restricted Habitat by Treatment Emphasis

Treatment	Goshawk/PFA Even-aged	Goshawk/Turkey Uneven-aged	Fuel Reduction Even-aged	Fuel Move Even-aged
Acres	132	1828	341	59

Per the Forest Plan rotation ages for even age stands is greater than 200 years. Alternative A does not set rotation ages within these stands. Uneven-aged treatments were modeled using a 40-year cutting cycle.

²⁴ Unless surveyed ahead of time and no occupancy determined

MSO PACs

- No activities within ¼ mile of Mexican spotted owl nest/roost sites from 3/1 to 8/31.
- Implement no thinning or burning treatments within the MSO 100-acre activity centers (mapped in GIS arcview project)
- A fire management plan will be prepared for slash pile burning and broadcast burning applications within PACs. Employ low intensity fires during broadcast burning.
- Impacts from smoke are to be reduced by coordination of timing and type of burning with wind direction, topography, time of year and distance to PACs, particularly around Fry Canyon.

Northern Goshawk

- According to the Forest Plan, avoid burning the entire post-fledging family area (PFA) in a single year. Low intensity ground fires are allowed in PFAs, however, a fire management plan will be prepared for slash pile burning and broadcast burning for nest stands within PFAs.
- If nest stands are occupied, delay broadcast burning and associated activities during March 1 through September 30 in the nest stand.

Cooper's Hawks

- If nest sites are occupied, delay burning activities April 1 through August 31 in the nest stands to minimize impacts to this species.

Other Raptors (if found)

- Implement no-cut buffers according to the Forest Plan

Wildlife Cover

- The Woody Ridge area is a major north-south wildlife movement corridor with connections to the east, south, west and north of the ridge. To retain connections between movement corridors, it is necessary to retain hiding and thermal cover in the following areas. Cover areas are to be a minimum of 200 feet wide.
- Maintain wildlife cover on steeper slopes in sites 106/2 and 107/7, as these areas are important components of the north end connection for the wildlife movement corridor.
- Maintain minimum of 30% wildlife cover in the north half of site 174/15 and along the drainage where sites 174/3, 15 & 16 meet up. These sites are part of a pre-designated wildlife travelway from Fry Canyon to Sterling Canyon.
- As stated in the Forest Plan, maintain hiding cover at least 200 feet wide around dependable waters, such as tanks, springs and seeps.

Designated Dispersed Camping

- Do not place designated dispersed campsites within ¼ mile of the wildlife movement corridor in south half of Section 23, T20N, R6E.
- Do not place designated dispersed campsites within the north half of location/site 174/15 or within ¼ mile of the drainage that is located where sites 174/3, 15 & 16 meet up.
- Do not place designated dispersed campsites within ½ mile of Fry Canyon.

Recreational Trails

- Eradicate weeds prior to trail construction is imperative to prevent further weed dispersal.
- Sections of trails that cross through the Dry Lake MSO PAC are to be constructed outside the MSO breeding season. No construction activities during March 1 through August 31.
- Construction of the portion of the Dry Lake Caldera Nature Trail that is inside the caldera but outside the MSO PAC is to be constructed outside the MSO breeding season; no construction activities from March 1 through August 31.
- Social trails, where intersecting with newly constructed trails, will be obliterated and naturalized to minimize further use of these user-created trails, and focus the travel pattern on established system trails.

Obliteration of Existing Roads and Temporary Roads and Social Trails

- Prior to obliterating existing roads and trails, conduct surveys for noxious weeds and sensitive native plants in order to avoid spreading weeds or damaging sensitive native plant populations.
- Note timing restrictions described above (table 8).

Temporary Roads

- Temporary road construction will be necessary for the proposed thinning. Approximately 8 to 10 miles of temporary roads will be required.

Batched-Programmatic Biological Opinion

- Refer to the Mandatory Impact Minimization Measures (Section II.C) and Recommended Minimization Measures (Section II.D.) in the WUI Batched-Programmatic Biological Opinion (USDI Fish and Wildlife Service 2001). These include a wide array of measures regarding activities in and effects to threatened and endangered species habitat in order to minimize effects from thinning and burning treatments and associated activities.

Peregrine Falcon

- Impacts from smoke can be reduced by coordination of timing and type of burning with wind direction, topography, time of year and distance to the peregrine falcon nesting area.

Cultural Resources

- Protect cultural resources through the creation of an Archaeological Clearance Report for the Woody Ridge Forest Restoration Project. This report has documented the archaeological inventory, results of consultations with Native American Tribes, and compliance with the National Historic Preservation Act of 1966, as amended. The report will contain site-specific protection measures for implementation, including monitoring requirements.
- Archeological Site Protection - There are 17 sites and 11 segments of railroad where fuels reduction is needed (150 acres). Prescribed burning, hand thinning, mechanical thinning, and hand piling will be used to protect historic sites. The team archaeologist has made a site-specific recommendation for each site and will coordinate recommendations during project implementation.

Homeowners

- Consider input from homeowners immediately adjacent to thinned stands.

Powerlines

- Where wood poles exist on electrical transmission line, and where thinning is occurring as described in the Alternatives, remove trees from underneath and around the wood poles for a distance of about 30 feet on either side. Incorporate this feature into the design of the thinning to achieve objectives.

Bug Kill

- Adaptive management strategies²⁵ will be emphasized to account for changes from potential beetle kill and the contribution of beetle kill trees to increase snag and log densities.

Wildlife general

- A buffer approximately 100 to 300 feet in width will left unthinned and unburned for turkey, bear and other wildlife movement around the edge of Fry Canyon.
- Incorporate into design, thinning around the old trees (pine and oak) to reduce competition for light, moisture, and nutrients to improve their longevity.
- When marking trees for thinning exclude faders or lightning struck trees in order to have those trees for future snags.
- Logs may be created where needed to mitigate loss during prescribed fire.

Turkey Stands

- Duff and debris will be raked away from the base of roost trees prior to broadcast burning where litter depth layers are greater than 12 inches. Also within these stands, the wildlife biologist and burn boss will coordinate, in the field, whether or not to conduct spring burning in these areas.
- 30% cover in small openings ¼-2 acres and cover patches ¼ acre to 4 acres. Work with what the stands provide i.e. some stands will be more open with less than 30% cover available, other stands are more dense and will have more cover available and will likely reach the 30%. We would like the flexibility to add more than 30% in some stands, if adjacent areas are extremely lacking (some are). This additional cover also maintains connectivity. When selecting cover consider the size and placement of patches, and the goal of limiting site distance (150 feet) for the birds, key in on rock outcroppings, logs, shrubs or other features, try to use the best of the existing cover (high canopy closure – 60% plus if you've got it).
- 20% openings also small in size – many small openings ¼ to 1 acre located along drainage bottoms when possible where we expect good forage response. In the stands that are already open, arrange openings along the edges if they are adjacent to cover stands. Openings are more valuable if they are immediately adjacent to cover.

²⁵ If a new patch of beetle-killed trees occurs, the patch will be evaluated, especially as it relates to the total number of snags and logs in the project area. If treatment actions are needed, they may be undertaken if they meet the desired conditions and environmental effects described for this analysis. If actions are necessary that are not within the parameters of this project, then new NEPA would be initiated.

Yellow Pines and Other Mature Trees

- No large old Gambel oak or yellow pine will be cut
- Burn damage to large mature trees will be avoided. Burning techniques will protect mast-producing trees (i.e. large alligator juniper, large pine, and oak), and turkey roost trees throughout the project area. Burning techniques will minimize heat effects to the feeder roots and cambiums of mature trees.
- Old ‘yellow barked’ pine trees will have duff raked away from the bases where high litter depth layers (greater than 12 inches deep) may result in girdling and mortality.
- Burn plans will mitigate oak loss by moving large material on the ground from around the base of trees, raking duff from the base of oaks where litter depth exceeds 12 inches, and avoidance of slash piles near oaks.

Location of Slash Piles

- Piles shall be so located that burning will not damage standing live trees, snags, down logs or physical improvements such as fences, poles, buildings, signs, tables, grills and cattleguards.
- Slash treatments will avoid piling of large logs existing on the landscape prior to treatment.

Soil and Watershed Protection

- Best Management Practices (BMP’s) will be incorporated into activities as a means of preventing or reducing the amount of pollution generated by nonpoint sources to a level compatible with water quality goals. BMP’s will be incorporated into all project activities. Authority and guidance to prescribe and implement BMP's is defined in FSM 2501, 2530, FSH 2509.22 and the Forest Plan. BMP’s are listed in the Soil and Water Quality Report (PRD#125). They include items related to the following,

24.11 - Use of Terrestrial Ecosystem Survey Timber Harvest Limitation Rating

24.13 - Limiting the Operating Period of Timber Sale Activities

24.18 - Tractor Skidding Location and Design

24.2 - Log Landing Location

24.21 - Erosion Prevention and Control Measures During Timber Sale Operations

24.3 - Slash Treatment in Sensitive Areas

41.3 - Obliteration of Roads

Additional BMP’s are located in PRD#125 Soil and Water Quality Report

Sensitive Plants

- Prescribed fire control lines and temporary roads will avoid known populations of sensitive plant species.
- Surveys for sensitive plant species will be conducted prior to trail and temporary road construction. If sensitive plant species are found, layout will avoid plants.
- Thinning slash and burn lines will not be placed within known sensitive plant populations. Appropriate firing techniques will be used to minimize the effect of burning on known populations

Nonnative and Invasive Weeds

- Locate the small populations of Musk Thistle and Diffuse Knapweed and treat them ahead of thinning treatments and burning treatments (dig up and bag them - Gps location of site for followup).
- If there are flowering weed plants landings then cut and bag the plants.
- Map landings during operations to re-visit and look for certain weeds – i.e. cheatgrass and Dalmatian will be on the increase after treatment but look for diffuse knapweed, musk thistle and others. The timber sale administer will have responsibility for this for the time prior to contract termination. The fuels crew will have responsibility for this during pile burning phases. Share findings with the Weed Coordinator in the supervisor's office.
- Vehicles that stay on roads are usually clean of weeds
- Vehicles that leave roads should be cleaned as needed.
- There is the option of small piles on the landscape if log length system is used – buck it into logs where felled and create piles. Coordinate to leave equipment in weedy areas until that part of the project is done.
- Broadcast burning will propagate cheatgrass and Dalmatian. When creating burn blocks consider locations of weed species. As like the thinning contract – consider lumping high weed areas into one burn block and low weed areas into another area.
- When draglines are created clean equipment prior to entering weedfree area. Don't drag line from weed to nonweed areas. If your going to have to drag line in weeds then do it last and then equipment will only need to be cleaned once.
- Use additional measures as needed according to the situation on-the-ground.
- Develop a weed plan for the Dry Lake Caldera and the Woody project area.
- Native perennial species or annual rye grass seeds will be used where re-seeding of grasses and herbaceous vegetation is needed after ground disturbing activities. Sterile non-native species or non-seeding methods, such as weed-free straw, may be necessary for sites where annual rye grass persists.

Snags and Logs

- Snags will be lined before broadcast burning²⁶.
- Loss of large logs will be minimized through ignition techniques and possibly fire-lining. The timing of prescribed burning (spring burning) may also reduce the loss of logs.

Recreation

- No slash piling in dispersed camping sites.
- No log landings in dispersed camping sites.
- No thinning activities on heavily used holiday weekends, such as Memorial Day, Fourth of July, or Labor Day.

Visual Management

- Adjust unit boundaries to avoid straight edges around units. Develop marking prescriptions, which “feather” the edges of units. Look for opportunities to define unit boundaries with

²⁶ Current snag densities are below forest plan guidelines and current beetle killed trees are minimal in this project area.

natural features such as canyon edges or drainages and avoid using roads or fence lines as unit boundaries when those features are straight.

Dry Lake Caldera Implementation

Construct the interpretive trail (class 3 or 4 trail for pedestrian or foot-traffic only) and do not connect this foot trail to the other trails in the project area. Use the trailhead location on Kiltie Lane where the Flagstaff Ranch Development deeded a small parcel to Coconino County. The trailhead would accommodate approximately 5-8 passenger vehicles and act as a portal for local residents; however, it would not allow for large school buses or travel trailers. Coconino County may pursue additional parking at a later date on the opposite side of Kiltie lane or ask the FRGC to allow school bus parking on their property if needed.

Install signs and natural or constructed barriers will be used as necessary to encourage hikers to stay on the designated trail and restrict access into sensitive areas; especially near wildlife viewing platforms and where social trail proliferation is likely to occur.

Provide interpretive messages about wetland protection, wildlife habitat, leave-no-trace ethics, nonnative and invasive weeds, and historical and archaeological features. The method of interpretation has not yet been determined, but may include signs, self-guided numbered stops accompanied with a brochure corresponding with designated locations, pamphlets, guided tours, or a combination of methods. In addition, primitive benches may be constructed out of logs and located at appropriate sites along the trail.

Assist Coconino County in asking FRGC for a short connector trail from the Flagstaff Ranch Community near the northeast corner of the caldera meadow (middle of section 25, T. 21N. R6E.) to allow residents access to the nature trail and discourage backyard social trails (pending concurrence with Flagstaff Ranch).

Separate from this decision and at a later date, continue to participate in trail planning discussion for State sections. Cooperate with State Land Department and Fish and Wildlife Service and Coconino County and Centennial Forest to progress towards an appropriate route for trail access from the Arboretum area to the caldera. This access should be located away from sensitive nest/roost stands within the MSO PAC²⁷.

The trail tread accommodates foot travel with an area up to 6-8 feet where invasive weeds and other vegetation will be cut back as a normal part of trail construction²⁸. This lessens the chance of a person picking up weed seeds and transporting them up slope to weed free areas.

²⁷ A connector trail to the Arboretum was discussed and considered, but not yet decided. Portions of a social trail currently used by the Arboretum to access the caldera is located within MSO Protected Activity Center, and that is of great concern. The Arboretum offers a great public education component for the caldera and would provide a good portal to the area; however, access through the sensitive wildlife habitat is a challenge. There may be an option to relocate the trail to a less sensitive area towards the northwest through State land, but that would require further analysis and collaboration with Arboretum officials and other interested parties.

²⁸ A volunteer opportunity is to become involved in trail maintenance to cut back invasive weeds should they grow back into the trail tread.

Naturalize social trails and fireline that follow the caldera rim on the southwest, south and east sides will be obliterated. Social trail obliteration will focus on the entrance points first, and then the entire length of the trails. Trail obliteration will occur only from September 1 through February 28, which is outside the MSO breeding season. Additionally, signs will be strategically located to inform forest visitors that these social trails are closed to all use for wildlife habitat and resource protection.

Implementation Coordination Common to Alternatives A and C

Thinning – Wildlife Cover

The wildlife biologist will assist in laying out cover patches and will incorporate Forest Plan direction for placing cover adjacent to dependable waters and key openings, and at least 200 feet wide. The wildlife biologist along with the silviculturist will determine if light thinning is needed within cover areas or not.

Thinning – Turkey Habitat

Site-specific implementation, such as the layout of cover, marking, and thinning, will include assistance from the Arizona Game and Fish Department and the USFS Wildlife Biologists. The monitoring objective will be to assure the sites include cover patches. The district wildlife biologist along with timber staff and silviculturist will assume responsibility for the completion of the task.

Thinning – MSO PACs

The key to implementation of site-specific thinning includes layout and assistance during thinning by U.S. Fish and Wildlife Service, USFS, and Arizona Game and Fish Department personnel.

Thinning – Goshawk PFA

The key to implementation of site-specific thinning includes layout and assistance during from the wildlife biologist and silviculturist. The objective of monitoring this thinning is to assure canopy closure guidelines are met.

Wildlife Movement Corridor

The site-specific layout will include assistance from the Arizona Game and Fish Department and USFS Wildlife Biologists. The monitoring objective is to assure the site includes adequate cover within the movement corridor. The district wildlife biologist along with timber staff will assume responsibility for the completion of the task.

Trails and Signing in the Dry Lake Caldera

The site-specific layout will include input from the Friends of Dry Lake. Objectives include protection of the wetland and wildlife habitat. Signs and trail design should discourage off-trail hiking. See Dry Lake Caldera section above.

Herbaceous Understory Recovery

The Annual Operating Instructions for grazing allotments will be adjusted as needed to allow for recovery of naturally occurring herbaceous communities. Range conservationists will conduct monitoring following both thinning and burning treatments. Monitoring will be conducted via

observations to determine readiness for livestock use. These observations will include species maturity (seed heads) and abundance. Grass species, including Arizona fescue (*Festuca arizonica*), mountain muhly (*Muhlenbergia montana*), and squirrel tail (*Sitanion hystrix*) will be the key species used in these observations. Noxious weed monitoring will occur during these observations to detect changes in distribution and or abundance.

Monitoring Common to Alternatives A and C

Post-treatment monitoring of MSO PACs to determine occupancy will be conducted for the Fry and Woody Ridge MSO PACs²⁹. The district wildlife biologist will assume responsibility for the completion of the task.

The recovery plan for Mexican spotted owl directs monitoring to determine if the effects of projects were predicted correctly for habitat components such as logs, snags, basal area, and type of fuels. By checking these habitat features, adjustments in techniques may be proposed. The method for achieving this monitoring goal is Forest Service Region 3 protocol for microhabitat monitoring. This protocol calls monitoring of restricted and target threshold habitat, PACs and protected habitat. There are different protocols for the different types of habitat. This monitoring occurs prior to treatment, immediately after treatment (within 3 years). Certain target stands are monitored again in 10 years. Various district staff contributes towards accomplishing this task under direction of District wildlife biologists³⁰.

Monitor and report the number of MSO protected activity centers impacted. The report should include the number of acres treated and type and intensity of treatment that occurred within each activity center. Report the number of acres, type of treatment, and treatment areas within each watershed per year. The reporting will be coordinated through the Forest Service Southwest Regional Office. This monitoring is a required measure included in the WUI Batched-Programmatic Biological Opinion (USDI Fish and Wildlife Service 2001). The district wildlife biologist will assume responsibility for forwarding information to the Forest biologist.

²⁹ These PACs were chosen because a large portion of the PAC would be treated with broadcast burning.

³⁰ On other projects field crews from the fuels, biology and timber shops have contributed to this task. .

Comparison of Alternatives

Summary of How the Alternatives Meet the Purpose and Need

Purpose and Need	Alt A (proposed action)	Alt B (no action)	Alt C (16 inch cap)
Flame lengths reduced to four feet or less in Fire Hazard Reduction emphasis areas	3 feet	5 feet (more in some places)	3 feet (same as A)
Probability of tree mortality from fire within the Fire Hazard Reduction Area	10 to 16 percent among large trees (12 to 20 inches dbh).	30 to 65 percent among large trees (12 to 20 inches dbh).	Similar to A but slightly higher because of higher canopy closure on 18% of the acres.
Probability of changing a crown fire entering the Fire Hazard reduction area from a crown fire to a ground fire.	Highest probability	Lowest probability	Lower than A and Higher than B (canopy cover is above 40% on 18% of stands in this emphasis area)
Decrease fire hazard over the project area	Low 8768 acres Moderate 2874 High 1006 Very High 137 Extreme 216	Low 1206 Moderate 4132 High 3152 Very High 2551 Extreme 1961	On 18% of the acres within the Fire Hazard Reduction area canopy cover exceeds 40% (height to live crown, tons per acre, are stems per acre are still at desired levels).
Improve Forest Health	All thinned areas except MSO PACs are below density risk threshold	Most stands exceed or are close to density risk threshold	Stands affected by the 16-inch cap (1,567 acres) are above density risk threshold. The remaining treated stands are the same as A.
Forest Service trails link Ft Tuthill, Arboretum, Rogers Lake and Communities	14.5 mi FS trail that links these features	0 miles of FS trails Few linkages between these features	Same as A
Trail management in Dry Lake Caldera provide for use while protecting site.	Yes	No	Same as A
Camping impacts are reduced and experience is sustained along Hwy 89A	Yes	600+ sites	Same as A

Purpose and Need	Alt A (proposed action)	Alt B (no action)	Alt C (16 inch cap)
corridor			
Fewer stands will initiate a crown fire in the MSO/Turkey/Uneven emphasis areas	Yes Turkey stands 2-5 foot flame lengths Uneven age 3-5 feet PAC and PFA's still initiate crown fire – flame lengths 5 feet	No – most stands have flame lengths greater than 5 feet	Similar to A
Probably of tree mortality from fire within the MSO/Turkey/Uneven emphasis area is less than current	Yes Range of 5-16%	Range of 6-98%	Similar to A
Maintain ROS, especially SPNM along Woody Ridge	Yes	Yes	Yes
Reduce fire risk as appropriate under recovery plan guidelines	Yes	No	Yes
Enhance mix of turkey cover/forage and reduce potential for habitat loss from wildfire	Yes	No	Yes
Change from 62% cover to 30% cover distributed in long stringers with open meadow corridors in Antelope Habitat emphasis areas.	Yes	No	Partially accomplished
Reduce road densities to budget and recreation setting objectives.	Yes	Partially accomplished through regular maintenance and continuation of road gates.	Yes
Use uneven age management	Yes on 3178 acres	No	Of the 3178 acres of uneven age emphasis – 734 cannot meet uneven age objectives.