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Hall Ranch Wildland Urban Interface

Springerville Ranger District, Apache-Sitgreaves National Forests
Apache County, Arizona

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CHAPTER 1 – PURPOSE AND NEED

Document Structure

The Forest Service has prepared this Environmental Assessment in compliance with the National Environmental Policy Act (NEPA) and other relevant Federal and State laws and regulations. This Environmental Assessment discloses the direct, indirect, and cumulative environmental impacts that would result from the proposed action and alternatives. The document is organized into four parts:

- *Introduction:* The section includes information on the history of the project proposal, the purpose of and need for the project, and the agency's proposal for achieving that purpose and need. This section also details how the Forest Service informed the public of the proposal and how the public responded.
- *Comparison of Alternatives, including the Proposed Action:* This section provides a more detailed description of the agency's proposed action as well as alternative methods for achieving the stated purpose. These alternatives were developed based on significant issues raised by the public and other agencies. This discussion also includes possible mitigation measures. Finally, this section provides a summary table of the environmental consequences associated with each alternative.
- *Environmental Consequences:* This section describes the environmental effects of implementing the proposed action and other alternatives. This analysis is organized by resource area. Within each section, the affected environment is described first, followed by the effects of the No Action Alternative that provides a baseline for evaluation and comparison of the other alternatives that follow.
- *Agencies and Persons Consulted:* This section provides a list of preparers and agencies consulted during the development of the environmental assessment.
- *Appendices:* The appendices provide more detailed information to support the analyses presented in the environmental assessment.

Additional documentation, including more detailed analyses of project-area resources, may be found in the project planning record located at the Springerville Ranger District Office in Springerville, AZ.

Background

In December 2003, President Bush signed the Healthy Forest Restoration Act (HFRA), H.R. 1904[1]. The Act provides forest management professionals the ability to work with local landowners and the public at large in streamlining the implementation of the 2000 National Fire Plan[2] and in restoring the health of our nation's forests by employing preventative techniques aimed at reducing the hazardous fuels buildup in our forests and reducing the risk of fires to at-risk communities. In 2004, in response to the HFRA, Apache County developed the Apache Communities' Wildfire Protection Plan[3] (ACWPP), which includes the Hidden Meadows and Green's Peaks Hideaways subdivisions.

Past management actions have contributed to a change in forest structure and species composition near these subdivisions. Dense overstocked stands have replaced more open ponderosa pine and mixed conifer stands. Surface fuel loadings vary anywhere from 2 tons/acre to over 33 tons/acre. Stand conditions in the ponderosa pine and mixed conifer forest types consist of interlocking crowns and ladder fuels resulting in increased crown fire potential. Fire spreads through these stands under extreme

conditions by torching and spotting. In addition, tree encroachment into grasslands has occurred. On March 7, 2005, John MacIvor, former District Ranger of the Springerville Ranger District signed the project initiation letter that identified the Interdisciplinary Team (IDT) and their responsibilities for the analysis of this project.

[1]http://fsweb.wo.fs.fed.us/hfra/references/fedreg36cfr218a.pdf

[2]http://www.fireplan.gov/content/home

[3]http://www.azstatefire.org

Purpose and Need for Action

There is a need to provide for public and firefighter safety by reducing the wildland fire potential on National Forest System lands around the at-risk communities of Hidden Meadow and Green's Peak Hideaways subdivisions. Both of these communities have been identified in the Community Wildfire Protection Plan for At-Risk Communities of the Apache National Forest in Apache County (CWPP).

Human caused changes and past management practices, such as fire suppression, have resulted in changes in stand conditions, surface fuels, and understory vegetation. Reduction of fuel loading will help restore a fire resilient forest by reducing the intensity, severity, and spread potential of wildfires around the private lands. It will also optimize firefighter efficiency and safety.

Existing Conditions

The proposed Hall Ranch project is located within wildland urban interface (WUI), and is included in the CWPP. Hidden Meadows (153 acres of private property) is located within the analysis area. Hidden Meadows is a guest ranch/resort; much of the property is developed with a 9,000-square-foot lodge, numerous houses and cabins, and other structures. Greens Peak Hideaways (155 acres of private property) is located immediately adjacent to the project. Greens Peak Hideaways currently has at least 60 houses and 10 mobile homes within its boundary. Some fuels reduction activities have occurred on private lands in both Hidden Meadows and Hideaways; however there are still areas that have high fuel loads (Apache County Wildfire Community Protection Plan, 2004).

Forest Route 118 crosses the project area, and Forest Route 117A runs along the southeastern edge. Several other roads within the area are used for local traffic. At some points along these roads, fuels conditions are such that traffic, whether normal or emergency in the form of firefighting equipment or evacuating public, could be jeopardized by the intense fire behavior.

All private parcels could be impacted by a severe wildfire which originated or encroached upon the area, not just those lots directly adjoining USFS lands. Risk varies for each developed lot depending upon factors such as roof and siding material, combustibles around the structure, construction design, and what exists in the way of defensible space around the structure.

The wettest part of the year in the Hall Ranch area is during the summer monsoon, which on the average lasts from early July until early September. The spring months prior to the monsoon often bring extreme

fire weather and fuels conditions, with high winds, low humidities, and low fuel moistures. This is the time of the year when Northern Arizona typically experiences its' worst problem fire activity. After the monsoon, there can be a smaller secondary fire season extending into the autumn months.

Approximately 53% of the project area is covered by a Ponderosa Pine (*Pinus ponderosa* var. *ponderosa*) vegetation type, and about 34% is covered by a mixed conifer vegetation type. Conditions within these timber stands vary, but generally consist of dense trees with interlocking crowns, and a heavy accumulation of surface fuels due to a lack of significant fire activity in recent decades. A fire becoming established in these fuels conditions has an increased chance to torch the trees and transition into a crown fire. Long range spotting also becomes increasingly likely in these conditions. Fireline production rates are slowed by the presence of heavier fuel loadings. Fireline intensity in these areas often would not allow for direct attack by hand crews or fire engine crews.

About 11% of the project area is in a grass fuel type. However, these areas have been encroached upon by ponderosa pine, pinyon or juniper trees. Firefighter safety and effectiveness would be affected by the trees present in the grasslands; torching and spotting would be expected to occur.

A total of 2,267 project acres support vegetation in the form of coniferous forest, aspen inclusions and grasslands. All of these cover types evolved with regular fire intervals as an important natural disturbance pattern which used to keep small trees thinned out, maintained a more patchy tree arrangement, and grasslands essentially treeless. Today, a majority of these acres (74%) are severely departed and another 21% are moderately departed from their historic natural range of variability. This means that several regular natural fire cycles have been missed, and non-fire-adapted species have become more prevalent. Species composition and vertical tree arrangements currently pose a ladder fuel problem which can carry ground fire up into the main canopy on approximately 89% of the area. Likewise, main forest canopies are increasingly becoming more horizontally continuous on 73% of the area. Thus they are already suited to carry, or are trending soon toward the ability to carry, a crown fire under spring, summer or fall weather conditions. Because most USFS lands surrounding them are not presently wildfire-defensible, the residential communities of Hidden Meadows Guest Ranch and Greens Peak Hideaways are at risk of serious wildfire danger.

If burned under existing resource conditions and unfavorable weather conditions, chances are good that fire severity would be high enough to cause widespread tree mortality across a majority of forested sites, with additional loss of key habitat components like large/old trees, aspen clones and topsoil. Approximately 80% of all sites have high tree densities that correlate with high levels of tree competition for limited available growing space, soil moisture and nutrients. Poor tree vigor and susceptibility to insect/disease factors account for reduced forest health. Aspen clones are in decline due various factors, including suppression by conifers. In the absence of regular fire, grasslands now have an accelerated trend of tree encroachment which reduces their ability to function as natural forest fire breaks on the landscape.

Desired Conditions

Return and maintain the majority of forested lands within the analysis area to a Fire Regime Condition Class 1. Forested lands in this class can sustain fire without significant alteration to forest ecosystem components and fires within the urban interface will be more easily managed by the existence of

defensible space. This will provide for homeowner and firefighter safety while allowing for direct attack of fires and a high probability of success in containment.

The objectives of returning the area to condition class 1 can be accomplished by increasing crown spacing, reducing ladder fuels and reducing surface fuel loading to more historic pre-settlement levels. This will produce a condition wherein crown fire initiation potential and potential for independent crown fire spread is greatly diminished.

Fire adapted ecosytems are restored and/or maintained to function within their natural range of variability. ie: A resilient forest composition should exist, which can survive extreme uncharacteristic fire and pest disturbances, and can be sustained over time for the human environment, as well as for forest health, wildlife habitat, soils/watershed stability, and visual quality. The number of coniferous ladder fuels is greatly reduced to keep fire on the ground, and the main canopy is interrupted enough to prevent horizontal crown fire spread. Stands are prepared well enough to re-introduce site-appropriate prescribed fire into them without risk of main canopy torching or major loss of key habitat components like aspen, large/old trees, and topsoil. Natural vegetation fire breaks are restored in the landscape, such as aspen clones and grasslands. Reduced tree competition results in improved leave-tree tree vigor. Additional fuel hazards resulting from insect/disease damage are reduced.

Relationship to Policies and Plans

Consistency with the Forest Plan

The Apache-Sitgreaves National Forests Land and Resource Management Plan (FLMP) was adopted in 1987. The plan assigns Management Areas (MAs) with particular goals, standards and guidelines (see Chapter 4 of the FLMP). The project area includes MA 01 (Forested Lands), MA 03 (Riparian Areas), and MA 04 (Grasslands). The Plan has undergone several amendments.

An analysis of consistency with the FLMP and amendments has been completed and is included in the Process Record. Several items were added to the Mitigation Measures and Design Features section of this document to ensure consistency with the FLMP and its amendments. Best Management Practices (BMPs) and design criteria were also developed by the IDT to meet, or move the project area toward meeting the goals and objectives established in the FLMP.

However, the Proposed Action departs from management direction of the FLMP, as amended in 1996 (USDA 1996, page 91), in the following circumstance:

- By not fully following the "Management Recommendations for the Northern Goshawk in the Southwestern United States" such that proposed density reductions may not meet the canopy cover requirements for Northern Goshawk at the stand level in some treatment areas. Canopy cover requirements in VSS 4-6 in ponderosa pine would be met at the group level. In addition, while created openings will be kept to four acres maximum size, some openings may exceed 200 feet width. Density reductions are needed to reduce fire hazard potential on the area and provide protection to the watersheds from large scale, high intensity fires.
- Not all FLMP standards and guidelines related to control of dwarf mistletoe will be met with this project. Large overstory trees with infection may be left to emphasize retention of deficit VSS 5 and 6 groups, where not jeopardizing fuels reduction objectives.

The decision document for the Proposed Action (if selected) would, therefore require a project-specific amendment to the FLMP to allow for these departures. The departures are necessary to meet the objectives of the Proposed Action adjacent to the at-risk communities of Hidden Meadows and Green's Peak Hideaways.

Other Laws, Regulations and Policies

This project was designed consistent with all current laws, regulations and policies that apply to fuel reduction projects. The Fire/Fuels Specialist Report discusses the National Fire Plan and other national policies related to wildland fire and reducing fuel loading within the wildland-urban interface area (WUI).

Proposed Action

The project area encompasses approximately 2276 acres of National Forest System lands adjacent to and surrounding the communities of Hidden Meadows and Green's Peak Hideaways. (See attached Project Maps). The Proposed Action is a combination of treatments, on approximately 2,246 acres, to live trees, snags (dead standing trees), existing and pre-existing slash and herbaceous vegetation. Treatments include thinning and treatment of existing and created slash in forest and grasslands areas and prescribed burning. A more detailed description of activities is included in Chapter 2 – Alternatives.

Decision Framework

Given the purpose and need, the Forest Supervisor reviews the proposed action and the other alternatives in order to make the following decisions:

- ►Whether or not to proceed with the proposed action.
- ►Whether or not to modify the project design and Best Management Practices.
- ►Appropriate monitoring requirements to evaluate project implementation.
- ►Whether or not the project may have significant environmental effects that must be evaluated in a separate Environmental Impact Statement.

Public Involvement

The proposal was listed in the Schedule of Proposed Actions on April 1, 2006. The proposal was provided to the public and other agencies for comment during scoping on July 16, 2008. In addition, as part of the public involvement process, the agency held a public meeting on July 29, 2008. As part of the collaborative process, a presentation on the draft proposed action was given to the Natural Resources Working Group on August 12, 2008.

Using the comments from the public and other agencies, (see Issues section), the interdisciplinary team considered potential issues to address.

Issues

Five comment letters were received in response to scoping. One email was received on November 3, 2008 in response to the Schedule of Proposed Action. The Interdisciplinary Team reviewed these comments.

Key Issues

- One letter of support for the proposal was received.
- Arizona Department of Environmental Quality encouraged the use of Best Management Practices (BMPs) and in stream monitoring. Use of BMPs has been incorporated into project design and their implementation will be monitored. No perennial streams exist on the area. In stream monitoring is not appropriate for the proposal.
- The Navajo Nation determined that the proposal "will not impact" any Navajo traditional cultural properties or historical properties.
- The Hopi Tribe requested copies of the cultural resource survey report if prehistoric cultural sites are identified in the project area that will be adversely affected by project activities. The Forest Service will comply with their request.
- During field review of the proposed action, Bob Kerr, Manager of Hidden Meadows requested retention of tree cover in areas to provide screening cover for the subdivision. This will be incorporated into project design.
- Jeff Burgess commented "It's my understanding that the legal purpose of the project is to reduce catastrophic wildfire danger in places where there's a wildland-urban interface. According to the project map, however, the Hall Ranch is no where near any urban areas. It appears that you are using the funding for this program illegally for the purpose of increasing livestock forage production on the Hall Ranch instead of reducing the threat of wildfires to the area's towns. Can you please explain how thinning woody vegetation on the Hall Ranch is going to significantly reduce the danger from wildfires to far away Pinetop or Springerville?"
- Dick Artley provided the following comments on the Schedule of Proposed Actions in an email on November 3, 2008.

  "The SOPA indicates that the purpose of this project is "fuels management." In the description of the project you say you are evaluating "fuel treatment/slash reduction on National Forest lands adjacent to private lands and heavily traveled roads."

  Your SOPA text lacks important specific information. "Fuels treatment" could include any number of actions.

> There is one action that you must not analyze in detail … commercial logging to reduce fuels. Scores of unbiased, independent scientists all agree that commercial logging sets the stage for more severe wildfires. Read attachments #1 and #2 and use best science as a basis for the selected alternative documented in the Whitcom WUI DN.
>
> Obviously, you are unaware of the work of USFS fire physicist Dr. Jack Cohen. Dr. Cohen recommends hand removal of fine fuels in a band no further than 40 meters from a human structure to reduce the risk of wildfire damage to nearly nothing!
>
> Lastly, the Forest Service loves the term WUI, because its size is undefined. In have read USFS proposals where the WUI was up to 5 miles from the structure at risk. I suggest rather than using the term WUI, you use a more definitive term "home ignition zone" coined by Dr. Cohen."

Comment consideration (Burgess):

The Hidden Meadows subdivision occurs within the project boundary. Green's Peak Hideaways lies adjacent to and immediately north of the project area. Hidden Meadows is a resort community with multiple cabins, privately owned homes and other facilities. Green's Peak Hideaways is a subdivision with multiple privately owned homes. Hidden Meadows and Green's Peak Hideaways are surrounded by National Forest. Each area meets the definition for Wildland Urban Interface. Hidden Meadows and Hideaways were identified in the Apache County Wildfire Protection Plan as at risk communities of the Apache National Forest in Apache County. The Green's Peak subdivision was listed in the Federal Register on August 17, 2001 as an urban wildland interface community within the vicinity of Federal lands that are at high risk for wildfire. The purpose of the proposal is for fuels reduction (not livestock forage production) in order to reduce fire risk to these areas (not Pinetop or Springerville). Fuels reduction funds are appropriate for use for this project. Because the subdivisions were listed in the Federal Register and in the CWPP, Mr. Burgess comments were considered covered by existing law, regulation or policy and therefore not identified as a significant issue.

Comment consideration (Artley):

The proposed action identifies proposed treatments which include a combination of thinning and slash treatment and prescribed burning. Mr. Artley will be sent a letter notifying him of the availability of the Environmental Assessment (EA) and be given an opportunity to comment during the formal 30 day comment period. Since the EA describes the proposed methods of fuels treatment, Mr. Artley's comment asking for a more specific description of treatments is not considered a significant issue.

Project implementation could include a variety of methods including the White Mountain Stewardship contract, commercial harvest and fuelwood harvesting. Slash treatment is included in the proposal. Slash will be treated concurrently with tree thinning operations and prescribed burning. The effects of the proposed treatments on fire hazard and potential fire severity will be disclosed in this EA. Therefore, Mr. Artley's comment regarding "commercial logging" is not considered a significant issue.

In Dr. Cohen's research, he addresses radiant heat within 40 meters of structures; however, he also addresses firebrands as a WUI ignition factor. Firebrands that result in ignition can originate from wildland fires that are a distance of 1 kilometer or more. Analysis of post-treatment factors shows a

decrease in crowning and torching indices, thus reducing the potential for firebrands. Analysis also shows a decrease in flame lengths which will improve firefighter efficiency and safety.

Regarding the size of the project, the need for the proposal is to provide for public and firefighter safety by reducing the wildland fire potential on National Forest System lands around the at-risk communities of Hidden Meadow and Green's Peak Hideaways subdivisions. This is in accord with the Healthy Forest Restoration Act which was aimed at "protecting communities, watersheds, and certain other at-risk lands from catastrophic wildfire, to enhance efforts to protect watersheds and address threats to forest and rangeland health including catastrophic wildfire, across the landscape and for other purposes." Variables such as Predicted Average Flame Lengths, Torching and Crowning Index, probability of ignition and spotting distance were analyzed, which effect resistance to control. Mr. Artley will be sent a letter notifying him of the availability of the Environmental Assessment (EA) and be given an opportunity to comment during the formal comment 30 day comment period. For the reasons listed above, Mr. Artley's comment regarding the size of WUIs was not considered a significant issue.

SUMMARY

Comments received during scoping were considered and for the reasons listed above, no key issues were identified from the public involvement process.

CHAPTER 2- ALTERNATIVES

This chapter describes and compares the alternatives considered for the Hall Ranch Wildland Urban Interface project. It includes a description and map of each alternative considered. This section also presents the alternatives in comparative form, sharply defining the differences between each alternative and providing a clear basis for choice among options by the decision maker and the public. Some of the information used to compare the alternatives is based upon the design of the alternative (i.e., helicopter logging versus the use of skid trails) and some of the information is based upon the environmental, social and economic effects of implementing each alternative (i.e., the amount of erosion or cost of helicopter logging versus skidding).

Alternatives

Alternative 1

No Action

The No Action alternative would not implement any fuel reduction treatments on National Forest System (NFS) lands around the at-risk communities of Hidden Meadows and Green's Peak Hideaways except as part of other National Environmental Policy Act (NEPA) decisions. Under the No Action alternative, fuel loading on NFS lands adjacent to private and State lands would not be reduced. The risk of threat to human life, property or adverse effects on watershed and other resources because of a wildland fire event would not be reduced.

Alternative 2

The Proposed Action

The Proposed Action treatments are summarized in Table 1. These proposed treatments would be utilized as guidelines for developing stand-specific silviculture prescriptions.

Table 1: Proposed Treatments

Treatment	Vegetation	Slash
1 Grassland/Savanna 280 acres	Grassland restoration is designed to promote and restore open grassland / savanna conditions. Pre-settlement trees would be retained. Post-settlement conifers encroaching on grasslands may be cut. Some encroaching trees may be retained for other resource objectives, such as visual screening and feathering of grassland/forested edges.	Project created slash may be mechanically treated, lopped and scattered, piled, burned or retained for soil stabilization or other resource benefits. Existing ground fuels may also be treated by relocation or removal to reduce fire hazard.
2 PP Slopes <40% 1181 acres	Ponderosa Pine sites on slopes less than 40% would be thinned to an average of 40-60 sqft/acre basal area (BA) using a combination of VSS group cuts and/or thinning from below. This would be accomplished by thinning conifer trees primarily less than 16”dbh. Occasional trees ≥ 16”dbh may be removed only as needed to promote fire resilience and forest health. Canopy openings up to 4 acres may be created. Retention of appropriate fire adapted species would be emphasized, with occasional alternate species where needed to promote fire resiliency and forest health.	Project created slash may be mechanically treated, lopped and scattered, piled, burned or retained for soil stabilization or other resource benefits. Existing ground fuels may also be treated by relocation or removal to reduce fire hazard.
3 MC Slopes <40% 536 acres	Mixed Conifer sites on slopes less than 40% would be thinned to an average of 40-60 BA using a combination of VSS group cuts and/or thinning from below. This would be accomplished by thinning conifer trees primarily less than 16”dbh. Occasional trees ≥ 16”dbh up to 23.9”dbh may be removed only as needed to promote fire resiliency and forest health. Canopy openings up to 4 acres may be created. Retention of appropriate fire adapted species would be emphasized, with occasional alternate species where needed to promote fire resiliency and forest health.	Project created slash may be mechanically treated, lopped and scattered, piled, burned or retained for soil stabilization or other resource benefits. Existing ground fuels may also be treated by relocation or removal to reduce fire hazard.
4 PP & MC Slopes >40% or inaccessible 222 acres	Mixed conifer and ponderosa pine sites on slopes greater than 40% may be thinned by hand up to 9” dbh. Within existing old growth stands, old growth attributes would be retained, with resulting basal areas ranging from 90 – 180. All other stands may be thinned to target basal areas ranging from 60 – 120. Canopy openings up to 2 acres may be created. Retention of appropriate fire adapted species would be emphasized, with occasional alternate species where needed to promote fire resiliency and forest health. Prescribed fire maybe used in conjunction with or in place of thinning.	Project created slash may be lopped and scattered, piled, burned or retained for soil stabilization or other resource benefits. Existing ground fuels may also be treated by relocation or removal to reduce fire hazard.

5 Location 6028 Stand 42 27 acres	Removal of coniferous species by a combination of Pre-settlement restoration and thinning from below within Stand 42, including the floodplain and channel. Pre-settlement trees and aspen would be retained. Conifers that provide stream-bank stability may be retained.	Project created slash may be mechanically treated, lopped and scattered, piled, burned or retained for soil stabilization or other resource benefits. Existing ground fuels may also be treated by relocation or removal to reduce fire hazard.
6 Location 6032 Stands 30 and 502 21 acres	Defer from mechanical treatment.	
*** Within all Treatment Units with aspen	Conifers would be targeted for removal within and around aspen. Post-settlement trees within or adjacent to aspen clones may be removed to promote aspen vigor. Pre-settlement conifers adjacent to and within aspen clones would be retained. Damage to aspen trees would be minimized during treatments, which may require relocation of created slash and some existing ground fuels away from aspen.	Project created slash may be mechanically treated, lopped and scattered, piled, burned or retained for soil stabilization or other resource benefits. Existing ground fuels may also be treated by relocation or removal to reduce fire hazard.
*** Within all Treatment Units	Snags up to 12”dbh may be treated to reduce vertical ladder fuels and for work crew safety. Hazard trees would be removed from within one tree height distance of falling on private property boundaries, overhead powerlines, and key fire control roads. Snags within 200 feet of private property boundaries and along key fire control roads will be removed to reduce fuels, spotting potential and provide for firefighter and public safety.	Project created slash may be mechanically treated, lopped and scattered, piled, burned or retained for soil stabilization or other resource benefits. Existing ground fuels may also be treated by relocation or removal to reduce fire hazard.

Along with the treatments, re-occurring maintenance burns would be used.

Total acres proposed for treatment = approximately <u>2246</u> acres

Mitigation Common to All Alternatives

Mitigation Measures and Design Features

Mitigation measures, project design features and Best Management Practices (BMPs) were developed by the IDT, specifically for the Proposed Action, to protect water quality, minimize adverse effects and meet Management Area Standards and Guidelines (Appendix B). BMPs were developed based on professional experience and field reconnaissance, Terrestrial Ecosystem Survey (TES) mapping unit properties, and limitations and suitability of various management practices. The White Mountain Stewardship contract, through which many of the proposed mechanical treatments would be accomplished, also has prescribed conservation practices as well.

The following mitigation measures to minimize resource impacts would be implemented with the treatments prescribed in the proposed action.

Best Management Practices: BMPs, as developed by the IDT shall be followed to mitigate ground-disturbing activities. These are included as Appendix B of this document.

Protection of Heritage Resources: All archeological sites will be identified on the ground and avoided by mechanized equipment, and closely monitored. If additional sites are discovered during project implementation, all work in that locale shall be halted and the Forest Archeologist will be notified. All known sites will be protected pursuant to FSM 2361.1(2) and FSM R-3 2362.21(2) until testing or additional information is available to allow for a formal determination of eligibility to the National Register of Historic Places.

Timing Restrictions in Mexican Spotted Owl Protected Activity Centers (PAC): If any Mexican Spotted Owl PAC's are established within the action area before implementation, timing restrictions may be used. Treatments will only occur during the non-breeding season (September– February 28) unless surveys determine the PAC is unoccupied, then treatments may occur during the breeding season.

Timing Restrictions in Goshawk Nesting Areas and Post-fledging Family Areas (PFA): If any Northern Goshawk PFA's are established within the action area before implementation, timing restrictions may be used. Treatments will only occur during the nonbreeding season (October 1 – February 28) unless surveys determine the PFA is unoccupied, then treatments may occur during the breeding season.

Burning Plans: Burn plans will be developed and designed to minimize high intensity fires and the possibility of escape.

Smoke and Fire Control Mitigation: The Forest Service will monitor smoke produced during pile or broadcast burns. Arizona Department of Environmental Quality (ADEQ) BMP's and District burn plans will be followed. Broadcast burning blocks will be laid out using existing roads or skid trails and Forest Service constructed handline or draglines when deemed necessary. Control features (i.e. existing roads or created fireline) will be used to control the amount of burning accomplished each day. The District will take measures to notify the public when the burning begins and the expected duration.

Visual Quality: In treatment areas adjacent to forest road 118, remove or dispose of slash that is within view of the road within one year. In areas that are being mechanically treated, flush cut stumps to allow visual screening by grasses and groundcover. Feather edges of openings to create a more natural appearance.

Snag Retention and Recruitment: Maintain an average of 2 snags per acre in ponderosa pine and 3 snags per acre in mixed conifer across the forested project area.
Downed Woody Material (Northern Goshawk): In Ponderosa Pine an average of two snags/acre, three ≥12" down logs/acre, and five – seven tons/acre of down woody material will be protected for wildlife habitat. In Mixed Conifer an average of three snags/acre, five ≥12" down logs/acre, and ten – fifteen ton/acre of down woody material will be protected for wildlife habitat.
Hiding Cover: Manage for and maintain deer and elk hiding cover (vegetation) to hide 90% of an adult standing dear or elk from human view at 200 feet on at least 40% of the perimeter of natural openings, openings created for silvicultural purposes, and along at least 40% of the edges of arterial and collector roads, streams, rivers and powerline corridors.
Meadows: Each meadow greater than 1 acre will be managed toward or maintained with at least 40% of the perimeter in timber stands that provide cover.
Fawning and calving areas: Defer logging activities from May 15 to June 30 in known fawning and calving areas. This restriction may be lifted if on-the-ground inspection indicates the area is not being used for fawning/calving and other areas adjacent to the area are available for wildlife needs.
Turkey habitat: If turkey nesting areas are discovered before or during project implementation, defer slash treatment activities in these areas from April 15 through June 30. Manage for turkey nesting cover through modified slash treatment. Leave scattered slash that provides potential turkey nesting habitat within ½ mile of dependable water. Advise Wildlife Biologist of the location of any active turkey nesting areas discovered during project layout.
Raptor nests: Protect active raptor nest tree groups and advise wildlife biologist of the location. Osprey – On non-aquatic sites; manage for a buffer of 100 acres of restricted harvest (retain dominant trees and snags). On aquatic sites; use linear buffer or streams/rivers using a 1200 foot restricted harvest (retain dominant trees and snags along the water's edge a distance of 300 feet back from the lake or stream edge.) Coopers hawk – 15 acres of uncut area around active nests. Sharp-shinned hawk and ospreys – 10 acres of uncut area around active nests. Other raptors – An areas extending to 200 feet from active nests is left uncut. Protect bald eagle winter roosts with a 300 foot uncut buffer zone around the roost.
Special habitats: Protect special wildlife features and maintain cover adjacent to elk wallows, salt licks, seeps, etc.
Squirrel caches: As needed to meet habitat capability, protect red squirrel primary caches at a density of one cache per 2 acres. Retain at least 20 Abert squirrel nest tree groups per 100 acres.
Reserve tree groups: Leave reserve tree groups associated with created openings, greater than 1 acre in size, wherever practicable, at the rate of 1 group per each open acre, with 3-6 trees per group. If possible, do not leave dwarf mistletoe-infected trees or hazard trees as potential snags.
Canopy cover of VSS 4-6: In ponderosa pine stands leave VSS 4, 5, and 6 groups dense enough to provide an average of 40+% canopy cover within each group.
Dwarf mistletoe: Where trees or tree groups > 16" dbh with dwarf mistletoe are retained, with potential to infect nearby trees, ensure that no trees of the same host species are left within 50-80 feet of the infected tree/s. If this cannot be accomplished, consider techniques to hasten snag recruitment of the infected tree/s.
Residential Screening: Without sacrificing project objectives, leave some saplings and/or open-grown trees with low live limbs for screening between Hidden Meadows and FR 118 and near the eastern edge of Green's Peak Hideaway.

Comparison of Alternatives

Table 2. Relative Comparison of the No Action and Proposed Action alternatives.

Activities/Actions	No Action	Proposed Action
Acres of Vegetation Treatment	None	Approximately 2267 acres
Fire Regime Condition Class*:	Vegetated Area:	Vegetated Area:
1	5%	55 %
2	21%	44 %
3	74%	1%
Predicted Average Flame lengths (ft.)	Grassland (280 ac): 9–17	Grassland: 3-7
(Flamelengths < 4 feet indicate that suppression with engines and handcrews would likely be successful).	PP, Slopes < 40% (1181 ac): 32-68	PP, Slopes < 40%: 3-5
	MC, Slopes < 40% (536 ac): 41-81	MC, Slopes < 40%: 1-3
	PP & MC, Slopes > 40% (222 ac): 49-97	PP & MC, Slopes > 36-71
	Treatment Type 5 (27 ac): 49-97	Treatment Type 5: 5-9
Torching Index **	Moderate to High Hazard	Low Hazard
Crowning Index ***	Moderate to High Risk	Low Risk

* Fire Regime Condition Class defines departure from a historic Fire Regime and resulting vegetative structure and composition. Condition class ranges from 1 to 3, from low to moderate to high

*Torching Index (TI) is the wind speed required to move a surface fire into the crowns of trees and is calculated to determine crown fire potential. It is a measure of crown fire initiation. The TI index for this analysis is broken into three categories of risk: low, moderate, and high. Low hazard is wind speeds >50 mph, moderate hazard is wind speeds 25-50 mph, and high hazard is wind speed <25 mph needed to initiate crown fire (Cassidy).

***The Crowning Index (CI) is based on twenty-foot wind speeds required to maintain an active crown fire. The denser or closer spacing of trees allows for fire to travel from tree to tree and on through the canopy. Stand density in the program is modeled through canopy bulk density. Components that determine the CI are crown bulk density, slope, and surface fuel moisture. CI indices are broken into three categories of risk: low, moderate, and high. Low risk is 50 mph or greater, moderate 25-50 mph, and high less than 25 mph (Cassidy).

Outputs reflected for fire regime condition class, flame lengths, torching and crowning index are estimates based upon modeling and provide a relative comparison of alternatives

CHAPTER 3 - ENVIRONMENTAL CONSEQUENCES

This section summarizes the physical, biological, social and economic environments of the affected project area and the potential changes to those environments due to implementation of the alternatives. It also presents the scientific and analytical basis for comparison of alternatives presented in the chart above.

Fuels

Affected Environment

Approximately 53% of the project area is covered by a Ponderosa Pine (*Pinus ponderosa* var. *ponderosa*) vegetation type, and about 34% is covered by a mixed conifer vegetation type. Conditions within these timber stands vary, but generally consist of overstocking of trees, interlocked crowns, and a heavy accumulation of surface fuels due to a lack of significant fire activity in recent decades. A fire becoming established in these fuels conditions has an increased chance to torch the trees and transition into a crown fire. Long range spotting also becomes increasingly likely in these conditions. Fireline production rates are slowed by the presence of heavier fuel loadings. Fireline intensity in these areas often would not allow for direct attack by hand crews or fire engine crews.

About 11% of the project area is in a grass fuel type. However, these areas have been encroached upon by either pinyon/juniper woodland or Ponderosa Pine. Firefighter safety and effectiveness would be affected by the trees present in the grasslands; torching and spotting would be expected to occur.

There is a small riparian area to the south of Hidden Meadows Ranch, which accounts for less than 1% of the project area; rocks, water, and barren areas also account for less than 1%. There are no significant rivers, creeks, or lakes present.

Direct/Indirect Effects

No Action Alternative

The No Action Alternative would not reduce the fire hazard potential to the Hidden Meadows Ranch and Greens Peak Hideaways. This alternative would increase the potential for high intensity wildfires with high resistance to control. While the modeling shows some stands are open enough to sustain wildfire without significant loss of key ecosystem components, most stands show they would sustain significant loss. Over time conditions within the analysis area are likely to worsen in the absence of disturbance; stands will become more closed, ladder fuels will continue to grow and dead and down fuels will increase, as modeling has shown. FVS simulation shows the entire analysis area can be expected to sustain passive, conditional, or active crown fire. Most of the area, roughly 2014 acres would experience high mortality (greater than 50% mortality) and be set back to an early seral stage, that equates to roughly 89% of the analysis area. Analysis areas that are currently in a Fire Regime Condition Class 1 simulate resistance to crown fire and show very little mortality. This corresponds closely to the existing condition of 2168 acres in Fire Regime Condition Class 2 and 3. Fire Regime Condition Classes would be expected to increase over time.

Proposed Action Alternative

This alternative would reduce fire hazard potential to Hidden Meadows and Greens Peak Hideaways, and increase fire resiliency of the forest ecosystems within the analysis area. Ladder fuels would be reduced, tree crowns would be better spaced, reducing the likelihood of crown fire initiation and crown fire spread. With a few exceptions flame lengths have been reduced, increasing the likelihood of firefighter success in control of a wildfire should one start. Torching index, crowning index and estimated mortality are all greatly improved. Under the action alternative wildfires in the near future would not likely result in stand replacing wildfires. The majority of the area (99%) would be returned to a Fire Regime Condition Class 1 or 2 see table 10.

TABLE 10. Post-Treatment FRCC Rating

Fire Regime Condition Class	Grassland Acres	Forested Acres	TOTALS	% of Total Vegetated
Class 1	216	1029	1245	**55**
Class 2	64	933	997	**44**
Class 3	0	25	25	**1**
TOTALS	**280**	**1,987**	**2,267**	**100%**

Treatment 1 is a grassland restoration. The proposed treatment will not alter significantly fire behavior in these areas short term. Over the landscape maintaining grassland areas will help to moderate fire behavior by providing breaks in conifer fuels and long term will prevent these areas from becoming choked with conifer trees and becoming a catastrophic fire potential site. On average fine fuel loading will increase from <.25 tons/acre to >.5 tons/acre potentially increasing flame lengths. However, the analysis area resides within two grazing allotments and fine fuel loading will be reduced by grazing, thus reducing flame lengths.

Treatment areas 2, 3, and 5 all decreased in basal area, mortality, and smoke production. All three treatments increased torching and crowning indices. Treatment 5 lowered flame lengths to a range of 4.7 – 9.31 feet but decreased from an active crown fire to a surface fire. Projected mortality for treatment 5 is 24% after treatment compared to 100% before treatment. Most important is the increase in crowning index is raised from 16 mph to 98 mph. Prescribed burns following treatment in 2, 3, and 5 will continue to lower flame lengths and mortality to acceptable levels.

Treatment area 4 modeling indicated relatively high mortality. The model assumes a simulated fire is running up slope with the wind behind it. The area has steep slopes modeled at 50%. This slope factor was a major contributor to mortality and fire severity with the model. After treatment the fire type is reduced from an active crown fire to a conditional crown fire. Following treatment, or in lieu of thinning, prescribed burning will be implemented on these slopes as a backing fire burning down slope with no ignition on the slope. This ignition technique will result in a cool low intensity mosaic burn. Rock outcroppings and sparse fuel areas will cause the fire to finger and leave areas unburned. Because of the dense tree cover and associated fire sensitive tree species some mortality in all size classes will be

inevitable. Modeling for burn plan prescription development will be completed with models that allow for slope factors to be adjusted.

Treatments will also include removal of all snags (dead trees) within 200 feet of private land, along designated Key Fire Control Roads, and power lines is approximately 600 acres. Average number of snags removed per acre for the analysis is; 2 next to private, 4 along fire control roads, and 1 along power line corridors. This snag removal will provide several benefits should a fire start within the analysis area or move into the analysis area. Burning snags provide a major source for lofted fire brands, even under low wind conditions. If fire crews were to attempt to hold a fire along these fire control roads or at private property and a burning snag were to drift burning embers across fire control lines, efforts by the firefighters would be lost and the fire would continue to spread. Burning snags frequently fall across control lines and foil control efforts. Removal of snags also offers increased safety for firefighters working in these areas. Snag removal will reduce the likelihood of fire weakened snags or snags damaged or knocked over by ground or aerial equipment, from injuring people working in the area.

All treatments in areas containing aspen are expected to stimulate sprouting. Other influences may prevent these sprouts from reaching maturity, such as ungulate browsing. Pure aspen stands are fire resistant. Aspen stands themselves don't burn easily, and due to the abundant grass forbs understory in aspen it will only carry fire when this understory is cured and dry or when sufficient dead and down material exists (Johnson). Aspen stands that contain a large amount ground fuels in the understory may need mitigation measures such as; removal of abundant ground fuels beneath aspen stands before a broadcast burn or fire control lines around aspen stands. Increasing or maintaining the aspen component within the analysis area will improve fire resistance.

Stands treated with prescribed fire will sustain some live tree mortality as a result of prescribed burning, which will contribute to surface fuel loading for several years post burn. This increased surface fuel loading will increase surface flame lengths as the model has indicated, however torching, crowning and mortality potential have all been improved by prescribed burning. These improved fire characteristics are due to prescribed fire raising the canopy by scorching lower branches of larger trees, killing many ladder fuel trees and consuming surface fuels. Prescribed fire may also kill larger trees that are not resistant to fire, opening up the canopy and providing better canopy spacing. Treating fuels across the entire landscape to the same level is impractical with the constraints of slopes, access, soils and wildlife habitat. Patterns of disconnected fuel treatment patches have shown to be effective in slowing fire spread rates and fire intensities. (Finney)

All of these factors improve a stands resiliency to fire by reducing crown fire potential. Follow up maintenance burns are recommended to reduce surface fuel loading and to maintain the benefits of the Proposed Action treatment. In the absence of disturbance such as fire, these stands will close in once again. Modeling indicates areas treated by cutting will remain relatively resistant to crown fire throughout the 50 year model run. Areas treated by prescribed fire or reduced treatment areas will exhibit moderate crown fire potential and lose much of the treatment effectiveness by the end of the model cycle. Modeling was completed without natural regeneration. This factor is expected to influence the longevity of the treatment effectiveness, by the growth of new ladder fuels. This influence if not maintained by regular prescribed fire will cause treatment effectiveness to diminish more rapidly than the modeling indicates. The area will need to be maintained with prescribed fire on a ten year or

less cycle or treated with mechanical thinning or both to maintain the effectiveness of this proposed treatment into the future.

Spotting potential and probability of ignition were both analyzed in this report. Documentation provided by the Ecological Restoration Institute at Northern Arizona University shows that in "ponderosa pine, wildfires commonly move though the landscape via multiple spotting ahead of the main fire front." This documentation also stated the following.

"Spotting ½ - ¾ miles is very common, ¾ to 1 mile is common, 1 mile to 1 ½ miles is rare, and longer distances are very rare but have become more common in recent years. There were reports of spots 3 miles in advance of the flame front on both the Cerro Grande and Rodeo-Chediski fires.

Modeling for the Hall Ranch analysis has shown an average spotting distance of .5 miles pre and post treatment. Probability of ignition was found to be 99% at the extreme weather conditions or 99 out of 100 burning embers will create a spot fire if they land in a receptive fuel. Both the spotting distance and probability of ignition do not decrease with the resulting treatment. The factors that do change are the production of embers by reducing the number of trees per acre, reducing the amount of ladder fuels, and retaining fire resilient trees thus reducing the chance for fire to rise into the crowns creating fire embers (included in crowning and torching indices). Probability of ignition does not change, but the amount of receptive fuel available to start a spot fire is reduced through mechanical and prescribed fire treatment. Treatment also reduces flame lengths to an average of four feet allowing for direct attack. Less potential for burning embers and fewer receptive fuels allow the firefighters more opportunities to protect the communities of Hidden Meadows and Green's peak Hideaway.

The version of FFE used for this analysis assumes every acre will burn in a simulated fire; this is unrealistic especially with a cool prescribed burn. Typically a prescribed fire would burn in a mosaic of burned and unburned areas, actually only burning between 60 and 75 % of the area. The model also assumes that broadleaf tree species will readily burn, however in this area these species will only burn when sufficient surface fuels exist to sustain fire or when foliar moisture is low enough to allow the foliage to burn this is generally in the fall when large fire potential is greatly diminished. Therefore aspen and gamble oak are not considered to contribute to fire spread or intensities.

Air Quality

Under the No Action Alternative no smoke would be generated other than by wildfire. If a wildfire were to occur it would produce significant amounts of smoke (in excess of .2 tons per acre of pm 2.5). Because of fire control difficulties due to increased fuel loading, future wildfires would be expected to become larger under the No Action Alternative, thus more acres burned and more smoke per acre produced.

Under the Proposed Action Alternative smoke would be produced as a result of management actions. Objectives of the proposed action can not be achieved without producing some smoke, however this smoke would be produced under controlled conditions. Smoke can be generated when impacts to the community would be lessened, such as under adequate ventilation, favorable winds and by reducing area burned. If a wildfire were to occur after treatment under the Action Alternative it would produce less than half the smoke per acre of the No Action Alternative (less than .1 tones per acre of pm 2.5).

Wildfires would be expected to be smaller and more easily controlled due to lower fuel loading, under the Action Alternative, reducing acres burned as well as less smoke produced per acre from a wildfire.

Cumulative Effects

Treatment Effects

Cumulative effects for the Hall Ranch analysis were based on a temporal scale of 25 years and spatial scale of Ecosystem Mgmt. Area #1604. The temporal scale of 25 years was chosen based on two factors; limited activity data prior to 1983, and second, 25 years covers most return fire intervals for the different fire regimes included in this analysis. The Ecosystem Management Area (EMA) #1604 was chosen based on the area most affected by this analysis. Hall Ranch comprises approximately 8% of the EMA.

Management practices over the last century such as: fire suppression, grazing, timber harvesting and road building, have altered disturbance regimes such as natural fire. This alteration in disturbance regimes has significantly changed forest structure, density and species composition. This condition has increased the potential for high intensity wildfire. Recorded wildfires within the Ecosystem Management Area have all been small with the exception of a couple of grassland fires, having been quickly suppressed. Grassland quickly recovers from fire disturbance. Therefore since fire records have been kept, fire has not played any significant role in fuel composition on the analysis area landscape.

Analysis of Apache-Sitgreaves National Forests fire reports for the years 1970-2008 indicates that no large fires have originated in or encroached upon the Hall Ranch area during that period. In May, 2003, the Hideaway Fire (human caused) burned 20 acres about ½ mile northwest of the project area; in December, 1997, the Mineral Fire (lightning caused) burned 70 acres about 5 miles northwest of Hall Ranch; and in October 2004, the Trigo Fire (lightning caused) burned 57 acres about three miles to the northwest. From 1970-2008, 15 fires were reported within the boundaries of the proposed Hall Ranch project. Most were 1/10th of an acre or less, with one reaching 1-1/2 acres in size. Of these fires, 13 were ignited by lightning, and two were human caused. This lack of appreciable fire activity raises a concern, since surface and ladder fuels have accumulated to the extent that stand replacing wildfires are increasingly likely.

Past timber sales have removed and thinned over-story trees and contributed to canopy spacing, reducing crown fire potential in treated areas. Previous treatments have occurred in the North Unit Timber Sale, which is in the southern part of the project area but failed to create any fire resiliency in the area. Nearby, the Mineral, Ranch, Benny-Hide, and Iris Springs projects were performed under the White Mountain Stewardship. Past cumulative vegetative affects are reflected in existing conditions in analysis modeling.

No historic cattle and sheep grazing has occurred in the analysis area since the 1800's. The Hall Ranch Analysis lies within the Green's Peak and Hall grazing allotments. The Green's Peak allotment currently grazes 461 head of cattle on 12,127 acres. Approximately 1659 acres from the analysis are listed in the Green's Peak grazing allotment. The Hall Ranch allotment currently grazes 533 head of cattle on 14,735 acres. Approximately 608 acres are listed in the Hall grazing allotment. Cattle distribution varies and is dependent upon water and forage. The Hall Ranch analysis currently contains

approximately 800 acres that contains good forage and water. The majority of the southern portion of the analysis area does not receive significant amounts of grazing. Grazing will continue to be an effect upon the land in relation to fine fuels. Cattle grazing typically changes grass from a grass fuel model 3 to a grass fuel model 1, thus reducing potential flame lengths.

Future foreseeable treatments include Green's Peak WUI four miles to the southwest, Iris Springs three miles to the south, Atascacita Grassland restoration to the north, and a powerline corridor within the Hall Ranch Analysis. Other foreseeable activities include cattle grazing, road construction and improvement, as well as recreational use and the potential for human caused fires. All activities will have some impact in EMA #1604 in fuels, soils, and fire creating a mosaic pattern upon the landscape which allows for opportunities to control natural wildfire.

Hall Ranch is comprised of 74% high risk, 21% moderate risk and 05% low risk areas. Treatment increases the amount of national forest lands in FRCC 1 and 2. The fire behavior associated with these categories compared to FRCC 3 is safer, and more easily fought by fewer resources, thus reducing the size of fires and their associated costs. Maintenance of these treatments will be accomplished by the extensive use of prescribed fire. Hall Ranch in conjunction with past treatment activities along with future activities will continue to move towards a greater percentage of national forest land in FRCC 1 and 2. Benefits to firefighter safety, public safety, and protection of natural resources from catastrophic wildfire outweigh the short term impacts upon the land during treatment.

Under the Proposed Action, future maintenance prescribed burns may be necessary to maintain proposed treatment effectiveness. Reentry for mechanical treatments to maintain canopy spacing may also be necessary. Both actions will have cumulative effects to the area in the form of smoke and soil impacts. Prescribed burning and wildfires in adjacent areas may also impact the assessment area with smoke. Adhering to ADEQ regulations will ameliorate impacts of smoke from prescribed burning within the project area.

Smoke Effects

The Hall Ranch WUI lies within Smoke Management Unit 3 (SMU) as defined by the Arizona Department of Environmental Quality (ADEQ). This SMU includes Springerville, Show Low north, Flagstaff east, and north into portions of the Navajo reservation. Other impacts to this SMU may come from federal, state and private entities and are regulated through ADEQ. The smoke impacts from any burning on Hall Ranch Project will be of short duration and will be coordinated with ADEQ. The Best Management Practices (BMP's) outlined the ADEQ Smoke Management Plan will be followed. ADEQ monitors and regulates smoke emissions in each SMU and regulates each burn in the SMU and those of adjacent SMUs so as to not have an impact on communities. At the district level, adjacent projects are monitored and regulated to decrease the impact on different communities within and adjacent to district boundaries, see table 10 for proposed burning. The long-term effect of treatments will be to reduce fuel loads to a level that will allow burns that are of short duration and low emissions due to fact that fine fuels are being burned. Historically emissions from burns in this area have been of a short enough duration and of low enough intensity that they have caused no more than minor inconvenience to the public.

TABLE 11. Future Proposed Burning on Springerville Ranger Distitict

Project	Planned date	Type of burn	Acres	Dist from Hall Ranch
Atascacita Grasslands	2009 - 2012	Piles/Broadcast	1040	2 miles
Eagar South WUI	2008 - 2010	Piles/Broadcast	1000	12 miles
Front Range Broadcast Burn	2009 - 2011	Broadcast	2000	2 - 19 miles
Greens Peak	2010 - 2011	Piles/Broadcast	150	4 miles
Greer WUI	2008 - 2010	Piles/Broadcast	1500	6 - 10 miles
Iris Spring	2009 - 2011	Piles/Broadcast	100	3 miles
Mineral BX	2009 - 2011	Piles/Broadcast	3200	5 miles

Vegetation

Affected Environment

Existing conditions –

Potential Natural Vegetation Types (PNVTs) represent the vegetation or forest cover type that historically evolved to dominate a site, or could reach/maintain 'climax' again, had more typical fire intervals and intensities remained on each site as a normal ecological process. (For example: A site with strong evidence of pre-European settlement pine dominance, now having abundant post-settlement composition of other mixed conifer species, is not classified as an existing mixed conifer stand, but rather as a pine site which has departed from its natural range of variability.)

The "pure" **Ponderosa Pine Type** (**PP)** covers approximately 1,204 acres in 17 stands, occurring primarily below 8800 feet elevation with only 2 stands found above 8800 ft. It is dominated by PP, but has a mix of secondary species found within these stands, including: alligator juniper, one-seed juniper, rare occurrences of isolated pinyon pine, and various minor numbers of woody shrubs on more xeric (dry) pine sites. Post-settlement Douglas-fir (DF), Southwestern white pine (SWP), white fir (WF), and small aspen (AA) clones are common associates on the more mesic (moist) pine sites. Woody shrub species present in the PP type include Arizona wild rose, buckbrush and wax currant.

The PP type acreage is stable in many stands, but is increasing into all grassland sites. It is also trending toward conversion to the Mixed Conifer type in 6 stands, given the artificially long fire return interval permitting more shade-tolerant mixed conifer species to encroach in the under- and mid-stories. This trend is not ecologically desired; as such an unaltered type conversion may not be sustainable in the event of a severe wildfire, likely resulting in the loss of PP from the site also. Off-site DF and WF trees as large as 16"dbh found growing in the pine type and acting as ladder fuels trees under the pine overstory were drilled and aged at only 30 to 42 years old. Alternatively, the acres of this PP cover type are trending to increase as pine encroachment into grasslands converts the grass sites to behave as pine forest.

Primary insect/disease concerns existing in this type are bark beetles and dwarf mistletoe. No pine stands have an oak component, and thus none provide Mexican Spotted Owl (MSO) key habitat as defined by the MSO Recovery Plan.

The **Mixed Conifer** (**MC**) type occurs on 783 acres total. It is further subdivided into "Dry MC" (346 acres in 9 stands) and "Wet MC" (437 acres in 12 stands), based on current and presettlement evidence of species found to have reached the late seral/climax stage on the site historically. Primary insect/disease concerns found in this type are various species of bark beetles, dwarf mistletoes in DF, PP, SWP, ES, and root rots. All MC stands meet MSO Recovery Plan definitions of Restricted and/or Protected owl habitat.

Dry MC

When functioning within their natural range of variability, most "dry/warm" or "frequent fire" MC sites typically fall within Fire Regime **I**, as forest stands evolved with relatively frequent fire return interval of 9-22 years on average, and a surface fire type of low-moderate severity wildfire. Native tree species suited to reach a regular fire 'dis-climax' on these sites include PP, DF, and SWP, with aspen acting as a subdominant seral species. These species have evolved with physiological adaptations and reproduction strategies to survive low to moderate severity wildfires.

Both pre-European settlement pines and large Douglas-firs appear to have co-existed there together for numerous decades, and both are reproducing successfully along with some aspen and white fir post-settlement encroachment. Numerous pockets of post-European settlement PP, SWP, DF, and WF have come in quite densely stocked, which has occurred in the absence of regular fire. Within this project area, the Dry MC acreage appears stable to trending slightly downward, due to fire exclusion, encroachment of more shade-tolerant (wet MC) conifers into the under- and mid-stories, and widespread dwarf-mistletoe infections attacking PP, DF, and SWP. Given that several normal fire cycles have been missed in most of these stands, they are more likely now to burn abnormally as total stand-replacement wildfire events.

Wet MC

When functioning within their natural range of variability, most "wet/cool" or "infrequent fire" MC sites typically fall within Fire Regime **III**, as forest stands evolved with relatively infrequent fire return interval varying from 22-150 years on average, and a mixed-severity fire type of moderate-high intensity wildfire. Native tree species suited to reach climax on these sites include WF, blue spruce (BS), Engelmann spruce (ES), and corkbark fir (CBF), with DF and Aspen as dominant seral species. PP may also be present in minor amounts as a seral species. The spruces, true firs, young DF, and above-ground aspen do not tolerate any degree of fire well at all. They have no physiological adaptations permitting them to survive wildfire or controlled fire, but rather relinquish their post-burn acreage to a type conversion composed of grassland, forbs, shrubs, aspen regeneration (if roots capable of producing ramets are present), followed by early seral conifer species suited to the micro-site (if a nearby seed source is present).

Within this project, the Wet MC acreage appears fairly stable but is trending toward higher dominance by the WF and BS climax species, with some more recent occupation by true Spruce-Fir forest type species such as ES observed in at least 3 stands. Of greatest importance to note is that all Wet MC stands are now uniformly in the late seral/climax successional stage, which means they are all ripe to burn very hot at about the same time, quite possibly in one wildfire event._These stands are rapidly losing their patches of early seral stages and species of aspen and pines that historically served to cause wet MC stands to burn in patchy or small stand-scale replacement fires typically under 50 acres in size. This means that all Wet MC stands will now burn continuously in a larger scale replacement fire that is

abnormal wildfire behavior for this type. Moreover, under the right seasonal conditions they could likely generate enough crown fire and heat to carry across the adjacent Dry MC stands as well.

So it must be recognized that the majority of mixed conifer acres are not sustainable in their present state.

The **Aspen** (**AA**) subtype exists on approximately 1,124 acres in 25 sites across the project area as an important seral species within both the PP, and MC Dry and Wet types. Pure aspen sites within their normal range of variability typically do not burn well and can help slow wildfire spread across the greater forested landscape. However, practically no totally pure aspen stands or clones were found to exist at this time. Various amounts of young to advanced conifer regeneration exist within and around every aspen clone seen. Likewise, many AA clones now have heavy accumulations of logs and down woody fuels built up underneath them. Nearly all aspen clones in the project area are in obvious decline due to tree mortality and stress by long-term conifer competition, persistent ungulate browsing of aspen sucker shoots, decay organisms introduced through bark wounds, severe weather extremes, and several years of drought. In their present state, practically all AA found in the MC stands would burn the same as the MC type will burn.

The **Grassland/Savanna Type** (**GS**) exists on approx. 280 acres in 13 sites, and is covered with a mix of graminoids and annual/perennial herbaceous plants. Presettlement tree cover is very sparse, but post-settlement pine abounds. At lower elevations sparsely scattered junipers also occur. At higher elevations adjacent to mixed conifer sites, some aspen and other conifer species are also present. Scattered buckbrush, AZ wild rose, and occasional Ribes species (orange gooseberry and wax currant) exist as woody shrubs. Existing herbaceous plant cover varies from <1 foot to 4 feet tall on average, and may be continuous enough to carry a ground fire where rocky ground or heavy use by ungulates does not occur. Pine needle litter accumulations exist under patchy tree cover where shade has caused grass cover to decline. Grassland acres are now trending toward patchy to nearly continuous tree cover, as post-European settlement PP seedling/sapling encroachment has progressed into these sites in the absence of frequent fire. Acreage of the grass cover type is in a decreasing trend, as pine encroachment into grasslands tends to convert the site to eventually function as pine forest.

Alternative Effects

According to this silvicultural analysis of vegetative trends and responses, the resulting estimated alternative effects are generally summarized below. Different spatial and temporal scales used for cumulative effects analysis of each vegetation attribute are defined in the Silviculture Specialist Report.

No Action: Given the existing forest and grassland conditions, if left untreated the majority of acres would fail to meet the desired condition (DC) for defensibility against wildfire and would continue to depart further from that DC. Neither would forest health be improved. With no new management actions undertaken, all forested and grassland vegetation condition would still not be static. Changes from existing conditions will continue to occur on their own, as dynamic natural processes would most likely follow the trends already underway.

Direct/Indirect Effects

Most trees will keep growing at variable rates in height, bole diameter and crown-spread, as dictated by available growing space, sunlight, water and nutrients. Some trees of various sizes will succumb to density related mortality, but a surplus will remain as flammable ladder fuels and main canopy fuels. Tree size/age class diversity would remain highly disproportionate with a huge surplus of VSS 3 (5-12"dbh range). Forest structure and wildlife habitats would keep trending into more decadent, densely-stocked, multi-storied stands, with interconnected canopies and late successional status tree species dominance in all stories. Likelihood for sustained crown fire would keep increasing. As a result, overall forest health on most acres would also continue to decline, with less resiliency to survive severe or uncharacteristic environmental disturbances.

Acres which are severely departed from their historic range of natural variability (FRCC 1) have a high risk of key ecosystem component losses (like large/old trees, aspen, and topsoil) due to extreme disturbances such as uncharacteristic wildfire or pest epidemics, with inability to re-grow trees and/or invasion by non-native species more likely as indirect results. The 39% of vegetated acres most severely departed now (FRCC 3) would increase to approximately 74% short-term (next 11-20 years) and possibly 88% in the long-term (21-40 yrs), as current sites trending from FRCC 1 to 2 and FRCC 2 to 3 would continue unchecked.

Insect/disease/stress levels will remain and/or increase and spread. In particular, approximately 81% of the area would remain overstocked with stand densities at or exceeding 80 sqft./acre basal area (BA), which equates to a high risk for bark beetle attack. A total of 39 sites would have dwarf mistletoe infection levels left unchecked. Unhealthy and old trees will continue to die at normal to above normal mortality rates, thus creating new snags, safety hazards and fuels buildup. Older snags will keep falling at various rates into logs, and logs will continue to slowly decay.

Conifer encroachment into meadows will continue, with increasing tree cover reducing the ability of grasslands to act naturally as effective fuelbreaks against forest fire. Fire-adapted tree species abundance will continue to decline as poorly fire-adapted, shade-tolerant species replace them in normal succession with the absence of major and/or regular disturbance. Aspen would continue to struggle to maintain its place in the ecosystem as conifers continue to crowd, overtop, and shade it out.

Cumulative Effects

Lack of appropriate ecosystem disturbance, either natural or human-caused, is primarily responsible for the existing condition and undesirable trends described above. The sum total of all other past, present and foreseeable future actions is not enough to restore ecosystem health, vigor and ability to survive extreme wildfire at either the project or larger scales. The forested areas not effectively treated or disturbed in the past 25 years and not scheduled for treatment within the foreseeable future amount to roughly 24,104 acres, or 89% of ecosystem management area (EMA) #1604. Most past timber sale cuts over 12"dbh and precommercial thinnings under 5"dbh were partial cuts. They were implemented long enough ago (14 to 26 years) that growth of the remaining trees and new conifer regeneration have negated some treatment benefits, from a live fuels reduction and forest health perspective. Particularly the midstory trees 5-12"dbh which contribute to both ladder fuels and main canopy have not been thinned by past treatments, and are excessively over-abundant today. With this key point in mind, the

estimated total of effective past treatments only amount to about 11% of the EMA. Most aspen is in decline across the entire EMA, due to serious conifer competition, drought, lack of fire, and repeated browsing of clonal suckers by ungulates. The 5,753 acre St. Peters's Dome Vehicle Closure Wildlife Quiet area has prohibited fuelwood cutting of ground fuels for many years.

Proposed Action: If treated as proposed with the recommended mitigations, the majority of forest/grassland acres would meet the project and silviculture desired conditions for much improved defensibility against extreme wildfire, and ecosystem sustainability.

Direct/Indirect Effects

Overall, fewer acres could carry and support an extreme wildfire burn severity. Stands thinned and broadcast burned on accessible slopes ≤40% (treatment areas 1, 2, 3 and 5) would have very few ladder fuel trees left, except for aspen and limited sparse conifers under 2 ft tall. The main canopy would be managed in a much more patchy arrangement, leaving single-to-two-storied groups of patchy "even-aged" appearance, next to groups of different sized trees, separated by treeless interspaces 30 to 80 feet wide between the groups, or a matrix of scattered single/double trees individually spaced apart from their neighbors. This arrangement would break up the main canopy enough to interrupt crown fire spread.

Most stands treated on steep slopes >40% (treatment area 4) would have ladder fuels reduced somewhat by cutting and/or broadcast burning, but only up to 9"dbh. Abundant shade-tolerant species 9+"dbh that tend to retain their lower live limbs could still serve as ladder fuels, although the crown height may be lifted by controlled burning. Well placed, scattered created openings up to 2 acres in size could be used to help break up larger stands on steep slopes to facilitate broadcast burning, as well as to reduce mistletoe infection centers and/or emphasize aspen clone restoration. However, they may not be large enough to ensure that early seral conifer species could become re-established long-term. Due to limited treatment options, the main canopy on most acres will remain dense and closely spaced. Tree spacing on some acres will be partially open and tree canopies on very few acres would be well-spaced. Treatment area 6 (21 acres) would not receive any benefits of treatment, and all statements made above for the No Action alternative would apply to these 2 stands.

Treated acres would be returned to a much more normal range of natural variability, with improved forest health, structure and resiliency to survive a wildfire. Area of FRCC 3 would drop from 39% to 1%, while FRCC 2 would drop from 49% to 18%. Meanwhile, 55% would be returned to FRCC 1 with fire regimes/disturbance patterns, insects/diseases, and vegetation species composition and structure functioning back within their natural historic ranges. The remaining 26% would almost become FRCC 1, but result in a trend toward FRCC 2 due to dwarf mistletoe infection levels not fully controlled in 9 stands to retain ponderosa pine on-site long-term as a key fire-resistant species suited to those sites. Thirty other stands would have dwarf mistletoe levels reduced effectively for the short-term. Infection spread would be controlled but not entirely eliminated within 80 ft. of private lands.

Resulting residual stand densities and tree spacing created by thinning would be fairly consistent with those outlined in the Apache County Communities Wildfire Protection Plan. The majority of treated stand densities would drop from an average range of 68-175 BA existing there now, down to an average of 40-59 total BA left on thinned-with-broadcast burned acres. Steep slope/inaccessible acres treated

only with non-mechanized thinning and/or broadcast burning would be reduced to a range of 90-130 total BA left on average. Along with thinning removal of the worst dwarf-mistletoe-infected trees, these general reductions in stand density would also reduce residual tree competition and stress, thus improving tree health and vigor to help survive drought and resist most insect/disease attacks. Only 9% of the vegetated acres would be left at high risk for bark beetle attack, due to stocking still in excess of 80 BA. Bark beetle risk would be adequately reduced adjacent to private lands, but not entirely within the 2-mile average beetle flight range. A minor number of stands heavily infected with one or more dwarf mistletoe species would not receive complete infection control, due to the project design favoring leaving as many trees 16+"dbh as possible.

Tree size/age class diversity would be improved considerably by reducing the huge surplus of VSS 3 (5-12"dbh range), thus increasing acres dominated by the VSS 1, 4 and 5 size classes. The majority of large conifers over 16"dbh (mostly VSS 5 and 6) would be left uncut. No live trees over 24"dbh would be cut on the 783 acres of mixed conifer type, unless they pose a direct safety threat to human life or utility lines. Trees > 16"dbh would only be removed if they are: post-settlement trees encroaching within grasslands; trees with low live limbs acting as ladder fuels; hazard trees and/or imminent mortality trees within hazard zones; heavily diseased trees or those attacked by bark beetles; or if their removal is needed for creation of VSS groups or group interspaces. It is estimated that on average, less than 1 tree per acre over 16"dbh would be cut across the project, as scattered individuals or very small groups in treatment areas 1, 2, 3 and 5.

An estimated 600 acres would have the majority of large conifer snags dropped for public and fire-fighter safety zones along private lands, powerlines and key fire control roads. The remaining vegetated project acres would have less treatment impact to existing large snags, with reductions on some acres and surpluses left or created on other acres. By leaving LMP required snag numbers where they exist during treatment, approximately 36% of the immediate post-treatment vegetated project area would still meet/exceed the Forest LMP snag policy for large snags 12+"dbh per acre, which would contribute to the diversity unit level snag requirement. New snag recruitment by natural tree mortality processes (such as lightning, old age, disease/insects, etc.) and prescribed fire scorch mortality are expected to replace some snags lost to cutting and/or snag-fall by decay. Overall, the LMP required large snag numbers per acre would still exist across at least 55% of the two diversity units encompassing this project.

Forest LMP old growth stand criteria would be maintained by treatment actions in all stands identified as existing old growth (8% of the project forested acres). However, many of the existing old growth acres are already in decline with high natural mortality rates occurring now, which this project is not expected to reverse before many large trees per acre are lost. No project stands are identified for management as potential old growth to replace them, because the LMP old growth criteria of high stand basal areas and canopy cover are not consistent with long-term WUI objectives. Adequate acreage of potential old growth is available to allocate in the EMA outside this project area, which would not jeopardize fire safety for the two Hall Ranch WUI communities.

Removal of most conifers from grassland sites would return those acres to their true cover types, thereby restoring them as natural fuel breaks scattered across the landscape in strategic locations. Thinning and prescribed burning would typically reduce numbers of fire-prone species like the true firs and spruces, and would leave more fire-adapted species like ponderosa pine, Douglas-fir, southwestern white pine

and aspen favored for early seral site dominance. All stands would continue to have aspen, woody shrubs, and small junipers left uncut, except for some amount of unavoidable logging damage and/or burn kill of smaller trees. Approximately 1,124 acres supporting aspen clones would be maintained and restored by eliminating competing conifers from within/around them, carefully removing the heaviest concentrations of large down logs from beneath them, and avoidance during broadcast burning. Thus, cover type acreages can be expected to shift with reductions in area dominated by the mixed conifer species to beneficial increases in the ponderosa pine, aspen, and grassland types.

Cumulative Effects

Past timber sale harvests done as partial cuts over 12”dbh reduced numbers of large overstory trees and snags, as well as contributed some additional fuel loading, in some areas both at the project and larger scale areas. Older pre-commercial thinnings under 5”dbh failed to remove enough small trees per acre from the understories to effectively interrupt ladder fuels on most acres. The lack of pulp cuts in the 5-12”dbh class for the past 25+ years and interruption of regular fire intervals have made strong contributions to overstocked stands, continuous main canopies and the undesirable existing trends already described. Although past cool prescribed burns in the pine type temporarily reduced ground fuel loadings, they did not effectively thin out dense stands. Only about 110 acres of USFS and private WUI thinnings inside the project, and another 2,908 USFS and private restoration acres at the larger scale have been treated effectively to return those areas to functioning better within their natural range of variability. Fuels reduction thinning/pruning done on certain private lands has provided little improvement for overall conditions at the project and larger scales.

Foreseeable future actions to be done at the larger scale would help restore more grassland type from tree encroachment, mostly directly north of private lands. If implemented, the Hall Ranch WUI project would tie in geographically with the Mineral EMA treatments underway around Greens Peak Hideaways to create a much more fire defensible space provided for both private inholdings concerned. Fuels reduction treatments done and planned for the Greens Peak WUI about 2 miles away, would contribute little toward meeting desired conditions because a nearly continuous canopy of dense/multi-stored timber stands would still be left untreated to the southwest of Hidden Meadows Guest Ranch. The other actions are not enough to restore ecosystem health and vigor at either the project, or larger scale (only 3,108 cumulative acres effectively treated within the EMA). Under 5% of the project area and only 11% of the EMA can be considered as having been or will soon be treated effectively to fully meet WUI and ecosystem objectives. This project would provide another 2,267 acres of vegetation treatments toward that goal in the short-term. It would result in 99% of the project area and an approximate total 19% of the EMA effectively treated to withstand uncharacteristic wildfire. Future followup thinnings and controlled burns would definitely be needed at all scales to achieve and maintain desired conditions.

Watershed

Affected Environment

Existing conditions –

General Project Area Description

The Hall Ranch WUI project area is located on forested volcanic benchlands and escarpments on the northern slopes of the White Mountains. Average annual precipitation ranges from around 18 to 28 inches. The area receives the typical bimodal distribution of rainfall common to northern Arizona with peaks occurring during the late summer monsoon season and the early winter period. Monsoonal rains and rain on snow events typically result in the highest runoff rates in the area. Except for such high runoff events and periods of spring snowmelt, stream channels in the project area are normally dry.

Watersheds

The Hall Ranch WUI, encompassing approximately 2276 acres, is contained entirely within the Little Colorado River Basin. The area of this project is all located within the Little Colorado River Headwaters 4th code Hydrologic Unit (HUC# 15020001). For more information on Hydrologic Units, see the following website. http://water.usgs.gov/GIS/huc.html

The Hall Ranch WUI is contained within the Carnero Creek – Little Colorado River Headwaters 5th code watershed (HUC# 1502000104). The project area comprises only 1.5% of this watershed. All but 11 acres of the project area are located in the Hall Ranch Draw 6th code watershed (HUC# 150200010403) and constitutes about 16% of the total area of the watershed (Table 1). The remaining 11 acres of the project, located along its northern fringes, lie within the Atascacita Draw 6th code watershed (HUC# 150200010407).

Table 1 Project Area by Watershed

5th Order HUC Watershed	6th Order HUC Watershed	Total Acres	Project Area Acres	Proportional Extent of Watershed
Carnero Creek - LCR (1502000104)		155734	2276	1.5%
	Hall Ranch Draw (150200010106)	12953	2265	17.5%
	Atascacita Draw (150200010108)	10565	11	0.1%
	Totals	`	2276	

Streams

No perennial streams are located within or immediately downstream of the project area. The nearest perennial stream downstream of the project is the Little Colorado River about 17 miles below the project area. Riparian vegetation adjacent to stream channels in the project area is very limited and absent in most reaches.

The principal drainage feature of the project area is an unnamed, mostly ephemeral tributary of Carnero Creek which for the purposes of this report will be called **Hall Ranch Draw**. This stream arises on the volcanic bench just to the south of the project area and continues northward in a poorly defined channel across the grassy benchlands in the southwestern portion of the project area. It falls steeply over the escarpment just south of Hidden Meadows Ranch where it enters a boulder field slope. Below this point it occupies the bottom of a steep sided valley incised into the escarpment. Stream gradients in the valley range from around 4 to 7%. The channel is well formed at this point and is often dominated by boulder or cobble size bed materials. The channel shows evidence of considerable runoff during peak flow periods but little if any evidence of riparian vegetation dependent on base flow, subsurface flow, or high groundwater tables. This valley bottom had been logged in the past. An old logging road, not shown on the travel route layer, was constructed along the narrow bottom and in some areas is directly adjacent to the stream channel. The road is no longer passable and its surface has revegetated along most of its length. At the current time it is not a major source of sediment to the stream. However, it is still intercepting flows and concentrating them to points along the stream channel. The channel is inherently stable in these reaches due to rock armoring. However, there is some evidence of nickpoint development in reaches where finer soil materials predominate and especially where the logging road has concentrated overland flow to the channel.

The narrow valley opens into a broader bottomland just south of the private land of Hidden Meadows Ranch. FR8363 crosses Hall Ranch Draw at a ford in this area. Some previous alteration of the stream channel apparently was made to accommodate this ford but there is little evidence of any current erosion problems related to the alterations

Hall Ranch Draw is impounded to form a recreational pond once it enters Hidden Meadows Ranch.

The stream flows out of the private land across a gently sloping grassland (1 to 1.5% gradient) that shows evidence of seasonally wet soils. County Road 1325 crosses the stream in this reach using a culvert. About 1/3 mile below the private land it enters a shallow but steep-sided valley bottom approximately 50 feet wide with gradients of 2 to 4%. The channel is well developed in this reach and inherently stable. It is often armored by cobbles and boulder and shows evidence of considerable seasonal flow capable of scouring and transporting finer bed materials (sands and gravel) and debris through the channel reach. Aggradation appears to be balanced with degradation processes at the current time. There is no base flow or sub-surface flow dependent riparian vegetation in this reach. FR8457 crosses the stream here at a log reinforced ford. No significant erosion problems are occurring at this crossing but the ford is in poor condition for transportation purposes. The road continues to follow the channel slowly climbing above it onto the sideslopes.

At a point approximately ¾ mile below Hidden Meadow Ranch, the Hall Ranch Draw is diverted into a ditch which leads toward Atascacita Sink. It appears that this ditch is capable of diverting most of the flows conveyed by Hall Ranch Draw in normal years. Flows in excess of the ditch capacity continue down the natural channel or, in a few locations, spill out of the ditch towards the natural channel. The natural channel is impounded within ¼ mile downstream of the diversion at a stockpond called Hall Ranch Tank. The tank held no water on the day inspected but is functional and capable of storing water. However, it has no constructed spillway. In past times, flows overtopping the diversion structure have eroded back into its downstream face. The structure is now in danger of being breached by any future spillage. A water right for storage in this stockpond is held by the Apache-Sitgreaves NF.

The channel of Hall Ranch Draw below the stockpond falls steeply over a minor escarpment where a plunge pool carved in basalt bedrock contained the only water found in the stream channel on the date inspected. This plunge pool is beyond the boundary of the project area. The stream channel was dry below this pool. The stream crosses the Forest boundary approximately 1.2 miles below the plunge pool. This length of channel was not inspected.

A second stream channel crosses the eastern portion of the project area. It is an **ephemeral tributary of Hall Ranch Creek**. It arises in a canyon incising the escarpment south of Hidden Meadow Ranch. It has a defined channel but has no recognizable riparian vegetation dependent on base flow, subsurface flow, or high groundwater tables. Bed materials are principally boulders and cobbles with some areas of fine textured materials. Old logging roads are located in or near the bottom along most of its length. In some locations the logging roads are directly in the bottom. There are at least 3 ford crossings of the creek. The roads in the bottom of this drainage as well as a tributary drainage entering from the west are poorly located and should be carefully re-evaluated before incorporated in the transportation plan for this area.

Springs, Wetlands and Water Developments

The principal perennial source of water within the project boundaries is **Patterson Spring** located about ¾ mile southwest of Hidden Meadow Ranch. The spring emerges on the first level of a volcanic bench above the private land near the base of an escarpment of the next higher level of volcanic bench to the south. The spring produces surface flows and near surface flows which maintain riparian vegetation in minor channels and seeps for a distance of at least 1/8 mile downstream. These channels eventually coalesce to form a headwater channel of Hall Ranch Draw. This area is the principal wetland of the project area. Patterson Spring is developed for stockwatering purposes and feeds two metal troughs nearby. (These troughs were not connected to the spring development at the time inspected.) The spring is also the likely source of a private water pipeline leaving Forest land and entering Hidden Meadow Ranch. A second spring area producing surface waters at the time inspected (but in much smaller quantities) is located about 300 feet SW of Patterson Spring in a similar topographic setting at the base of the 2nd escarpment. It is possible that other springs may be found elsewhere along the base of this escarpment.

Topographic maps indicate a spring on National Forest land just to the west of the Hidden Meadow Ranch boundary. This spring could not be found in the field. But the location is near the alignment of the private water transmission line previously described. Wait a Minute Spring is shown on topographic maps in the upper reaches of the previously described ephemeral tributary of Hall Ranch Draw. No evidence of this spring could be found in the field.

The only other potential "wetlands" to be found within the project boundaries are located in the areas adjacent to Above Tank and in the meadow area of Hall Ranch Draw immediately downstream of Hidden Meadow Ranch. These areas likely have only seasonally wet soils.

Earthen stockwatering tanks have been constructed at three locations within the project area. Above Tank is located on the volcanic benchland above Hidden Meadow Ranch, Hall Tank is located between the east boundary of Hidden Meadow Ranch and County Road 1325. Hall Ranch Tank, previously

described, is located NE of Hidden Meadow Ranch on the channel of Hall Ranch Draw. Atascacita Sink is used as a stockwatering facility to hold the water diverted by the Hall Ranch draw diversion previously described.

As noted earlier, a water transmission line from Patterson Spring traverses parts of the project area as it heads to Hidden Meadows Ranch. From Patterson Spring to near the edge of the lower escarpment it is buried. Along the upper part of the escarpment it is laid on the ground surface and consists of a 2" PVC pipe. Towards the lower end of the escarpment it is mostly buried again. For much of its alignment below the top of the escarpment, it follows a boundary fence between the Hall and Green's Peak Allotments. A Statement of Claim was filed in 2002 by Fennemore Craig, legal counsel for AM Ranch Co. L.L.C. of Scottsdale, AZ claiming 0.25 acre foot per annum of water from the spring for stockwatering purposes with a 1/1/1880 priority date. The basis of the claim was that cattle had grazed the area since 1880. No mention of the development of the spring was made in the claim or that the claim was on Federal land. No special use permit has been issued for the water transmission line. The Apache-Sitgreaves National Forests had also filed a claim on the spring in 1979 for stockwatering purposes with a similar priority date. The diversion may possibly be in trespass and needs to be further investigated. The alignment of the transmission facilities need to be determined before the area is accessed by heavy machinery.

The diversion ditch from Hall Ranch Draw is still operative but is in a state of disrepair along the lower portion of its length. Existing roads (FR8455 and FR8455a) and an abandoned section of road between private land in Section 19 T9N R27E and Atascacita Sink capture most if not all of the flow of the ditch. Immediately beyond FR8455, the ditch shows no evidence of recent flows. The original road bed became the conveyance system for the water in the ditch and was severely eroded by the flows. This road has been abandoned and a second road formed parallel to it. Despite attempts to reduce the erosion on the old road surface by the use of waterbars, it continues to erode and in places now is more characteristic of a stream channel than a road surface. The new road is itself capturing flows from the old road surface and is in danger of suffering the same fate as the old road. At a point about 0.25 miles above Atascacita Sink it eventually conveys at least a portion of the diverted flows back into the original ditch. This ditch and FR8455a convey the remainder of the diverted waters to the sink. There was water in the sink when visited. If the sink were to fill to capacity, water would begin to flow down a gentle drainage back to Hall Ranch Draw.

Soils

Selected interpretations of Terrestrial Ecosystem Survey units are described below by groups with similar characteristics.

The soils of TES mapping unit 16 are found in alluvial landscape positions in either perennial wetlands or in areas seasonally saturated to the surface. These soils are highly productive but susceptible to mechanical impacts from heavy equipment to stream banks and rutting/compaction when wet. The soil condition of this unit is generally satisfactory, however, this is an area where cattle or wild ungulates will congregate which may result in impaired conditions. These units are associated with ephemeral and intermittent drainages.

Mapping unit 515 is within the transition vegetation zone between woodland and forest. These soils are rated as having satisfactory watershed condition.

Mapping units 532, 537, 538, 543 and 591 fall within the Pipos/Quga vegetation taxonomic unit. These units are rated as having satisfactory watershed condition. The soils are moderately drained, and are generally moderately deep and deep. Soils within these units have low soil strength when saturated, and are moderately susceptable to deep soil compaction and rutting under wet conditions.

MU 550 is a grassland unit associated with ponderosa pine vegetation type. This unit is generally in satisfactory soil condition, with some localized areas of impaired condition where ungulates concentrate. The soils are moderately deep and deep, with 3 to 6 inches of loam or clay loam surface texture over clay to very stony clay subsurface horizons. Erosion hazard is slight, but the soils have severe limitations for unsurfaced roads due to low soil strength when wet. Minimum effective ground cover for this unit to prevent loss of soil productivity is 40%.

Mapping units 561, 567, 574 and 577 represent soils of the mixed conifer vegetation type. MUs 561 and 577 have satisfactory soil condition, with moderately deep and deep, moderately well drained soils. Minimum effective ground cover recommended for these soils is 40% to prevent loss of soil productivity. MU 567 occurs on north aspects of cinder cones, (on south aspects at higher elevations) with slopes of 16 to 80%. Minimum ground cover percentages for areas of management activity are 60% at 25% slope or less and 80% effective ground cover at greater than 25%. MU 574 occurs on moderately steep slopes. This unit has a severe erosion hazard rating, and requires minimum effective ground cover of 65% to prevent loss of soil productivity. Soils within these units also have low soil strength when saturated, and are moderately susceptible to deep soil compaction and rutting under wet conditions.

Mapping unit 583 represents soils within the spruce/fir vegetation zone. These soils are also in satisfactory soil condition. MU 583 is rated moderate for erosion hazard and un-surfaced road limitations. A minimum effective ground cover of 50 percent is recommended to prevent accelerated soil loss.

Direct/Indirect Effects

Alternative 1 - No Action Alternative

Scenario A (w/o Subsequent Wildfire)

Under this alternative and scenario, current upward trends in condition of riparian areas, wet areas, springs, stream channels, water quality, upland soils, and overall watershed condition found within the Hall Ranch project area would be expected to continue. This alternative and scenario would result in the fewest short term impacts to the above mentioned resources of the alternatives. In the absence of subsequent wildfire, the upward trends in condition would be expected to continue. Water quantity as measured in runoff of surface streams would stay steady or experience a slight decline.

Scenario B (with Subsequent Wildfire)

Under this alternative and scenario, the short term impacts to soil and water resources would be similar to the previous scenario. However, the risk of damaging wildfire occurring in the watershed remains high or increases over time. In the event of a serious wildfire, some soil and water resources would be severely impacted. Tree canopy densities, and vegetative and litter ground cover would likely decline dramatically across much of the area. Combined with the potential development of hydrophobic soil conditions, these reductions would likely result in dramatic increases in surface runoff and associated soil erosion across the forested areas of the project area. Long term fertility rates would likely decline due to loss of soil depth, soil organic matter, and due to reductions in potential future inputs of organic matter to soils. In grasslands, these impacts would likely be much lower in severity or perhaps result in long term improvements to soils as lower fire severities here may actually stimulated greater growth in graminoid vegetation.

Dramatic increases in flood flows would be expected to occur in stream channels across the project area. These flows could destabilize stream beds and banks resulting in areas of long term channel degradation and raw unstable stream banks. Loss of large woody debris in the channels could also help to destabilize some stream reaches. Inputs of sediment from side slopes could result in areas of excessive stream aggradations. Damaging flood flows and excessive inputs of sediment may also have negative impacts on riparian and wetland vegetation within the project area.

Water quality in surface streams would likely decline dramatically immediately after the fire due to the input of ash and sediment from adjacent sideslopes. Destabilized stream channels and banks could result in longer term impacts to water quality due to chronic inputs of sediment from these instream sources. (Although severe on a local level, these water quality impacts would have minimal impact on aquatic resources since the nearest perennial stream, the Little Colorado River, is 17 miles below the project boundary.)

The flow of springs in the burned area and overall surface water yield in project area streams would likely increase for several years due to a reduction in evapo-transpiration in the burned area. This effect would be greatest in areas where mixed conifer stands are severely burned. The potential positive effect of increases in water quantity however, would likely be offset by the negative impacts on water quality and on the greater risk of damaging flood flows.

Overall this alternative, under conditions of wildfire, would result in the highest level negative long term impacts to soil and water resources of the alternatives in this project.

Alternative 2 - Proposed Action Alternative

Under this proposed action alternative, thinning, harvest, slash disposal, and prescribed burning operations will result in short term negative impacts to some soil and water resources. The principal negative short term impacts will result from the disturbance of ground cover on project area soils by project activities with consequent increases in soil erosion. Use of mechanized equipment to access extensive areas of the timbered portion of the project area, will result in some compaction of forest soils, particularly those with low levels of rock in surface soil horizons. Increases in surface runoff and soil erosion will be particularly associated with skid trails, landings, and roads temporarily opened for

access, harvest and processing activities, and product transport. These effects will consequently result in a short term negative effect on water quality caused by an increase in sediment reaching streams in the project area. Consequent prescribed burning activities will also result in ash being conveyed to stream channels in the area. These impacts will remain within acceptable levels through strict implementation of Best Management Practices (BMPs) designed to limit the impact on watershed conditions and water quality. Of particular importance are those BMPs which limit activities within streamside corridors and during periods of wet soil conditions, and which address proper road drainage. No violations of State water quality standards are anticipated as a result of this project.

Project activities will result in a short and long term reductions in large woody debris available for input to stream channels with possible minor impacts long term channel stability. Riparian and wetland areas within the project area will be only minimally affected by project activities since these areas are generally excluded from mechanical entry or will be entered during periods of dry soil condition. Less woody material will be available for input of organic material to forest soils. However, BMPs will be implemented to maintain sufficient woody debris to maintain long term forest soil fertility. The above negative effects will be counterbalanced in some areas by a long term increase in graminoid groundcover and organic matter input due to the opening of forest canopies and to treatments in conifer invaded grasslands. Also those areas where lop and scatter thinning and slash disposal are practiced would experience a positive impact from increased ground cover and organic matter input to soils.

Water yield may increase somewhat especially in years of high precipitation as a result of reductions in forest evapo transpiration (particularly in treated mixed conifer stands). This increase would be lesser in magnitude and duration than that described under Alternative 1 with subsequent wildfire scenario.

An important potential positive long term effect on soil and water resources is related to the reduction of hazardous fuels in the project area (which is the objective of the Hall Ranch WUI project). With the reduction of hazardous fuels, the risk of damaging wildfire occurring in the project area is reduced. If a future wildfire does occur in the project area, its intensity, severity and areal extent are likely to be less than in the No Action w/subsequent Wildfire alternative and scenario. Therefore the wildfire impacts to soil and water resources would likely be less severe than those described under that alternative.

In summary, the short term impacts to soil and water resources due to implementation of this project will be greater than those described under the No Action alternative. However, the long term effects of the project activities would be to reduce the risk and magnitude of the negative effects to soil and water resources of a damaging wildfire. It is appropriate to consider the balance between the manageable and acceptable level of short term impacts on soil and water resources of the proposed project and the unmanageable and severe long term impacts posed by a future wildfire under the No Action alternative

Cumulative Watershed Effects

Cumulative watershed effects are considered on a watershed basis. The nature of the activities and of the anticipated impacts from this project indicates that cumulative effects are most appropriately analyzed at the 6th Code watershed level. On the A-SNF, these watersheds are generally in the range of 10,000 to 20,000 acres in size. At watersheds much larger than this level (5th code), the additive effect of the impacts from this project would be extremely small relative to those arising on all the other lands in the watershed and be immeasurable.

An "Equivalent Disturbed Area" (EDA) analysis was used to compare the impacts of past, existing, and future activities, events and developments both on the Forest and on private land within the Hall Ranch Draw watershed. The model used in this analysis calculates the runoff inducement potential of various activities, events and developments and indexes them to the runoff potential of open roads. Thus the EDA figure represents the percent of the watershed area which will have runoff related disturbance levels equivalent to that of being in a roaded condition. Existing long term developments, such as roads and private land development, are included in the analysis with their impacts considered permanent and included in all alternatives. Past non-permanent ground disturbing / runoff inducing activities such as fires or timber harvest over the past 25 years are considered. Beyond that time frame, the present impacts are considered negligible due to hydrologic recovery. Ten years is considered the foreseeable future planning horizon as concerns the EDA analysis. No known ground disturbing/ runoff inducing projects have been identified in the Hall Ranch Draw watershed either on public or private lands for that period.

When the cumulative EDA for past, existing, proposed, and foreseeable future activities reaches 15% for a 6th code watershed, the situation raises a "red flag" that the total ground cover disturbing and runoff inducing activity in the watershed may be reaching levels that could signal potential deleterious impacts to watershed resources, particularly stream channel stability and water quality. The application of this type of analysis has been a standard practice on the Apache-Sitgreaves National Forests since the early 1990's. (Lovely, 1991). The A-SNF model is an adaptation to fit local conditions of Cumulative Watershed Effects (CWE) models developed in Region 5 of the Forest Service. (See for example the Equivalent Roaded Acres section of Kuehn and Coburn, 1989)

For this project, an initial analysis was performed to determine if there is any potential to reach the threshold level under a "worst case" scenario. Under this scenario, the disturbance related to all past and current activities were calculated to the year 2010, assumed to be the first year of implementation of the Hall Ranch WUI project. The proposed activities of the Hall Ranch WUI project are modeled as if they will all be implemented and completed in the year 2010 instead of the approximate 5 to 10 year period anticipated for full implementation. The analysis is described in detail in the report "Cumulative Watershed Effects Analysis – Hall Ranch WUI", which can be found in the project records.

The analysis (summarized in Table A below) indicates that at the present time, the cumulative watershed impacts as measured by EDA are very low in the Hall Ranch Draw watershed, amounting to only 1% of the watershed. Most of that impact comes from roads in the watershed. The "worst case" analysis results indicate that when the effects of activities proposed in the Hall Ranch WUI project are compressed in time so as to occur in just one year (2010), their additive impact still leaves the EDA in the watershed at only 7.8%, well below the 15% "red flag" level. This result indicates that the cumulative impact of the Hall Ranch WUI project, when added to the impacts of past, present, and foreseeable activities, events and developments, will likely not result in any unacceptable impacts to watershed resources and, therefore, there is no need to consider further actions to reduce the cumulative impact of this project.

It must be noted that the calculation of percent of watershed in EDA should not be considered an absolute indication that a watershed will or will not be negatively impacted by a proposed action. The resulting EDA figures require professional judgment for adequate interpretation. They are meant to

assess the hazard of the scale and the duration dimensions of disturbance in a watershed. As such they indicate where changes in scale, duration, nature, or timing of project activities may require adjustment. They do not address the site specific hazards of activities on various watershed functions. Addressing these hazards will require strict adherence to BMPs developed for the project and, in some cases, such as treatments in riparian zones, further on-site development of treatment prescriptions and mitigating measures by resource specialists before and during project implementation.

Table A: Results of "Worst Case" EDA Analysis for Hall Ranch WUI Project on the Hall Ranch Draw 6th Code Watersheds

	Equivalent Disturbed Area (acres or % of watershed
Total Existing EDA (acres)	**128.1**
As % of Watershed	**1.0%**
Total EDA in No Action Alt (acres)	**128.1**
As % of Watershed	**1.0%**
Total EDA in Action Alt (acres)	**1005.9**
As % of Watershed	**7.8%**
Watershed Size (acres)	**12,953**

Wildlife and Fisheries

Affected Environment

Existing conditions –

The Hall Ranch project is approximately 12 miles west of Springerville and Eagar, Arizona. It is within the Springerville Volcanic Field, which has rolling terrain punctuated by steep cinder cones. Elevations range from about 8,000' above sea level in the north to 9,000' in the south. The topography of the north half is relatively rolling and flat, with slopes ranging from 0%-20%. South of the Hidden Meadows resort area, the topography consists of steeper terrain, with generally northeast-north-northwest facing slopes ranging from 20%-45%. The southwest sections are somewhat flatter and have the highest elevations within the project area.

There is a small riparian area to the south of Hidden Meadows Ranch, which accounts for less than 1% of the project area; rocks, water, and barren areas also account for less than 1%. There are no significant rivers, creeks, or lakes present.

No terrestrial or aquatic species with Federal status are known to exist in the project area. Mexican Spotted Owl potential habitat does exist in the project area. Occasional transient Mexican Wolves may forage in the project area but there are no denning sites within the Hall Ranch WUI Project Area. There are no Northern Goshawk Post-Fledgling Family Areas (PFA's) within the project area, however potential habitat occurs throughout the project area.

Desired conditions (DCs) –

Return and maintain the majority of forested lands within the analysis area to a Fire Regime Condition Class 1. Forested lands in this class can sustain fire without significant alteration to forest ecosystem components and fires within the urban interface will be more easily managed by the existence of defensible space. This will provide for homeowner and firefighter safety while allowing for direct attack of fires and a high probability of success in containment.

The objectives of returning the area to condition class 1 can be accomplished by increasing crown spacing, reducing ladder fuels and reducing surface fuel loading to more historic pre-settlement levels. This will produce a condition wherein crown fire initiation potential and potential for independent crown fire spread is greatly diminished and will help protect and enhance terrestrial and aquatic species habitat.

Another Desired Condition is to restore the open grassland habitat by mechanically treating trees that have invaded the grassland habitat and reintroduce periodic prescribed fire to maintain the open grassland conditions. Grassland restoration is also intended to increase cool season herbaceous species that are important to a variety of wildlife species.

EFFECTS OF ALTERNATIVES TO THREATENED, ENDANGERED, PROPOSED, AND SENSITIVE SPECIES

The Hall Ranch WUI Project is being analyzed through an interdisciplinary process occurring during the 2008 calendar year. That process will be documented in the Hall Ranch WUI Project Environmental Assessment (EA) and Decision Notice (to be completed and signed upon completion of consultation for both fish and wildlife) and will be found on file at the Springerville District Office in Springerville, Arizona. This specialist reports is based on the effects of the no action and the one action alternative as described in the proposed action above and as identified in the Hall Ranch WUI Project EA.

ALTERNATIVE 1 – NO ACTION

The current condition in the Hall Ranch WUI is not altered through treatment under this alternative. The Project area would maintain 2, 267 acres of forest land at the current tree density. Current fuel loading, accumulated through wildfire suppression, will continue to threaten the watershed with the potential for catastrophic fire for all species. Conifer encroachment will continue in meadow and riparian habitats, decreasing forage production for grazing species. This alternative will not provide improvement to habitat for forage production for wildlife species that depend on healthy browse and grass components. Since no treatments will occur, there will be no actions to stimulate the growth of these habitat components. Wildlife populations are not expected to change significantly, with the implementation of the no action alternative.

THREATENED, ENDANGERED, PROPOSED & SENSITIVE-

The no action alternative will result in no direct impacts to TEPS species, although continued threats to species viability would be significant. Catastrophic fire hazards would remain in the project area. The

MSO Recovery Plan identifies catastrophic fire as the major threat to Mexican Spotted Owls. The no action alternative, will not reduce the high catastrophic fire potential. The no action alternative will do nothing to help create habitat diversity and attempts to restore natural forest conditions. This alternative would not create any short term disturbances to TEPS species from treatment. There would not be any effects as a result of mechanical treatment or prescribed burning activities as proposed by the action alternative. The no action alternative will result in the least short-term impacts but could result in the greatest long-term indirect negative effects to TEPS species if a catastrophic fire event should occur.

Cumulative Effects

The no-action alternative would allow current effects to continue which would continue to contribute to cumulative effects. Present management of the project area would keep terrestrial and aquatic species habitat at high risk from catastrophic fire. Fire risk would continue to increase with the no-action alternative and the impacts could accumulate with other actions or events.

ALTERNATIVE 2 – PROPOSED ACTION

The current condition in the Hall Ranch WUI project area is altered through treatment under this alternative. The potential for catastrophic fire will be lessened from current conditions. Current fuel loading, accumulated through wildfire suppression, will be reduced through timber harvest and prescribed burns. Conifer encroachment will be addressed through meadow treatments, increasing forage production for grazing species. Maintenance prescribe burns will be conducted and will provide improvement to habitat for wildlife species that depend on healthy browse and grass components. Wildlife populations are not expected to change significantly, with the action alternative.

THREATENED, ENDANGERED, & PROPOSED-

This analysis represents treatment assumptions as described above in the Proposed Action.

The Hall Ranch WUI BAE concluded that the proposed project will have no effect to the Southwestern Willow Flycatcher and Critical Habitat, Apache Trout, Little Colorado spinedace and Critical Habitat, or Loach Minnow and Critical Habitat. There is no habitat in the action area for these species. The proposed project is not likely to adversely affect the Mexican Spotted Owl or Chiricahua leopard frog and is not likely to jeopardize the Mexican Gray Wolf.

In the long-term this project will improve the production of grasses and understory vegetation, which are important to many TEPS species by removing some of the overstocked forested stands. There may be short-term impacts due to the modification of vegetation and disturbance during implementation, but these impacts will be of short duration and are not likely to jeopardize the continued existence of threatened or endangered species or result in a trend toward federal listing or loss of viability of any species. See Biological Assessment and Evaluation for effects determination for each species. Also see the Biological Assessment and Evaluation for cumulative effects for each species.

SENSITIVE

Riparian

Species utilizing riparian or aquatic habitats within the Hall Ranch WUI action area may be directly and indirectly impacted by timber removal, pile burning and broadcast burning throughout the treatment areas. Designated sensitive species that have potential habitat in the analysis area or are known to occur include: American Peregrine Falcon, Mexican garter snake, Northern leopard frog, Arizona southwestern toad, Arizona copper, Mountain silverspot butterfly, Goodding's onion, Blumer's dock, Wislizeni gentian, Gila groundsel and White Mountain clover.

Amphibian, reptile, bird, mammal, plant and insect groups that are dependant on riparian habitats will not experience direct disturbance in the majority of these habitats in the action area. In the project area, riparian habitats that will likely see some level of direct disturbance include those associated with Patterson Spring, the wet meadow around Above Tank, and along the drainage in stand 42. These treatments will be designed to protect riparian and will be treated to encourage a more desirable deciduous species assemblage. Best Management Practices, including drainage buffers, will be implemented to minimize soil movement and ground disturbance during treatments. The effectiveness of the buffer strips will be enhanced with the staging of timber treatments and prescribed burns in multiple year phases.

Amphibian, reptile, and insect groups that are dependant on riparian habitats may be affected indirectly by project implementation. In conjunction, fuel load reductions and prescribed burning may indirectly affect riparian dependant species through increased sediment delivery into the streams, which may affect water quality, instream habitat structure and available prey base.

Over the long-term, the fuel reduction treatments should be beneficial to all riparian dependant species as the chances for catastrophic fires are decreased.

Determination of Effects. Based upon the above discussion, Sensitive species associated with riparian areas may have individuals of a species impacted but this disturbance is **not likely to result in a trend toward Federal listing or loss of species viability**

Cumulative Effects:

For aquatic sensitive species such as northern leopard frog, Arizona southwestern toad, Arizona copper, and White Mountains water penny beetle, consideration for cumulative activities that affect overall watershed functionality must be analyzed in relation to stream functionality for these aquatic dependent species. This analysis is based upon an “Equivalent Disturbed Area” (EDA) model described in the Cumulative Watershed Specialist Report analysis for this project. This model estimates the amount of runoff induced over time by various management activities and wildfire. Induced runoff is considered a primary effect since many impacts such as erosion, sedimentation, and channel stability are runoff induced and can adversely affect aquatic sensitive species populations. The calculated EDA is compared with a conservatively derived threshold level of 15% of the watershed area to warn if the level of activity under a compressed time scale would be considered excessive and therefore deleterious to watershed functions in the watershed. Based upon the *Cumulative Watershed Specialist Report* analysis the “worst case” EDA calculated in the action area for Hall Ranch Draw is 7.8% and is below

the threshold of 15%. Since the project area contains 11 acres or 0.1 % of the Atascacita Draw watershed, effects to this watershed were considered minor and EDA was not calculated. The assumption within the EDA effects analysis was that all treatments would occur in one year and these percentages reflect that assumption. In actuality, treatments including thinning and burning and other associated disturbance activities such as road reconstruction will occur over an estimated 10 year period and EDA levels will be less than disclosed in the analysis and will be well below the EDA threshold of 15%. Over the long-term, the fuel reduction treatments should be beneficial to sensitive species as the chances for catastrophic fires are decreased. With the removal of overstocked trees within the watershed, other long-term benefits to the species could occur. More water may become available for riparian areas as a consequence of less surface and sub-surface moisture being utilized by dense conifer stands. Based upon EDA analysis of the action area for these species, it is predicted that although individuals of each species may be affected by the cumulative actions, that level of effect will not result in a loss of species viability or result in a trend toward Federal listing.

Additionally, past, present and future effects to potential or suitable habitats could occur from the proposed action when combined with a number of actions *not considered as part of the watershed EDA analysis*, including: wild and domestic ungulate grazing impacts in riparian bottoms which raises the potential for increased surface runoff due to vegetation removal/trampling and soil compaction in ungulate concentration areas; water withdrawals from aquatic systems that limit the amount of available aquatic habitat; and habitat disturbances from stock pond maintenance activities such as dredging.

Direct and indirect cumulative effects on species of concern from riparian disturbances and increased sedimentation resulting from the proposed action when combined with grazing and dredging activities described above and activities considered in the EDA analysis are not likely to drastically diminish the quality of habitats in the action area. Of the livestock allotments in the action area, Beehive Allotment was analyzed in 2002 and Greens Peak is currently being analyzed with a decision expected in 2009. Necessary adjustments were made on Beehive Allotment to meet management objectives as stated in the Apache-Sitgreaves Forest Plan including management concerns for TES species. Livestock numbers were reduced to allotment capacity, allowable use standards were implemented to meet the physiological needs of range plants and range improvement structures were developed to better distribute livestock across the allotments. Similar adjustments are expected for the Greens Peak Allotment.

Over both short term and long term timeframes, maintenance of above natural levels of sedimentation will likely occur with the implementation of the proposed action, the continuation of the ongoing ground disturbing actions *not considered in the EDA analysis,* as well as those activities evaluated in the EDA analysis. Cumulatively the described actions will not measurably alter aquatic habitats from their current conditions. Continual sediment inputs from ongoing activities will persist but sedimentation effects are not expected to be at a level to extensively affect species of concern or their habitats for current or future occupancy.

With the exception of continued water withdrawals associated with water rights and continued land development on private inholdings, there are no state, tribal or private actions known that would affect the action area. Continued water withdrawals from the action area drainages will likely continue to affect the suitability of habitats in the action area by diminishing the amount of wetted habitat that is available for the species. Continued development of private lands will increase short-term and possibly long-term erosion rates above existing levels but will not be at a level to affect species viability.

Grassland

Species utilizing montane grassland habitats may be impacted by meadow restoration treatments and maintenance prescribed burns. Designated sensitive species that have potential habitat in the analysis area may be affected by meadow treatments. These species include: Springerville pocket mouse, White Mountains ground squirrel, American Peregrine Falcon, Mountain plover, Arizona copper, Mountain silverspot butterfly, Wislizeni gentian, Blumer's dock, Gila groundsel and White Mountain clover.

Meadow restoration will be accomplished either through prescribed fire and/or mechanical treatment such as machine mowing and chainsaw slashing. Mechanical treatments falling under meadow restoration will be implemented only under dry or frozen conditions to minimize ground disturbance and disruptions to wildlife. This level of disturbance may displace individuals of a species, short-term, but over the long-term the meadow treatments will have beneficial effects to most of the resident species. Short-term displacement of avian, mammal and insect species will likely occur during implementation of both mechanical and non-mechanical treatment and for a relatively short time period after treatment. Over the long-term, retention and expansion of meadow and wet meadow habitats will be beneficial to the insect species that require these open habitat types to retain herbaceous vegetation component. The Springerville pocket mouse, Mountain Plover, White Mountains ground squirrel, and Peregrine falcon, if present, will benefit in the long-term from reduction in the conifer component and the increase in herbaceous species within the grassland/meadow habitats. Benefits to mammal species can be further defined as increases in cover and in vegetative and invertebrate food sources. Peregrine falcon benefits can be defined as an increase in foraging habitat quality. Destruction of sensitive vegetative species could occur for the duration of ground disturbing activities, but effects should not be to the extent that affects species viability. Plant species such as Blumer’s dock,Wislizeni gentian, Gila groundsel and White Mountain clover will benefit long-term from treatments designed to maintain open meadow habitat.

Determination of Effects. Based upon the above discussion, Sensitive species associated with grasslands may have individuals of a species impacted but this disturbance is not likely to result in a trend toward Federal listing or loss of species viability.

<u>Cumulative Effects:</u>

The cumulative effects analysis area for sensitive species within grassland habitat will spatially include the Hall Ranch Draw 6th code watershed, Iris Springs/Ranch Project, Mineral EMA, and Greens Peak WUI project. This area makes up a significant portion of the habitat on the northern portion of the Forest where current data (within the last 10 years) is available and reasonable foreseeable actions are known (see exhibit A cumulative effects data sheet). This cumulative effects analysis area was chosen to analyze reasonable determination of effects to this species and/or its habitat. The proposed treatment includes thinning on approximately 280 acres of grassland habitat. Restoration treatments of this type help maintain grassland habitat.

Past grassland treatments have occurred on approximately 1500 acres throughout the Hall Ranch Draw 6th code watershed, Iris Springs/Ranch Project, Mineral EMA, and Greens Peak WUI project within grassland habitat. It is estimated that over the next 10 years, 3000 additional acres will be treated in grassland habitat throughout the Hall Ranch Draw 6th code watershed, Iris Springs/Ranch Project, and

Mineral EMA project within grassland habitat. This is approximately 27% of grassland habitat throughout the cumulative effects analysis area that will have had grassland treatments including thinning and burning.

If no action or no treatments occur within grassland habitat a higher risk for a severe fire remains, which could damage soils and prevent production of important grasses and forbs. The treatments are intended to reduce the catastrophic fire risk and provide for the long term protection of grassland habitat. Grassland (meadow) treatments help by eliminating competing conifers, and prescribed fire helps improve forage production and condition.

Cumulatively treatments that thin/cut trees and/or prescribe burn create a more open forest which is very beneficial to all sensitive species. Overall, cumulatively the treatments are expected to be beneficial to sensitive species because forage production and condition will be improved in grassland habitat. There are no known state, tribal, or private actions planned within the action area.

Forested

Sensitive species found within forested habitat in the proposed Hall Ranch WUI project area that may be affected by timber harvest include the Northern goshawk and the Bald Eagle. The analysis of effects for the Northern Goshawk are described below in the MIS section as it is being used as an indicator species for this project. No roosts have been located within or adjacent to the analysis area although potential roosting locations are present throughout this area.

Year-round nesting and foraging habitat occurs in association with reservoirs, rivers, and larger streams. There are some ponds on the private land that are adjacent to the project area that provide a very minimal amount of foraging habitat. These ponds are very small and provide very marginal habitat. Potential perching, roosting, and foraging habitat is present in the project area but it is marginal because there are no reservoirs, larger rivers or streams within or adjacent to the project area. Nesting habitat is associated with large lakes, reservoirs, and rivers which are not present within the project area.

Implementation of treatments will be phased in over several years resulting in decreased disturbance levels. All trees 16” dbh and larger will be retained unless removal is needed to promote a fire resilient stand and forest health. Therefore bald eagle perching, roosting, or nesting habitat will not be modified measurably. The treatments may result in a minor temporary (during implementation which is expected to be a few weeks in each area) disturbance to potential prey base habitat as a result of the use of heavy equipment. Timber treatments will take place during spring, summer, and fall months in normal weather years, and possibly winter months in dry years. Potential roost sites occur throughout the project area. Because only small areas are planned to be treated at any one time per year, potential disturbance is expected to be minimal due to the abundance of potential roost sites available in the area. Bald eagles could be displaced from perch sites during logging operations.

Broadcast burning will take place primarily in the fall but could also occur during spring months of dry years. Bald eagles could be present during burning periods and may be disturbed from perch sites during burning activities. Broadcast burning is not expected to change the availability of bald eagle perch sites although some live large trees could be killed by the activity, reducing the life expectancy of some possible perch sites.

If bald eagle nest or roost sites are discovered in the project areas between now and project implementation, buffers, which will not be treated, will be established. Because implementation will be phased in over years and localized in small areas over the large project area, increase disturbance levels will not be significant. The proposed actions will also have long-term benefits to habitat conditions. Timber harvest or burning could potentially cause short-term disturbance to a bald eagle that may be foraging or roosting in the area but bald eagle perching, roosting, or nesting habitat will not be modified measurably.

Determination of Effects. As required, the proposed action will include all measures required in the National Bald Eagle Management Plan and the Conservation Assessment and Strategy for the Bald Eagle in Arizona to ensure the action does not result in disturbance and or result in a trend toward federal listing or loss of viability.

Cumulative effects.

The cumulative effects analysis for bald eagle will spatially include the Hall Ranch Draw 6th code watershed, Iris Springs/Ranch Project, and Mineral EMA project. This area makes up a significant portion of the habitat on the northern portion of the Forest where current data (within the last 10 years) is available and reasonable foreseeable actions are known (see exhibit A cumulative effects data sheet). This cumulative effects analysis area was chosen to analyze reasonable determination of effects to this species and/or its habitat. The Greens Peak WUI project which is partially within the watershed was also reviewed in this analysis. There is no potential perching, roosting, or foraging habitat in the project area. Therefore the Greens Peak WUI project area will not be used in this cumulative effects analysis.

The proposed treatment includes ponderosa pine trees greater than 16" being left unless removal is needed to promote a fire resilient stand. Also snags within 200 feet of private property boundaries and along key fire control roads will be removed to reduce fuels, spotting potential and provide for firefighter and public safety. Reduced levels of down woody material would result from prescribed burning and some snags would be lost. Snags >12" dbh will be retained beyond the 200' of key fire control roads. While insect and disease incidence is expected to be reduced under some treatment, they will not be eliminated from the landscape so snag recruitment would occur over time. No nesting habitat will be modified with this project because there is no food source concentration point in the area. Timber treatments including the removal of large trees can impact Bald Eagle perching or roosting habitat. Generally perching and roosting habitat occurs in or near drainages. The removal of larger trees will not occur on steep slopes or drainages however; prescribed burns will be used in these areas to reduce fuel loads. The prescription in which fire will be allowed to burn in these areas is intended to minimize the loss of potential perch or roost trees.

Past timber treatments have occurred within the Hall Ranch Draw 6th code watershed, Iris Springs/Ranch Project, and Mineral EMA project within Bald Eagle roosting, perching, and foraging habitat. However, snags have not been removed in these past timber treatments. The Hall Ranch WUI is the only project within the cumulative effects analysis boundary that will be removing snags. The impacts as a result of these treatments and incorporation of the mitigation measures are insignificant because important habitat features are retained and prey species habitat is maintained or improved. This is evident by expanding population levels and new bald eagle nesting that is occurring on the District.

Although some perch trees may be cut, the percentage is very small and there is an abundance of potential roost and perch sites throughout the action area, District, and Forest. If no action or no treatments occur within Bald Eagle habitat then a higher risk from a catastrophic fire is maintained. The treatments are intended to reduce the catastrophic fire risk and provide for the long term protection of Bald Eagle habitat. Based on the following discussion the cumulative impacts of this project and other projects that have occurred or are expected to occur will be discountable because of the mitigation measures used. There are no known state, tribal, or private actions planned within the action area.

MANAGEMENT INDICATOR SPECIES

MIS Project Level

All Forest MIS were reviewed in the Hall Ranch WUI Project Area analysis to determine the appropriate MIS to be analyzed at the project level. Species analyzed below were determined to be present or have habitat within the project area and will be used as indicator species for the project level analysis. Quality project level population baseline information for water (cinnamon teal) and riparian (macroinvertebrates) indicator species is lacking. Localized changes in population trends are most commonly attributed to larger scale factors. For a full discussion of MIS species life history descriptions, habitat requirements, population trends, and status of the current situation for these MIS habitats on the Apache-Sitgreaves N.F. see the 2005 Forest Level MIS analysis. The following table displays the MIS selected for the Hall Ranch WUI project level analysis.

Table 2. Management Indicator Species for the Hall Ranch WUI Project Area

Species Common Name	Water	Forested (MA1)	Woodland (MA2)	Riparian (MA3)	Grassland (MA4)	Habitat Present
Red-naped Sapsucker		X				X
Pygmy Nuthatch		X				X
Hairy Woodpecker		X				X
Mexican Spotted Owl		X				X
Turkey		X				X
Northern Goshawk		X				X
Abert's Squirrel		X				X
Red Squirrel		X				X
Mule Deer		X	X			X
Elk		X	X		X	X
Antelope			X		X	X
Aquatic Macroinvertebrates				X		X

The MIS species listed above were analyzed in the Wildlife and Fisheries Specialist Report for the Hall Ranch WUI project area. The project is small scale and short in duration and will not create any measurable impacts to any MIS species.

In the long-term this project will improve the production of grasses and understory vegetation, which are important to many MIS species by removing some of the overstocked forested stands. There may be

short-term impacts due to the modification of vegetation and disturbance during implementation, but these impacts will be of short duration and are not likely to change the Forest-wide population or habitat trends for any MIS species analyzed. More detailed information on direct, indirect and cumulative effects for each species are included in the Wildlife and Fisheries Specialist Report.

Summary of Cumulative Effects

There are unavoidable impacts associated with treatment activity included in the proposed action. These include a temporary increase in disturbance levels; a short-term increase in large fire potential until treatment of activity fuels is completed; and minor soil displacement prior to re-establishment of vegetation and ground cover. Mitigation measures help reduce these impacts, but they will occur. They are expected to be short term in duration and minor in consequence at the landscape scale.

There are no known current or proposed projects on the adjacent Apache Reservation or lands of other non-federal ownerships proximate to the Hall Ranch WUI that would generate effects that would combine with those of the proposed action to constitute an accumulation of effects on wildlife species. The possible exception would be a combination of smoke from prescribed burns conducted by both the Apache-Sitgreaves Forests and the Apache Reservation during brief burning windows in the spring and fall. But these burns are coordinated through State of Arizona smoke management procedures to mitigate any cumulative effects. There is one large-scale thinning project located on federal land adjacent to or in close proximity to the Hall Ranch WUI project area. This project is the Mineral EMA project (approximately 25,000 acres) which has been partially treated and is still proposed for treatment over the next 10 years. There is also a small scale wildlife restoration treatment project near the Hall Ranch WUI that has been treated over the last 5 years and is proposed for treatment over the next 2-3 years. Because implementation of these projects will be phased in over several years and localized in smaller areas across the landscape, impacts to TES species will be lessened. Localized disturbances to terrestrial species may result in displacement of some individuals during project implementation. Altered habitats may permanently displace some of these species from the areas treated, although considerable amounts of untreated habitat will remain across the landscape. Overall abundance of terrestrial TES species should not be affected. Most of the livestock allotments in the action area have been analyzed within the last 15 years and necessary adjustments were made to meet management objectives as stated in the Apache-Sitgreaves Forest Plan including management concerns for TES species. Livestock numbers were reduced to allotment capacity, allowable use standards were implemented to meet the physiological needs of range plants and range improvement structures were developed to better distribute livestock across the allotments. Current management of these allotments further reduces impacts to terrestrial and aquatic species and their habitats from previous management practices. The described actions can singly or cumulatively affect aquatic species through alterations in stream channel morphology, changes in water chemistry, and the continued dewatering of potential, suitable or occupied habitats. The described actions can singly or cumulatively affect terrestrial species in the short –term during project implementation. Over the long-term, the fuel reduction treatments should be beneficial to all TES species as the chances for catastrophic fires are decreased.

The selection and implementation of the action alternative would best meet the short and long term needs of the greatest number of wildlife and plant populations that occur or may occur in the Hall Ranch WUI project area. Directly and/or indirectly and cumulatively, all TEP/Sensitive/MIS/Game species would benefit the most by the selection and implementation of this alternative because of expected

improvements in their habitat capability and in increased prey species habitat capability and level of fuels reduction. The implementation of this alternative would contribute to 1) reversing the slow decline in habitat quality that resulted from current management direction because implementation will trend habitat and watershed to a more natural condition; 2) maintaining viable species populations; 3) preventing the trend toward federal listing of sensitive species that occur in the Hall Ranch WUI project area, and 4) protecting the area from catastrophic fire.

Transportation

No Action

Direct and Indirect Effects. Under this Alternative, no fuels treatments would be performed and the existing road system within the WUI area would remain as is.

Cumulative Effects. No progress would be made towards the established Objective Maintenance Levels. Roads would continue to deteriorate through use by high clearance vehicles, OHV riders, mountain bicycles, etc. without concurrent maintenance and upkeep. Some of these roads could possibly deteriorate to the point where they would no longer be accessible to high clearance vehicles, including fire suppression equipment. This would limit access for firefighting ground resources and would reduce the firefighter safety factor.

Proposed Action

Direct and Indirect Effects. Successful implementation of mechanized treatments for the project is dependent on the existing ASNFs road system.

A list of roads that would be used for the project is included in Appendix I of the Transportation System Report. A map illustrating existing roads and road location by objective maintenance level can be found in Appendix III of the Transportation Report. Road maintenance treatments for identified system roads within the analysis area are described in the Transportation Report. Road maintenance treatments would bring the roads currently not meeting objective maintenance levels into conformance and meet BMPs to minimize erosion and sedimentation.

To access the proposed vegetation treatment areas and complete the vegetation treatments, the existing road system would be utilized and Maintenance Objective Level 1 roads would need to be re-opened. These roads would then be re-closed when fuels treatments are completed. Temporarily opened Maintenance Level 1 roads and Maintenance Level 2 roads may be closed to the public during operations. This would provide for public safety, reduce the need for additional turnout construction, and provide for a more efficient administrative and contractor use of the travel routes during fuel reduction activities. Landings may be located a short distance from major haul routes to provide for safety during implementation. No new permanent roads would be built for this project. Road maintenance and use would conform to the White Mountain Stewardship Project Road Maintenance Specifications found in Appendix II of the Transportation Report and Exhibit 9a of the White Mountain Stewardship Contract.

Cumulative Effects. Cumulative effects were assessed considering adjacent analysis areas, with data available for 3 specific projects. These 3 projects comprise approximately 43,000 acres and

implementation is predicted to extend into the year 2010. In addition to the Hall Ranch Wildland-Urban-Interface (WUI), the other analyses include the Greens Peak WUI Project and the Mineral EMA Project. These are the most obvious selections for spatial and temporal bounds of cumulative effects because they:

- have had environmental analyses completed
- are similar in scope to other foreseeable actions beyond 2010
- have data available
- require transportation planning to incorporate road changes for handling the mechanized fuels treatment systems
- are likely to be completed in the near future (if funding remains as is)

The post-project road densities for these areas are as follows:

Project	Open Road Density (mi/mi^2)	Total Road Density (mi/mi^2)
Mineral EMA	1.9	3
Greens Peak WUI	1.5	1.6
Hall Ranch	2.3	3.2

Each of the adjacent projects meet the road density guidelines of the current A-S Forests Plan. In addition, the projects present opportunity to physically manage for determined road management objectives and deferred maintenance items. This includes providing proper closure devices for roads not managed for public motorized use, removal of vegetation to meet health and safety requirements, and maintenance/repair of road drainage structures.

Other foreseeable future projects include Beehive fuels reduction project as well as the implementation of the Forest Plan Revision and the Forest Travel Management plan. No specific road densities have yet been calculated for the Beehive project, but based on past management decisions and the economic status of the forest roads budget, the road densities are likely to drop or remain as is. These densities are expected to remain within the recommended guidelines of the current Forest Plan. In addition, the implementation of the A-S Travel Management plan (in September 2009) may result in the general elimination of legal, public cross-country motorized travel.

Recreation

Affected Environment

Existing Conditions

<u>Recreation Opportunity Spectrum (ROS)</u>

ROS classification was determined and mapped for the 1987 Forest Land Management Plan. These classifications were then integrated into a forest GIS layer. The ROS GIS layer was overlaid on to the

Hall Ranch Project area. Through this process it was determined that 1946 acres of the Hall Ranch project area falls in ROS classification of Semi-Primitive Motorized and 344 acres in Roaded Natural.

The following text describes these classifications:

Semi-Primitive Motorized: Area is characterized by a predominantly natural or natural appearing environment of moderate to large size. Concentration of users is low, but there is often evidence of other users. The area is managed in such a way that minimum on site controls and restrictions may be present, but are subtle. Motorized use is permitted.

Roaded Natural: Area that is characterized by predominantly natural appearing environment with moderate evidence of the sights and sounds of man. Such evidences usually harmonize with the natural environment. Interaction between users may be low to moderate, but with evidence of other users prevalent. Resource modification and utilization practices are evident, but harmonize with the natural environment. Conventional motorized use is provided for in construction standards and design of facilities.

The land based recreation activities that are associated with Semi-Primitive Motorized and Roaded Natural classification include but are not limited to: hiking, horseback riding, dispersed camping, hunting, gathering forest products, and viewing activities.

Visual Quality Objective (VQO)

Aesthetic conditions were inventoried and evaluated for the 1987 Apache-Sitgreaves Forest Land Management Plan and then mapped on Mylar overlays for each ranger district. The VQO Mylars were overlaid over a project area map. Through this process it was determined that the Hall Ranch project area falls in the VQO management objective classification of primarily Partial Retention. A small portion of the area lies within the Retention classification.

The text below describes these classifications:

Retention (R): This visual quality objective provides for management activities which are not visually evident. Under retention activities may only repeat form, line, color, and texture which are frequently found in the characteristic landscape. Changes in their qualities of size, amount, intensity, direction, pattern, etc., should not be evident.

Partial Retention (PR): Management activities are visually evident but subordinate to the characteristic landscape when managed according to the partial retention visual quality objective. Activities may repeat form, line, color, or texture common to the characteristic landscape but changes in their qualities of size, amount, intensity, direction, pattern, etc., remain visually subordinate to the characteristic landscape.

Modification (M): Under the modification visual quality objective management activities may visually dominate the original characteristic landscape. However, activities of vegetative and land form alteration must borrow from naturally established form, line, color, or texture so completely and at such a scale that its visual characteristics are those of natural occurrences within the surrounding area or character type.

Research suggests that a more open forest with less ground litter and more big trees, typical of the historic forest, is more appealing to most people than sites with more dense smaller trees. Historic conditions prior to the intensive management that followed European settlement represent the most scenic condition, and the highest level of scenic integrity. What we know and understand about historic scenic conditions provides a base line for comparison with modern conditions and helps us to understand the scenic potential of the area.

Past management has altered the vegetative pattern from the more desirable open sites with more big trees to the present generally less desirable condition with more dense sites of smaller trees. Even though the resulting landscape looks unaltered and natural to the casual observer and meets the original scenic objectives (VQOs) set forth in the Forest Plan, the existing scenic condition falls short of the potential scenic quality inherent in the historic ponderosa pine and mixed conifer forest which were more open, contained groups of different sized trees but were dominated by large trees.

Overall existing scenic integrity could be defined as "moderate" meaning that the landscape appears slightly altered but with the natural appearing landscape dominant. Alterations to the natural appearing landscape within the project boundary (including private land) include roads and trails, power lines, and residential developments and all of the evidence of human occupation and activity. Over the past several years increased recreation use of areas, adjacent high use access roads and residential developments have resulted in increasing visible evidence of human activity such as fire rings, compacted bare ground, and litter. All of these additional elements in the landscape detract from its natural appearance and degrade the areas' scenic integrity resulting in a "low" to "moderate" scenic integrity rating that generally equates to a "modification" VQO for the specific areas affected.

Special Use Permits

Navopache Electric Cooperative Inc. special use permit for a power line was amended in 2003 to provide service to Hidden Meadow Ranch. This amendment was to place a buried 69 KV line 300 feet in length, 20 feet in width on national forest lands. Navopache has requested to place a power line from Hidden Meadow Ranch to private land located in T9N, R27E Sec 29. The proposed power line is 1 1/8th mile in length.

Hidden Meadows Ranch has been issued an Outfitter/Guide special use permit since 2002. Activities that are authorized by the special use permit are horseback riding, hiking, packing, mountain biking, horse drawn sleigh rides, sledding, snow shoeing, snow boarding and cross country skiing. The permit also allows for campfire meals in conjunction with listed services on forest lands and a small rock fire-ring with log seating on the knoll northeast of the ranch.

Recreation Niche

In 2005, a team of specialist participated in the development of the forest niche statement, a forest niche map and management options for each niche type. This statement is based on public desire and unique forest characteristics. The Apache-Sitgreaves (ASNF) niche statement contains four types which are corridors, dispersed-use, wilderness/primitive-use, and developed use. The forest niche map was reviewed and it was determined that the analysis area for Hall Ranch WUI is within the dispersed-use

niche. This niche type is defined as remote canyons, large high elevation meadows, rivers, streams and lakes surrounded by forested mountains which are less crowded. This setting is used primarily by visitors not wanting a lot of amenities. Locals also use this setting as their 'backyard' for short duration day-use activities. The activities that are associated with this niche type are designated dispersed, dispersed, and primitive camping, hiking, OHV riding, mountain biking, fishing, horseback riding, X-Country skiing (groomed and un-groomed), snowmobiling, hunting, and interpretation & education opportunities.

Lands

Several potential trespass issues were identified while doing inventories in the Hall Ranch WUI area. The Forest Surveyor recovered all forest boundary corners and posted the forest boundary surrounding the Hidden Meadows Ranch. Trespass issues were confirmed during this process.

Desired Conditions

The desired conditions for the Hall Ranch analysis area are:

- Maintain each ROS class and provide for associated recreation experiences.
- Enhance scenic integrity and ensure that the proposed action is compatible with the VQOs objective of Partial Retention and Retention.
- Follow the recommendations outlined in the ASNF niche statement for management of dispersed areas.
- Resolve all trespass issues in the analysis area.

Direct and Indirect Effects Of The No Action Alternative

No treatment will result in a landscape that will continue to meet visual quality objectives defined in the Forest Plan but will continue to fall short of meeting the long term scenic potential of the area as a whole. Visitors to National Forest System lands within the area will see a mostly natural appearing landscape with minor evidence of human activity, aside from the existing road system. The existing vegetative pattern of variable density ponderosa pine sites and mixed conifer with large areas dominated by "over stocked" small diameter trees will continue to define the areas' landscape character.

No treatment will result in a vegetative pattern that tends to decrease the viability of larger, older trees and to favor conditions that result in dense sites of small diameter trees; therefore reducing scenic quality. Crowding by smaller trees for moisture and nutrients will tend to accelerate mortality in the larger trees from insects and disease as well as to put them at risk of mortality by wild fire. The long term result will likely be a decrease in the number and extent of large trees across the landscape. The ability of the landscape to reach the maximum inherent scenic potential that existed historically will be compromised with no treatment. Continuation of the present condition of vegetation in the project area could see a loss in considerable scenic value due to an increased risk of wildfire, insect infestation and disease. No treatment would be less disruptive to the scenery in the short term but is likely to result in a much less desirable scenic landscape in the long term compared to the Proposed Action.

The no action alternative will result in no effect for ROS recreational activities, special use permits, the recreation niche and lands.

Cumulative Effects Of The No Action Alternative

Past/Ongoing/ Future Foreseeable Action

Past forest actions that were identified for cumulative effects for recreational activities associated with the ROS classification were vegetation treatment projects conducted on the north end and the Beehive Springs Wildlife Area Closure order # 01-07-488. This was a temporary closure, from May 24, 2007 to July 15, 2007 for the protection of wildlife. These actions displaced recreationists for a short period of time while the treatments occurred and while the closure was in effect. Once the special order was lifted and activities during treatment phases of the project were completed, recreationists were able to return to normal activities.

The continuing treatment of Mineral and prescribed burning has the potential to displace a small amount of recreationists within treatment areas.

The Schedule of Proposed Actions (SOPA) for the Apache-Sitgreaves National Forests was reviewed. The National Forests Public Motorized Travel Management Plan (TMR) was considered for cumulative effects for ROS recreational activities future and foreseeable actions. This effect is expected to be minimal and immeasurable. Through the TMR process, areas have been identified by district personnel that would allow dispersed camping to continue. Scoping has also occurred to include public input that will help identify favorite camping areas that could have been missed by district personnel. The estimated result is that a large portion of the dispersed campsites were captured and a minimal number of dispersed camping sites available to vehicles eliminated. The displacement of recreationist from vegetation treatment is short in duration and is expected to have no long term effects.

The no action alternative for the Hall Ranch WUI Project, adds no additional adverse impacts to ROS activities.

There are numerous vegetation treatment projects that have occurred on the north end of the Springerville Ranger District in the last 20 years. These projects included thinning, burning, piling and lopping and scattering of slash. Each of these vegetation treatments project have reduced ground litter and enhanced the viability of larger trees therefore increasing visual quality potential. Cumulatively with the no action alternative the areas that have been treated would continue to improve visually. The Hall Ranch Project Area over the long term would decrease in visual quality or not able to reach to visual quality potential of those other treatment projects. Also with the Hall Ranch Area left untreated, it creates a disconnect or disruption in the open area flow that the adjacent treated areas have.

VQO is currently being affected by vegetation treatment of Mineral, prescribed burning and Whiting Knoll Power Line Extension project. Vegetation treatment and prescribed burning will result in a landscape that will experience short term disruptions of existing scenic quality, but will meet all visual quality objectives within a relatively short time. The Whiting Knoll Power Line Extension Project is approximately 600 feet in length. This project is expected to have little to no impact on visual quality due to project location and size.

A future action that was identified that would potentially effect VQO quality is the Hidden Meadows Power Line Extension Project. The project proposal is approximately 7,300 feet in length and follows an existing roadway. The power line is anticipated to have little to no effect on visual quality because of project location.

Past, ongoing and future forest management activities were reviewed, it was determined that none of which had a cumulative effect on Special Use Permits, Recreation Niche and Lands.

Direct and Indirect Effects Of The Proposed Action

With the selection of the proposed action, the recreational activities that are associated with the ROS classification Semi-Primitive Motorized and Roaded Natural such as camping and hunting and the special use permit held by Hidden Meadows Ranch will have a limited and short-term affect within the project area. When vegetation is being treated either with thinning or prescribed burning, recreationist will be displaced from the treatment area to another location. That location can be close in proximity and even in the analysis area where vegetation isn't being treated. Recreationists are expected to return to the project area shortly after treatment has been completed.

The VQO classifications of partial retention and retention will change to modification during vegetation treatment. This classification change will be short in duration. VQO classification partial retention, retention for the project area can be achieved by cleaning-up of logging debris along roadway within one year, a growing season to help heal the ground cover in the project area, stumps being flush cut to be better screened by grasses and groundcover, feathering of treatment edges to create a more natural appearing opening, and the retention a few untreated islands of various sized tree clumps. The ability of the landscape to reach the maximum inherent scenic potential that existed historically will be enhanced with this alternative. The treatment will provide a mixture of tree size classes in clumps, a more open character and will enhance development of large trees. Recovery to partial retention classification is expected to occur within one to three years following treatment.

There will be no affect on the Recreation Niche or lands with the selection of the proposed action.

Cumulative Effects Of The Proposed Action

Past/Ongoing/and Future Foreseeable Action

The past, ongoing, and future foreseeable action that were considered for the cumulative effects for the no action alternative, are the same for the cumulative effects for the proposed action alternative.

The added potential adverse cumulative effect to ROS activities and the special use permit with the selection of the proposed action would be a small displacement of recreationists within the project area during vegetation treatment. This is expected to be short in duration.

The Hall Ranch Project area is expected to meet the partial retention, retention classification through project activities such as flush cutting of stumps and treatment of slash. The long term cumulative effect on VQO for the analysis area is expected to enhance visual quality with the additional treatment of the

Hall Ranch. The vegetation treatment in the analysis area has created an open forest that will increase large tree viability. The proposed action would extend that visual continuity to provide a more open landscape that was found in historic scenic conditions. With a more open landscape the power line clearings would be less evident. Over time, following slash treatment and revegetation of disturbed soils, the treatment will be less apparent allowing the analysis area to meet the retention and partial retention objective.

Economics

Direct and Indirect Effects.

Estimated economic costs and revenues, and outputs, associated with the proposed Hall Ranch WUI treatments for the Forest Service alone are shown below. Costs are based upon mechanical fuel treatments only. Values are used to provide a relative comparison of alternatives.

Table 3. Estimated economic value comparison of the No Action and Proposed Action alternatives.

Alternative	Volume of Products Ccf[1]	Estimated Revenue from Products	Estimated Cost of Treatments
No Action	0	0	0
Proposed Action	(Approximate) 3,968	$36,988	$961,520

[1]Ccf = 100 cubic feet

A variety of management activities will be used to accomplish the fuels objectives of the thinning project at a cost to the American taxpayer. The proposal will take advantage of opportunities to reduce the cost to the public by requiring reimbursement for those components of removed material (i.e, wood fiber or timber) of commercial value.

Cumulative Effects.

Table 22 below summarizes the revenue and cost associated with each project and non- treatment areas and gives the total revenue and cost at a larger scale.

Table 22 – Revenue and Cost from Treatments at the larger scale

	Revenue	Cost
Ranch and Iris Spring	0	$362,374
Greer WUI	$421,363	$7,630,918
Nutrioso WUI	$346,580	$11,704,984
Eagar South WUI	$251,620	$8,113,944
Outside WUIs	0	0
Hall Ranch WUI	$36,988	$961,520
Total of above	$1,056,551	$28,773,740

Although the costs are much greater than the revenues, the objective of lowering the fire hazard potential at the larger scale will potentially reduce a much greater cost if a catastrophic wildfire should occur. Development of private lands within the area is expected to continue with a trend of building homes adjacent to the existing dense forest conditions. The value of this development will also continue to increase which makes lowering the fire hazard potential even more desirable.

Not only would a severe wildfire be expensive from a structural development standpoint, the potential for loss of human life exists, for which no value can be assessed.

Another cost, though not monetary, from a severe wildfire is the damage done to the ecology of the environment. This type of fire can result in deforested conditions and adverse impacts to soil and watershed conditions. The damage done can be very costly ecologically. Any attempts to rehabilitate the environment following severe wildfire (e.g. planting, seeding, and erosion control barriers) can be very expensive monetarily.

It is hoped that as more trees are available for harvest, there will be an increase in industry interest in these products. That is one of the main purposes of the White Mountain Stewardship contract. If more industry is developed in the area, the Forest Service could start selling the trees for more than the cost to harvest them.

The revenue from timber harvesting above is only in terms of receipts the Forest Service receives from the sale of the trees. Other related revenues will be generated throughout the communities, too, but are very hard to quantify. As part of the White Mountain Stewardship Contract, the Multi-party Monitoring Board conducts an annual economic assessment based on revenues generated by companies associated with the Contract. Examples of the categories of revenues monitored are the sale of raw material (clean and dirty chips, roundwood and saw timber), outsourced hauling, petroleum products, mill equipment, heavy equipment, heavy equipment parts, electricity, mill parts, vehicle parts, tires and transportation. These categories were tracked for 2007 and account for estimated expenditures of over $20 million, with $11 million in sales within the White Mountain Region. These values do not include revenue resulting from labor and employment which are tracked and monitored separately. (Gibson, 2007)

Implementation of the Hall Ranch WUI would help sustain local industry which could provide thinning of dense forest conditions, a major cause for the existing high fire risk across the Forest.

Chapter 4 - Consultation and Coordination

The Forest Service consulted the following individuals, Federal, state and local agencies, tribes and non-Forest Service persons during the development of this environmental assessment:

ID Team Members:

Judy Palmer (ID Team Leader), Fire Management Officer, Springerville R.D.

Bruce A. Buttrey– Natural Resource Specialist, Springerville R.D.

Charles Denton– Wildlife Biologist, Springerville R.D.

Monica Boehning – Silviculturist, Springerville R.D.

James Probst – Soils, Riparian and Watershed Specialist, Apache-Sitgreaves National Forests

Peter Taylor – Heritage Resource Staff Officer, Springerville R.D.

James Pitts – Pre-Sale Forester, Springerville R.D.

Russell Bigelow – District Fuels Specialist, Springerville R.D.

Shanea Ward – Outdoor Recreation Planner, Springerville R.D.

GIS support to the IDTeam was provided by Stacy Weaver, Springerville R.D.

Federal and State Officials and Agencies

Chris Bagnoli – Wildlife Habitat Manager, Pinetop Region, Arizona Game and Fish Department

Len Schlesinger – Conservation District Representative, Apache Natural Resource Conservation District

David Smith- Wildlife Biologist, United States Fish and Wildlife Service

Tribes

The Tribal contacts on the Apache-Sitgreaves National Forests were consulted. Their names are included in the project record.

Others

A list of those attending the public meeting and the Natural Resources Working Group is included in the Project Record. Those commenting on the proposed action included: the Arizona Department of Environmental Quality; the Navajo Nation; the Hopi Tribe, Bill Greenwood, Richard Artley and Jeff Burgess.

Agencies, Groups and Persons Contacted but Who Did Not Provide Input

Letters of notification of the proposed action were sent to the agencies, groups and individuals on the project mailing list. Many of them did not respond. This list is filed in the project record at the Springerville Ranger District in Springerville, Arizona

Chapter 5 – Appendices

Appendix A. – Monitoring Plan

MONITORING SUMMARY

Monitoring will be accomplished as part of implementation of the proposed action. Monitoring activities are accomplished through routine examination and accomplishment reporting channels already in place. Those pertinent to the proposed action include the following:

Annual reforestation and timber stand improvement report
Monthly timber sale accounting reports
Annual Performance Accountability System Reporting
Contract administrator inspection reports
Contract inspector compliance reports
Contracting Officer's Representative accomplishment and inspection reports
Engineering Representatives inspection reports
Post-harvest stand examinations and fuels monitoring
Annual Forest Monitoring Report
Periodic Forest and District Management Reviews
Annual silviculture accomplishment report
Road inventory and condition reports
Seasonal threatened, endangered and sensitive species occupancy surveys
Oversight field reviews by resource specialists and program managers
Annual aerial insect and disease detection survey
Recreation/fuelwood/resource protection law enforcement patrols
Public safety & road closure compliance patrols
Annual GIS layer updates
Annual co-op fund balance reconciliations
Bi-annual employee/supervisor performance reviews
Annual assessment of water quality accomplishment report
White Mountain Stewardship Multi-party Monitoring report

In addition, specific additional monitoring associated with this proposal are:

a). In conjunction with post-treatment surveys, examine disturbed areas for invasion by noxious weeds. The District Ranger is responsible for this activity.

b). Visit roads closed under this proposal approximately one year following implementation to determine effectiveness. The District Roads Coordinator is responsible for this review.

c). Conduct implementation and effectiveness monitoring for Best Management Practices. The contract administrator or the contracting officer's representative for service contracts is responsible for this review. Results will be forwarded to the Forest Soil Scientist for inclusion in his annual report to ADEQ.

Appendix B – Best Management Practices

Best Management Practices: The following are site specific BMPs required for the project: The following list is divided into categories dealing with *watershed*, *riparian areas, uplands, roads, and noxious weeds.* Some of the *BMPs listed in one category may overlap into another*.

General Watershed BMPs

If unforeseen events occur in the future (e.g., large wildfires, prescribed burns producing higher than planned levels of severely burned conditions, etc.) that result in significant disturbances to a sixth code watershed involved in this project which are above those anticipated from this project, an Equivalent Disturbed Area (EDA) analysis will be performed to determine if the watershed has sustained levels of disturbance which are above threshold values (generally interpreted as an EDA level equivalent to 15% of a 6th code watershed). This analysis will be used, along with field investigations, to determine if the planned schedule of treatment activities in that watershed needs to be revised to allow for recovery of watershed conditions before the next treatment action there is taken.

Riparian/Stream Protection BMPs

1. Use of Project Area Maps for Designating Stream Courses for Water Quality Protection

Locations of protected stream channels will be delineated on the project area and contract maps. Riparian areas and meadows designated for protection will also be delineated on the project area and contract maps.

2. Stream Channel and Wetland Protection

Stream channels and other wetlands to be protected will be shown on the project contract maps. Special SMZs shall be designated along the intermittent stream channel of Hall Ranch Draw north of Hidden Meadows and the ephemeral channel headwater reach to the southwest of Hidden Meadow. Harvest and thinning guidelines allowing limited mechanical access within 50 feet of these channels will be developed with input from the Forest Hydrologist. For other ephemeral channels, follow the direction in BMP #3 (Treatment of Ephemeral Channels) found below. Stream channels shall be crossed at designated crossings only and shall be pre-approved by the authorized Forest Service (FS) Officer. There shall be no skidding or road construction longitudinally within stream channels. There shall be no decking and machine piling of slash within stream channels. Lead-out ditches or water-bars shall not be constructed in such a manner as to divert run-off into stream channels. Unless designated by the authorized FS Officer, debris generated from treatment activities will be removed from stream channels. Trees designated for removal shall be felled outside the stream channel. Trees, in or on the banks of stream courses that are providing bank and stream channel stability are not to be removed. The authorized FS Officer will identify exceptions where restoration or additional thinning is needed for

resource concerns. The authorized FS Officer will use their authority for skid trail and log landing location to protect, as needed, stream courses that were not designated on the project contract map.

4. Treatment of Ephemeral Drainages

Ephemeral drainages are recognized in the following ways. They form the lowest spot of the surrounding ground. They form obvious channel continuity along its length and joins with more obvious channels downstream. They show evidence of having run water on previous occasions, i.e., litter and vegetation has moved, or there is a lack of litter in the channel.

The water quality objectives for harvest treatments within close proximity to ephemeral drainages is to provide for or to retain sufficient amounts of ground cover possible to mitigate sediment input to stream system and to minimize the number of crossings to retain stream bank and stream bottom stability. No specific stream buffers are recommended, however, there are harvest techniques that aid in the retention of ground cover and are considered Best Management Practices. The following are recommended BMPs for harvesting activities around ephemeral drainages, *whether designated on a map or not*.

a. No skidding will be allowed up or down ephemeral channels or in low points or swales.
b. No road construction will be allowed in or immediately adjacent to ephemeral streams except at designated crossings.
c. All skid trails crossing drainages will be designated and approved by the authorized FS officer prior to activity, and will be at right angles to stream banks.
d. Minimize the number of skid trail and road crossings across these channels.
e. Maintain an undisturbed filter strip of vegetation and litter between skid trails/log decks/roads and the channel wide enough to prevent sediment from entering the channel.
f. Construct water control features (waterbars, leadout ditches etc.) on these skid trails and roads.
g. Minimize the amount of logging debris deposited in ephemeral channels and remove excess debris by hand or end lining with one end suspension except where coarse woody debris is needed for stream health as identified by fisheries or watershed specialists.
h. Do not cut trees where the root system is important in maintaining the integrity of the bank.
i. No log decks will be located within or immediately adjacent to the ephemeral streams or depressions.
j. The preferred method for extracting biomass using feller-buncher or grapple skidder equipment near ephemeral drainages (within 75 feet) will be to approach the material to be extracted on the contour as much as possible to the ephemeral drainage, cut or grapple biomass, then back equipment out as much as possible. This action will reduce ground disturbance by limiting the turning of equipment in or near the stream channels, and will retain as much of the filtering effect of undisturbed ground cover as possible. Slash can be placed to drive equipment over to reduce rutting and soil disturbance.
k. Outslope roads/skid trails to minimize concentration of water/sediment into streams closer than 50 feet to channel.
l. Place water control features so there is adequate filter distance between structure outlets and stream channel (minimum of 50 feet and width can increase as slope steepness increases).

5. Log Landing Location

Log landings (decking areas) shall not be allowed in meadows, riparian areas, stream channels, and SMZs as defined in #2 above. The authorized FS Officer may authorize landings, in these areas, if required. These treatment areas will be clearly designated on the project area contract map.

6. Slash Treatments in Sensitive Areas

Mechanical slash piling shall not occur in meadows wetlands and the intermittent stream SMZ defined in #2 above..

7. Wetlands, Springs, Seeps and Meadow Protection During Tree Removal Activities

These areas will be protected from treatment activities and include a 50 ft buffer that excludes mechanized equipment. Treatments may occur within these areas if specific restoration objectives are identified and approved by the FS Officer. This BMP will be applied to mapped and unmapped wetlands, springs, seeps and meadows.

8. Prescribed Burning Treatments

For the retention of long term soil productivity, to maintain the sediment filtering capacity of streamside management zones, and to reduce erosion, burn to allow for low to moderate burn intensities.

Fire control lines shall not be constructed on slopes greater than 40% or within SMZ's. Exceptions will be identified by the authorized FS Officer and specific mitigations will be determined at that time.

Ignition shall be above slope breaks of active floodplain. Fire will be managed such that burning into streamside management zones is limited to 15% or less of the area of the SMZ when adjacent upland zones have not recovered hydrologically from project entries. Utilize jackpot burning where appropriate.

Livestock grazing will be coordinated with prescribed burning, especially relative to drainages and their floodplains. Livestock use may be deferred, if necessary in order to establish grasses in sufficient quantity to carry fire, prior to burning, or to protect new growth after burning.

9. Servicing and Refueling Equipment

During servicing or refueling of equipment, pollutants shall not be allowed to enter any waterway, riparian area or stream course. Select service and refueling areas well away from wet areas and surface water, and by constructing berms around such sites to contain spills. Spill prevention, containment and countermeasures plans are required if the fuel exceeds 660 gallons in a single container or if total storage at a site exceeds 1320 gallons. The project contract administrator shall designate the location, size and allowable uses of service and refueling areas. The authorized FS Officer shall be aware of actions to be taken in case of a hazardous substance spill.

The contractor shall take all reasonable precautions to prevent pollution of all National Forest soil and water. Equipment operators shall maximize the recovery and proper disposal of all fuels, fluids,

lubricants, empty containers and replacement parts. Refuse resulting from the contractor's use, servicing, repair or abandonment of equipment shall be removed from National Forest system lands by the contractor to the appropriate disposal facilities. Any leaks originating from contractor equipment shall be repaired or the equipment replaced in a timely manner.

Upland related BMPs

1. Limit the Operating Season

Ground disturbing activities (tractor skidding, decking and machine piling, etc.) shall be limited to dry or solidly frozen soil conditions to reduce compaction and soil displacement (rutting) that is associated with tree removal activities when soils are wet or are saturated. Hauling and skidding will be restricted on all soils by the contract administrator during wet periods to prevent damage to the road system. (See A/S Guidelines for Excessive Rutting, 6/10/92).

2. Log Landing Erosion Prevention and Control

Immediately after use, landings will be scarified as needed to eliminate compaction. Once scarified, log landings are to be reseeded, as needed, with an erosion control seed mix consisting of primarily native species. Slash or chips may be scattered on landings to further retard formation of rills and gullies.

3. Tractor Skidding Design

Skid trails will be designated or approved by the authorized FS officer in conjunction with the contractor. To minimize soil disturbance by equipment use, trees are to be felled to the lead and the authorized FS officer shall locate skid trails as far apart as possible to reduce the number of skid trails needed to harvest the unit. Use existing skid trails where properly located. Designate new skid trails throughout the project area to prevent long, straight skid trails from running up and down slopes. Skidding of logs will be with one end of the log suspended above the ground surface. Skidders will be required to stay on the skid trail system, except where other objectives take priority (like maximum site disturbance wanted for seed cuts, etc.), which shall be noted on the stand prescription field card.

4. Erosion Control on Skid Trails

Skid trails will be water-barred, scarified and seeded with primarily native species as needed. All berms and depressions such as ruts will be filled in or removed, restoring skid trails to the natural grade of the slope to the greatest extent possible. In addition, slash generated from the project may be spread in addition to water barring where conditions require.

5. Soil Productivity/Coarse Woody Debris

To maintain or improve soil productivity in areas over ½ mile from private land, manage towards a minimum of 5-10 tons/acre of coarse woody debris in pine types, in the 3" + size class. Where 5-10 tons/acre of coarse woody debris currently exists, break up the continuity to reduce potential fire spread.

Reduced levels of organic debris may be allowed within fuel-breaks. Manage towards a minimum of 8-16 tons/acre on mixed conifer sites of large woody material (3"+).

Within ½ mile around private land; to maintain or improve soil productivity and maintain low fuel loads, manage towards a minimum of 3-6 tons/acre of coarse woody debris in pine types, in the 3" + size class. Manage towards a minimum of 5-10 tons/acre on mixed conifer sites of large woody material (3"+).

6. Machine Piling of Slash

Where slash is machine piled, minimize disturbance to existing ground cover, surface soil and rock material and any existing surface organic material (i.e. surface litter and duff and old semi-decomposed branches and logs). Rough piling will also reduce impacts from equipment. Rough piling involves piling only large concentrations of slash, leaving areas of low concentration undisturbed. Machine pile when soils are dry or solidly frozen. Refer to ASNFs Guidelines for Excessive Rutting, 6/10/92, as a guide to determine when soils are too wet to operate. Keeping slash piles free from soil material will minimize smoldering of piles when burning, which should have a positive effect on air quality. Refer to #5 above for retention of coarse woody debris.

7. Acceptance of Project Erosion Control Measures Before Project Closure

The authorized FS officer will verify that the contractor has implemented erosion control practices prior to the closure of the project contract.

8. Conduct Implementation and Effectiveness Monitoring for Best Management Practices

The desired result of BMP monitoring is to document that BMPs have been applied as prescribed and that they appear effective in reducing sediment and moderating flow regimes in forest streams. BMPs that are found to be ineffective in protecting identified resource, aquatic and water quality goals will be adjusted.

Road Related BMPs

1. Maintenance of Roads

Existing and newly constructed roads are maintained throughout the life of the project to insure that drainage structures (culverts, rock crossings, rolling dips, etc.) are functioning correctly, and that concentrated surface run-off does not occur. Drainage control structures will receive maintenance prior to monsoon season and winter shutdown of project operations.

2. Road Reconstruction

Drainage structures shall be incorporated into each road design. Erosion control practices shall be implemented during the reconstruction of existing roads. Maintenance shall also be done prior to the winter shutdown of project operations. Runoff from road prisms must be discharged frequently enough to avoid erosion or overtopping of roadside ditches. Drainage from the road prism and associated ditches shall be discharged into buffer strips (or scattered slash piles) where its energy can be dispersed

and sediment can drop out before reaching the natural drainage system. Improve or correct installations of rolling dips, stream crossings, and culverts. Extend and enlarge, as needed, the raised portion of water-bars on the uphill side of the road to insure all flow from ditches or drainages is diverted across the road.

3. Long Term Road Closures

Except where administrative access is needed, closed roads will be disguised or blocked and in some instances signed to traffic or lightly scarified and reseeded with an erosion control seed mix of primarily native species. Road berms located lateral to the roadbed will be removed and ruts will be filled in. Drainage will be maintained and improved as needed to prevent erosion. Due to the road surface condition being depressed on some existing roads, water-bars of enough size to either remove the water from the road or with enough storage to prevent run-off from returning to the road will be installed. All connected disturbed areas (CDA): high runoff areas like roads, skid trails, mines, burns, or highly compacted soils that drain directly into the stream system will be disconnected from stream systems. Road closures are to be completed by the contractor as specified in the project implementation plan or planned with other sources of funding. Where necessary, scarify, reseed and camouflage the road entrance with rocks and slash to improve the road closure. Wing fence construction may be necessary in some cases to effectively prevent new resource damage from vehicles attempting to drive around closures.

Noxious Weeds Related BMPs

1. Survey for noxious weeds in treatment units at a time when the growing season is well established, and prior to treatment implementation.

2. If noxious/invasive weed populations are identified prior to implementation, avoid WUI treatment in the area until noxious weeds are eliminated, or avoid the site occupied by the weeds. Monitor the site for a minimum of three growing seasons post weed-treatment to determine success of eradication.

3. If noxious/invasive weeds are identified during or post implementation, treat the weeds and monitor the site for a minimum of 3 growing seasons to determine weed-treatment success.

4. If noxious/invasive weeds are identified within a treatment unit while treatment is occurring, equipment will be cleaned and inspected before moving to another treatment unit.

5. Any fills, mulches, or re-vegetation seeding, used during or after project implementation will be certified weed free.

6. The Forest Service will be notified prior to each piece of equipment entering the National Forest. Notification will include the location of the equipment's most recent operations.

7. Ensure that all contract equipment moved onto the National Forest is free of soil, weeds, vegetative matter or other debris that could harbor seeds. Inspect each piece of equipment to ensure cleanliness, prior to entering the National Forest.

8. Highly disturbed areas with significant bare ground will be reseeded using native seed to re-establish perennial plants.

9. Seeding will be considered if natural re-vegetation of ground cover species does not occur rapidly enough to protect and area from erosion.

10. Minimize soil disturbance by limiting the extent of the area traveled by vehicles and by avoiding areas with wet soils.

Bark Beetle Related BMPs

For Bark Beetle Control **-** The following beetle brood prevention/control practices should be implemented in coordination with the Silviculturist:

1. Use the Ips bark beetle timing restriction (LMP pg. 141) for creation and treatment of slash = "In precommercial thinning projects in low elevation pine, cut trees only during the period of July 1 through December 31." Apply this to slash 3" diameter and larger; but monitoring of beetle attacks on piles, slash of all sizes, and residual standing trees should also be done year-round.

2. Whenever possible, require treatment of slash within 28 days of creation. Encourage maximum removal and utilization of created slash by biomass markets.

3. If heavy boles must be left untreated on steep slopes, de-limb and trim bole tops to 6" diameter for slash piling to minimize bole lengths left for brood material. If too many slash piles and/or boles are being generated by the <5"dbh thinning operation across too many hand-treated acres, then thinning of the larger conifers (5-9"dbh) would need to be postponed for a time. They should be felled as a second or third stage operation after at least 2 years have elapsed after the previous stage thinning slash has been burned.

4. Do NOT place clear plastic covering over slash piles.

5. Burn slash piles as promptly as is absolutely possible in all forest types, preferably within 6 months after creation, especially if evidence of beetle use becomes visible.

6. Pile and broadcast burning should be done to minimize the number of severely scorch-damaged residual trees which often attract more bark beetles.

7. Implementation monitoring should be ongoing during and after slash creation. If evidence of beetle use becomes visible in slash, immediately report it to the Silviculturist and possibly suspend creation of any more slash within 2 miles until an entomologist can be consulted.

Aspen Maintenance BMPs

Require logging/thinning contractors/USFS personnel to use equipment and methods which will minimize aspen damage to less than 10% total from all operations combined. Open up wildlife quiet closure area roads to vehicles for public fuelwood access, specifically focused in mixed conifer sites

with aspen, as wood permit areas to emphasize cleaning up heavy accumulations of ground fuels under aspen clones. Manage prescribed fire (both pile and broadcast burns) to protect 90% or more of aspen clones.

Old Growth Maintenance BMPs

Where needed, utilize understory thinning and pile burning first to ensure old/large trees do not have extra fuel loading created/left near them when broadcast burns are done later. This may require staged felling/piling of more than one entry to use the limited available space for safe pile location. Use any other methods available and feasible to protect existing large/old trees from crown, bole, and root collar scorch during pile/broadcast burning.

Appendix C – Glossary

Glossary of Terms

Aspen/Aspen Clone (AA): Individuals or groups of aspen trees *(Populus tremuloides)* which are connected underground by the same root system. Aspen clones exist within portions of the pine and mixed conifer forest types, often having coniferous tree species intermingled within and around them.

Basal Area (BA): The cross sectional area of a tree at **dbh** measured as square feet. It is used as a measure of stand density.

Best Management Practices (BMPs): A combination of conservation practices identified by the IDTeam to be the most effective, practicable means of preventing or reducing the amount of pollution generated by non-point sources to a level compatible with water quality goals and meeting other desired resource conditions.

Bole: The trunk or stem of a tree or **snag**.

Broadcast Burning: Allowing a **prescribed fire** to burn over a designated area within well-defined boundaries for reduction of fuel hazard under ideal weather conditions to meet desirable objectives.

Canopy cover: The percentage of a fixed area covered by the crown of plants delimited by a vertical projection of the outermost perimeter of the spread of foliage.

Canopy Fuels: The live and dead foliage and branches and lichen of trees and tall shrubs that lie above the **surface fuels**.

Catastrophic Fire: Any high severity fire that results in loss of natural or man-made resources or results in a disruption to a community, e.g. evacuations.

Closed Road: A road closed to public motorized vehicle access.

Conifer: A cone-bearing tree with needles or leaf scales, usually evergreen, (e.g. pines, firs, spruces, junipers).

Crown Fire: Any fire that burns in **canopy fuels**.

> **Active Crown Fire**: An active crown fire presents a solid wall of flame from the surface through the canopy fuel layers. Flames appear to emanate from the canopy as a whole rather than from individual trees within the canopy.
>
> **Conditional Crown Fire:** A hypothetical type of fire in which the conditions required for sustained active crown fire are met but conditions required for crown fire initiation are not.
>
> **Passive Crown Fire:** A type of crown fire in which the crowns of individual trees or small groups of trees burn, but solid flaming in the canopy cannot be maintained except for short periods. Passive crown fire is also called torching or candling.

Crown Index (CI): The 20 foot wind speed (miles per hour) required to <u>maintain</u> an active crown fire. The higher the CI value the less likely a crown fire could be maintained in a stands canopy. The closer spacing or interlocked crowns of trees allows fire to travel from tree to tree and increase crown fire potential.

Decommission: To permanently close an unneeded Road to motor vehicle use through draining, seeding, and scarifying for protection of soil and water quality in returning to a more natural state.

Diameter Breast Height (dbh): Diameter of the trunk of a tree measured outside bark at 4.5 feet above the ground level, on the uphill side of the tree.

Diameter Root Collar (DRC): The diameter of the trunk of the tree measured outside bark at ground level.

Ecological Restoration: The process of assisting the recovery of resilience and adaptive capacity of ecosystems that have been degraded, damaged, or destroyed. Restoration focuses on establishing the composition, structure, pattern, and ecological processes necessary to make terrestrial and aquatic ecosystems sustainable, resilient, and healthy under current and future conditions.

Ephemeral Channels: They form the lowest spot of the surrounding ground. They form obvious channel continuity along its length and join with more obvious channels downstream. They show evidence of having run water on previous occasions, i.e., litter and vegetation has moved, or there is a lack of litter in the channel.

Erosion Control (Skid Trails): Water-barring, scarifying, seeding (with a grass species mix), filling in or removing depressions (ruts, berms, etc.), and spreading slash to control surface erosion.

Fire Adaptive Species: Those native species historically evolved to occupy each vegetation/forest type according to the natural **fire regime** which belongs there.

Fire Behavior: The manner in which a fire reacts to the influences of fuel, weather and topography.

Fire Hazard: A fuel complex, defined by volume, type, condition, arrangement and location, which determines the ease of ignition and resistance to suppression methods.

Fire Intensity: The numerical product of a fire's rate of spread, fuel consumption, and heat yield at a given point on a fire's perimeter. Refers to the rate at which a fire produces heat at the flaming front and should be expressed in terms of temperature or heat yield.

Fire Regime: Typical fire frequency and severity that a particular ecosystem is adapted to as part of its natural disturbance pattern, according to historic reference conditions established by research.

Fire Regime Condition Class: A classification of the amount that current vegetation or fire regime characteristics have departed from the presumed historical reference conditions. Condition Class ranges from 1 to 3, representing low to moderate to high levels of departure from the historic range of natural variability.

Fire Resiliency: The ability of forests to tolerate fire and recover quickly following wildfire.

Fire Severity: A measure of the physical change in an area caused by burning, it describes the immediate effects of fire on vegetation, litter, or soils. The severity of a fire depends on the fire intensity and the degree to which ecosystem properties are fire resistant.

Fuelbreak: A natural or manmade change in fuel characteristics which affects fire behavior so that fires burning into them can be more readily controlled.

Inaccessible Areas: Areas where there is no Road access for the removal of Boles.

Insect Infested: Trees that exhibit any evidence of a bark beetle attack, or other threatening insect outbreak.

Grassland/Savanna: Sites historically evolved to support herbaceous grass/forb cover with some shrubs, and scattered tree cover on less than 20% of the area.

Hazard Tree: A tree of any size, live or dead that could fall and cause damage and/or could jeopardize firefighter safety within hazard zones, such as near private lands, overhead utility lines or along key fire control roads.

Key Fire Control Roads: Strategic roads used for access, evacuation, or defensibility of private property.

Ladder Fuels: Fuels that provide vertical continuity between the ground and trees crowns, thus creating a pathway for a surface fire to move into the main forest canopy. Ladder fuels generally occur as shrubs, small trees, standing/leaning snags, and trees with live limbs extending to within approximately 10' of the ground.

Landing: Centralized areas within a management unit where logs and other extricated fuels are skidded to, processed (including bucking, delimbing, debarking, chipping, and grinding), and loaded onto highway transport vehicles for removal.

Mechanical Treatment: Any cutting and/or removal of trees by machinery that travels across the ground.

Mexican Spotted Owl Protected Activity Center (PAC): An area of 600 acres (minimum size) surrounding the "activity," which is the nest site, a roost grove commonly used during the breeding season in absence of a verified nest site, or the best roosting/nesting habitat if both nesting and roosting information are lacking.

Mixed Conifer (MC): Mixed Conifer - Stands where more than one conifer species currently share the majority of dominance in the upper most canopy layer, and/or more than one conifer species reached climax prior to post-settlement fire regime interruption. Mixed species can include ponderosa pine, southwest white pine, douglas fir, white fir, blue spruce, aspen, and other native conifers.

Objective Maintenance Level: The maintenance level to be assigned at a future date considering future Road management objectives, traffic needs, budget constraints, and environmental concerns.

Obliterate: See Decommission.

Old Growth: The final successional stage of a stand of trees, characterized by old trees and related structural features that typically differ from earlier stages in structure, composition, function, and other attributes including but not limited to: higher degree of canopy closure, variable tree sizes and spacing, variable number of canopy stories, greater number of large snags and logs. Specific old growth criteria differing by each forest type are defined in the ASNFs Land Management Plan.

Open Road: A Road open to and maintained for public vehicle use.

Operational Maintenance Level: The maintenance level currently assigned to a Road considering today's needs, Road condition, budget constraints, and environmental concerns. In other words, it defines the level to which the Road is currently being maintained.

Ponderosa pine (PP): Stands where ponderosa pine has the majority of dominance in the upper most canopy layer, and/or is the primary species found to have reached 'climax' prior to post-settlement interruption of the naturally frequent fire regime.

Post-fledging Family Area (PFA): Northern Goshawk habitat consisting of a 420 acre area of concentrated use by a goshawk family after the young leave the nest and until they are no longer dependent on the adults for food. A total of 180 acres of nest areas are identified in each PFA. The total PFA size is 600 acres.

Prescribed Fire: Any fire ignited by management actions to meet specific objectives. A written approved prescribed fire plan must exist and NEPA requirements must be met, prior to ignition.

Pre-settlement Trees: Living trees that existed at the time of local Euro-American settlement. Estimated as the year 1880 for this project area, for the starting point at which interruption of the historic natural fire regime is noticeable as a result of European activities across the landscape. This is assessed through increment boring to count tree age, and/or the presence of yellow bark on ponderosa pines.

Protected Activity Center (PAC): Mexican Spotted Owl habitat area of 600 acres (minimum size) surrounding the "activity," which is the nest site, a roost grove commonly used during the breeding season in absence of a verified nest site, or the best roosting/nesting habitat if both nesting and roosting information are lacking.

Reconstruction: Activity that results in improvement or realignment of an existing classified Road as defined below:
Road improvement—Activity that results in an increase of an existing Road's traffic service level, expansion of its capacity, or a change in its original design function.
Road realignment—Activity that results in a new location of an existing road or portions of an existing Road and treatment of the old roadway.

Rehabilitate: Scarifying, seeding, draining, and/or scattering slash or chips over a disturbed area to reduce compaction and erosion after management activities have been completed.

Remnant Evidence: All indicators of trees standing at the time of Euro-American settlement that are no longer present as living trees—including snags, downed logs, stumps, and stump holes.

Restoration: See ecological restoration.

Road: A motor vehicle travel way over 50 inches wide, unless designated and managed as a trail.

(Road) Maintenance Level: A varying standard for Road management that depends on the level of use and administrative objectives.

Riparian: Narrow strips of land that border creeks, rivers or other bodies of water. Because of their proximity to water, plant species and topography of riparian zones differ considerably from those of adjacent uplands.

Severely Diseased: Trees suffering disease infection at a high level which leads to certain tree mortality or advanced infection spread, such as conifers with a dwarf-mistletoe infection rating of 4, 5, or 6.

Skid Trails: Pathways on which skidders, tractors, and other forest machinery will transport logs and other fuels to the Landing.

Slash: Any woody vegetation on the ground, whether existing or generated by management activities.

Snag: A standing or leaning dead tree.

Spotting: Behavior of a fire producing sparks or embers that are carried by the wind and which start new fires beyond the zone of direct ignition by the main fire.

Stand: A contiguous group of trees sufficiently uniform in species composition, arrangement of age classes, and condition to be a homogenous and distinguishable unit.

Stand Density: The degree of site occupancy or crowding within a stand of trees, usually expressed as measures of average Basal Area, number of trees per acre, or stand density index.

Stand Replacement Fire: A high intensity fire that removes all aboveground vegetation and results in a change of stand vegetation type.

Streamside Management Zones (SMZs): A buffer strip on either side of a stream course with a width and recommended management activities based on such factors as erosion hazard, existing vegetative groundcover conditions, flow regime, and resource values as risk.

Surface Fire: A fire that spreads through surface fuel without consuming any overlying canopy fuel.

Surface Fuels: Needles, leaves, grass, forbs, dead and down branches and boles, stumps, shrubs and short trees.

Temporary Roads: Roads authorized by contract, permit, lease, other written authorization or emergency operation not intended to be a part of the forest transportation system and not necessary for long-term resource management.

Torching Index (TI): The 20 foot wind speed (miles per hour) required to move a surface fire into the crowns of trees. The higher the TI value the less likely individual or groups of trees would torch. The presence of ladder fuels and low canopy base height increases the likelihood of torching.

Transportation Analysis Procedure (TAP): An integrated ecological, social, and economic approach to transportation planning that addresses existing and future Road management options. A completed science-based Roads analysis will inform management decisions about the benefits and risks of constructing new Roads in un-roaded areas; relocating, stabilizing, changing the standards of, or decommissioning unneeded Roads; access issues; and increasing, reducing, or discontinuing Road maintenance.

Turnout: A widening in a Road to allow vehicles to pass or park.

Vegetation Structural Stage (VSS) : A description of forest growth and aging stages based on trees within a specific diameter range. VSS can be determined at the stand or sub-stand level for groups of like-sized trees where the majority of the trees by basal area determine the VSS value.

VSS 1: Grass/forb/shrub openings, with trees <1" dbh present now or expected in the future.

VSS 2: Trees 1-5" dbh

VSS 3: Trees 5-12" dbh

VSS 4: Trees 12-18" dbh

VSS 5: Trees 18-24" dbh

VSS 6: Trees 24+" dbh

Wildland Fire Use: The management of naturally ignited wildland fires to accomplish specific prestated resource management objectives in predefined geographic areas outlined in Fire Management Plans.

Wildland Urban Interface (WUI): The line, area, or zone where structures and other human development meet or intermingle with undeveloped wildland and vegetative fuels.

Wildlife Quiet Area: Areas that are closed to all motorized vehicles for the benefit of wildlife.

The sources for most definitions are:

- *National Wildfire Coordinating Group. 1996. Glossary of Wildland Fire Terminology, National Wildfire Coordinating Group, Boise ID*
- *Restoration of Ponderosa Pine Forests to Presettlement Conditions. 2005. Ecological Restoration Institute, Flagstaff AZ*
- *www.firewords.net*