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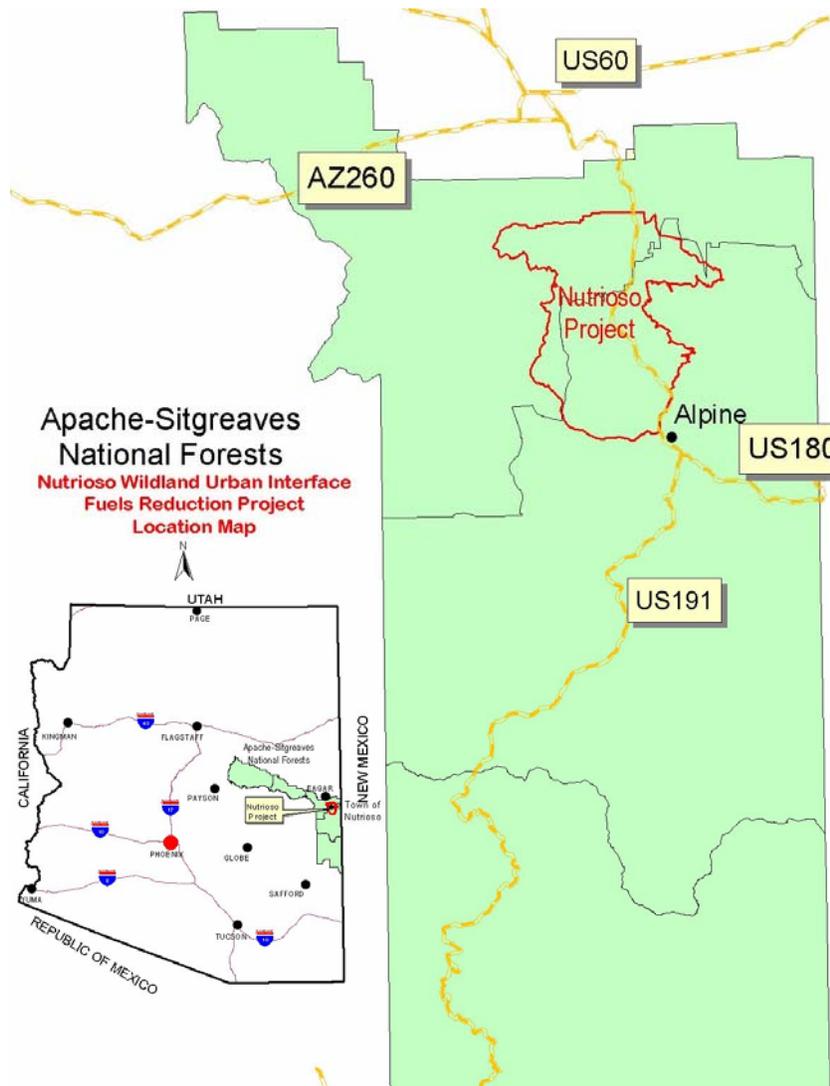
June 2005



Environmental Assessment

Nutrioso Wildland/Urban Interface Fuel Reduction Project

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



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INTRODUCTION

Summary

The Forest Supervisor for the Apache-Sitgreaves National Forests proposes to conduct fuel reduction treatments, including thinning and burning, on National Forest System lands adjacent to private and State lands around the community of Nutrioso, AZ, in Apache County. The overall area encompassed is approximately 52,655 acres (see attached Project Map). This includes 1,125 acres of State lands of the Sipe Wildlife Area (SWA) managed by Arizona Game and Fish Dept. and 9,772 acres of private land in several parcels, with the largest parcel being the area considered as the community of Nutrioso, AZ. The project analysis area is located within the following USGS 7.5' quad maps from north to south and west to east: Eagar, Rudd Knoll, Buffalo Crossing, Nelson Reservoir, Nutrioso, and Alpine and is within the Alpine and Springerville Ranger Districts, Apache-Sitgreaves National Forests.

The intent of the project is to reduce fuel loading around private lands and within wildlife species habitats, help create wildfire suppression zones, and improve public safety. Large-scale maps of proposed treatment areas are located in the Project File at the Alpine Ranger District office, Apache-Sitgreaves National Forests, Alpine, AZ. Appendix A contains a glossary of terms used in this document and in the Specialists' Reports that support the analysis.

Background

In December 2003, President Bush signed the Healthy Forest Restoration Act (HFRA), H.R. 1904¹. 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 Plan² 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 and threatened and endangered wildlife species. In 2004, in response to the HFRA, Apache County developed the Apache Communities' Wildfire Protection Plan³ (ACWPP).

In 2004, Three-Forks Fire burned approximately 6,700 acres of forested lands on the Apache-Sitgreaves National Forests (ASNFs). No structures were destroyed, but the fire threatened the community of Nutrioso, AZ, reaching within approximately three miles of the community. On November 18, 2004, the Forest Supervisor signed the project initiation letter (Project Record #019) 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

The purpose of this project is to respond to the need for public and firefighter safety and protection of important wildlife species habitats by reducing the wildland fire potential in and around the at-risk community of Nutrioso and other adjacent private and State lands. The need for action is to reduce the risk of serious threat to human life or property because of a large-scale wildland fire event, should one occur.

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 02 (Woodlands), MA 03 (Riparian Areas), and MA 04 (Grasslands).

MA 01 – Management emphasis for forested lands is a combination of multiple uses including a sustained yield of timber and firewood production, wildlife habitat, livestock grazing, watershed, and dispersed recreation.

MA 02 – Management emphasis for woodlands consists of fuelwood production, wildlife habitat, watershed condition, and livestock grazing. Other resources are managed in harmony with the emphasized resources.

MA 03 – Management emphasis for riparian areas recognizes “the importance and distinctive values of riparian areas when implementing management activities” by giving preferential consideration to riparian area dependent resources (as defined in the FLMP, p. 277-1; note that these resources include watershed condition). In cases of unsolvable conflicts, manage to maintain or improve riparian areas to satisfactory riparian condition (as defined in the FLMP, page 277-1), and implement other resource uses and activities to the extent that they support or do not adversely affect riparian dependent resources. Management emphasis of riparian (MA 03) is directed at areas with riparian dependent resources in the priority order of: threatened and endangered species; cold-water fisheries; warm water fisheries; and all other riparian areas.

MA 04 – Management emphasis for grasslands is for wildlife habitat, especially big game winter range, and visual quality.

Best Management Practices (BMPs) and design criteria were 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 two circumstances:

- ▶ 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 (high canopy closure and interlocking crowns in PFAs) specified for Northern Goshawk in treatment areas both within and beyond ½ mile of private land.
- ▶ By not fully following the Mexican Spotted Owl Recovery Plan direction in maintaining a high enough basal area in mixed-conifer and pine-oak stands that currently meet the Recovery Plan definition of target threshold.

The decision document for the Modified Proposed Action (if selected) would, therefore require a project-specific amendment to the FLMP to allow for these departures. These departures are necessary to meet the objectives of the Modified Proposed Action adjacent to the at-risk community of Nutrioso, AZ.

Other Laws, Regulations and Policies

This project was designed consistent with all current laws, regulations and policies that apply to fuel reduction projects. The Fuels Specialist Report (Project Record #165) discusses the National Fire Plan and other national policies related to wildland fire and reducing fuel loading within the wildland-urban interface area (WUI).

Public Involvement

The proposed project was first listed in the Schedule of Proposed Actions in February 1998. On August 21, 2004, agency personnel attended a Nutrioso Community Association meeting to provide a brief update on the status of the proposed project. On December 3, 2004, a Public Involvement Plan was prepared (Project Record #023). On December 9, 2004, agency personnel conducted a public meeting at the Nutrioso Bible Church to update the public on the status of the development of a proposed action. Comment forms were provided with a request for comments (Project Records #025, 026, 027). On December 22, 2004, U.S. Fish & Wildlife Service, Arizona Game & Fish Department, Apache County Natural Resources Department, and Apache County were invited to serve as cooperating agencies on the IDT to assist in the development of the proposed action (Project Records #028, 029, 030, 031). On January 21, 2005, a scoping report (Project Record #041) was mailed to 446 groups, organizations and individuals. The scoping report was posted on the ASNFs web page on January 26, 2005; on the Alpine RD bulletin board and the Nutrioso Community Association bulletin board at the Nutrioso Post Office on January 31, 2005; and in the Alpine Post Office on January 31, 2005. In addition, as part of the public involvement process, an information flyer regarding the scoping report was posted at public establishments in Alpine and Nutrioso, AZ. On February 12, 2005, ASNFs personnel conducted an open house meeting at the Nutrioso Bible Church to discuss and clarify the Proposed Action and to reinforce the need for comments (Project Records #099, 100).

Eighty-one scoping responses were received between January 24, 2005 and April 10, 2005. Two additional comments were received prior to issuing the scoping letter. The IDT evaluated all responses for applicability to the analysis, e.g., was the comment an issue and, if so, was it a key issue, a design issue, or an issue beyond the scope of the analysis. No key issues were identified during scoping. Fourteen design issues were raised during scoping (see Comment Summary and Issue Determination From Scoping, Project Record #155). These design issues were utilized to develop design criteria that were incorporated into the Proposed Action to minimize the risk of adverse affects.

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 design criteria 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.

ALTERNATIVES, INCLUDING THE PROPOSED ACTION

Alternatives

No Action

The No Action alternative would not implement any fuel reduction treatments on National Forest System (NFS) lands around the at-risk community of Nutrioso, AZ and adjacent private and State lands, 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 and the risk of serious threat to human life or property because of a wildland fire event would not be reduced.

Modified Proposed Action

The project analysis area comprises approximately 41,758 acres of NFS lands adjacent to the community of Nutrioso, AZ (see attached Project Map). The Modified Proposed Action is a combination of treatments, on approximately 40,752 acres, to live trees, snags (dead standing trees), and existing and pre-existing slash. Approximately 16,330 acres of treatments are proposed within one-half mile of private and State land boundaries, and approximately 24,422 acres of treatments are proposed beyond one-half mile of private and State lands. Approximately 1,006 acres within the project analysis area do not have treatments proposed. The areas not proposed for treatment lie within the Greenwood Sediment Reduction Project funded by Arizona Department of Environmental Quality (watershed restoration work currently being implemented) and within the shrubland vegetation type within MA 04 (Grasslands). The Modified Proposed Action treatments are summarized in Table 1 and detailed in Appendix B. These proposed treatments would be utilized as guidelines for developing stand-specific Silviculture prescriptions. Also, see the discussion below on “Other Alternatives Considered” in reference to the Proposed Action that was submitted to the public during scoping.

Table 1. Summary of treatments for the Modified Proposed Action as they are generalized across vegetation type and slope, and within and outside one-half mile of private lands.

GENERALIZED TREATMENT PRESCRIPTION	TOTAL AC. % of total	CONSISTING OF INDIVIDUAL TREATMENTS BY VEG TYPE (see * below) in=within ½ mile; out=beyond ½ mile	ACRES OF EACH TREATMENT (Approximate)
Cut & remove boles from site	20,072	3A1 (in) & 5A1 (out) AA,MC,OW,PP slope <40%	5,166 & 12,274
Mechanical Treatment and Rx burn	48%	4A (in) PJ slope <40% 4A (out) PJ slope <25%	1,677 955
Cut boles, leave boles on site	6,306	3A2 (in) & 5A2 (out) AA,MC,OW,PP slope <40%	2,304 & 2,459
Mechanical Treatment and Rx burn	15%	4B (out) slope<25% 4GW (in) PJ slope<40%	327 1,216
Rx Burn only	7,590	3B (in) & 5B (out) AA,MC,OW,PP slope >40%	1,578 & 2,389
No mechanical treatment	18%	5C (out) PACs all slopes 4B (in) PJ >40% 4C (out) PJ >25%	1,720 1,260 643
Thin to 110 BA favoring 16"+ dbh trees or Rx burn only	802	5WL (out) AA,MC,PP slope <40%	802
Mechanical Treatment and Rx Burn	2%		
Grassland restoration	4,586	3C (in) & 6B (out) Grasslands slope <25%	3,129 & 1,457
Mechanical treatment and Rx burn	11%		
Restoration – presettlement	1,396	6A (out) PP, MC slope<40%	1,396
Mechanical treatment	4%		
No treatment proposed	1,006	Greenwood sediment reduction project area and shrubland vegetation type of MA 04	1,006
	2%		

* AA=aspen; MC=mixed conifer; OW=oak woodland; PP=ponderosa pine; PJ=pinyon-juniper; GR=grasslands

Other Alternatives Considered

A Proposed Action was developed and public scoping was accomplished as described in the Public Involvement section above. Table 1 reflects adjustments in acres and treatments made by the IDT to the Proposed Action presented to the public. The adjustments were made for resource and other considerations identified during scoping. Specific adjustments, based on input from the public, are documented in Project Record Document #149. The Proposed Action presented to the public during scoping, therefore, was dropped from further detailed consideration and the Modified Proposed Action is now the “action” alternative considered in further detail in this document.

An alternative that accomplished fuels reduction by prescribed burning only (no mechanical treatments) was briefly considered; however, the IDT determined that the objectives for the project would not be met, even minimally. This alternative was dropped from further detailed consideration.

Within one-half mile of private land, forty-one stands covering approximately 1,159 acres, were identified as having a high stocking level of conifers greater than 16” dbh. The concern was the potential for not having an adequate tree spacing to interrupt crown fire spread in the main canopy. An alternative that accomplished fuels reduction by intensively thinning conifers greater than 16” dbh on these acres was considered. On March 18, 2005, field reconnaissance of six of the denser stands was completed. It was noted that due to inherent stand variability and past logging activities, most large conifers over 16” dbh were arranged in clumps ranging from approximately one-quarter acre to 2 acres in size, separated by canopy gaps in the overstory, such that thinning ladder fuels beneath and around the clumps would be adequate to break up the clumps from initiating and/or spreading crown fire. The IDT determined that the purpose and need of this proposed project could still be met by the Revised Proposed Action. Therefore, this alternative was dropped from further detailed consideration.

Mitigation Measures and Design Features

Best Management Practices (BMPs) were developed by the IDT, specifically for the project area and Modified Proposed Action, to minimize adverse effects and meet Management Area Standards and Guidelines (Appendix C). 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.

Protection of Heritage Resources: All archeological sites will be marked in an inconspicuous fashion, 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.

Snag Retention and Recruitment: Beyond one-half mile of private land, snags will be managed to meet or exceed the Forest plan standards of two snags per acre, except along

key fire control roads. Beyond one-half mile, recruitment from the large diameter over-story will be used to exceed the Forest Plan Standards and Guidelines of snags per acre, thus the average number of snags per acre will, over time, meet or exceed the minimum requirement of snags per acre over the landscape.

Timing Restrictions in Mexican Spotted Owl Protected Activity Centers (PAC): No project related activities will occur within known Mexican Spotted Owl PACs during the breeding season (March 1-August 31).

Timing Restrictions in Goshawk Nesting Areas and PFAs: No project related activities will occur in active goshawk nesting areas or Post-fledging Family Areas during the nesting season (March 1- September 30). Treatments in potential or suitable goshawk habitat will only occur after Goshawk surveys are completed.

Timing Restrictions for Mexican Gray Wolf Denning: No project related activities will occur within denning closure areas while occupied.

Smoke Mitigation: FS will monitor smoke produced during pile or broadcast burns. Arizona Department of Environmental Quality (ADEQ) Best Management Practices (BMP's) will be followed. Smoke impacts to communities will be closely monitored, and burning curtailed if impacts to communities exceed State ambient air quality standards of 150 micrograms per cubic meter of PM10 in a 24-hour average concentration.

Additional Smoke and Fire Control Mitigation: 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 done each day. Nutrioso residents will be alerted when the burning will be started and the expected duration.

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

Livestock Grazing: Where livestock grazing occurs in areas that have been burned, the District will determine when grazing can be resumed.

Monitoring Plan

For this project, monitoring would be conducted in accordance with the requirements outlined in the Apache-Sitgreaves National Forests Land and Resource Management Plan. Planned monitoring activities are displayed in Appendix D.

Comparison of Alternatives

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

Activities/Actions	No Action	Modified Proposed Action
Acres Treated	None	Approximately 16,330 acres within ½ mile of private land; approximately 24,422 acres beyond ½ mile of private land (98% of Project Area).
Mechanical Vegetation Treatments Note: Acres may also be prescribe burned	None	Commercial and Noncommercial thinning on approximately 33,162 acres; 80% of Project Area.
Prescribed Burning Treatments Only	None	7,590 acres: 18% of Project Area.
Ladder Fuels Reduced Substantially, and Main Canopy of Conifers Left Well-Spaced to Proposed Target	None	65% of the Forested & Grassland Area
<u>Fire Regime Condition Class:</u>	<u>Forested Area:</u>	<u>Forested Area:</u>
1	20%	72%
2	34%	23%
3	46%	5%
Old Growth Acres Allocated By This Project	0 acres	7,161 acres; 20 % of the forested acres within the Project Area.
Snag Treatments ¹	<u>Snags/Acre</u> Ponderosa Pine – 5 Mixed Conifer & Aspen – 6 Pinyon-Juniper – 3	<u>Snags/Acre</u> Ponderosa Pine – 4 Mixed Conifer & Aspen – 15 Pinyon-Juniper – 6
Average Stand Basal Area (BA) of all tree species ²	<u>BA / % of Forested Area</u> ≥80 BA / 82% 60-79 BA / 9% 40-59 BA / 6% <39 BA / 3%	<u>BA / % of Forested Area</u> ≥80 BA / 34% 60-79 BA / 51% 40-59 BA / 11% ≤39 BA / 4%

¹ Snag estimates are presented for 10+” diameters because exam snag tables and model mortality tables provide information categorized at 10” rather than 12+” breaks. See Project Record #159, Silviculture Specialist Report, for details.

² Proposed Action BA of *conifers only* would be: ≥80 BA/14%; 60-79 BA/21%; 40-59 BA/54%; ≤ 39 BA/11%.

ENVIRONMENTAL CONSEQUENCES

This section describes the environmental impacts of the Modified Proposed Action and No Action alternatives. The focus is on the significance of various environmental effects to determine whether to prepare an Environmental Impact Statement. Further analysis and conclusions about the potential effects are available in Resource Specialists' Reports and other supporting documentation cited below.

Fire, Fuels and Air Quality

This section summarizes the effects analysis described in Project Record #165, Fire, Fuels and Air Quality Specialist Report. The Forest Vegetation Simulator (FVS) along with The Fire and Fuels Extension (FFE) was used to model the alternatives due to its many applications for fire and stand dynamics. FVS along with the FFE were used to model treatments such as thinning, removal of created slash, pile burning, broadcast burning and effects of wildfires under specific parameters. The FFE estimates crown fire hazard based on tree, stand and site characteristics, and expresses fire hazard effects in terms of crowning index, torching index, flame length, tree mortality and potential smoke production.

No Action

Direct and Indirect Effects. The No Action Alternative would not reduce the fire hazard potential to the community of Nutrioso and other private and State lands within the analysis area. Through time, implementation of this alternative would increase the potential for large-scale wildfire. While modeling shows some stands are currently open enough (crown spacing) to sustain wildfire without extensive loss of key ecosystem components, the majority of the stands would sustain widespread loss. Over time, stand conditions within the analysis area would likely worsen in the absence of disturbance; stands would become more closed, ladder fuels would continue to grow, and dead and down fuel loading would increase. These are all factors that would directly contribute to potentially high intensity fire and crown fire sustainability. Roughly 9,006 acres across the analysis area would be expected to sustain passive or active crown fire if one were to occur in 2014, roughly 25% of the forested area.

The No Action Alternative would not produce any smoke, other than by potential wildfire. If a wildfire were to occur, such as modeled in 2014, it would produce significant amounts of smoke (in excess of 0.2 tons per acre of pm 2.5). Because of fire control difficulties due to increased fuel loading, future wildfires would be expected to become large-scale, thus, more acres burned and more smoke per acre produced.

Cumulative Effects. Fires have been an integral part of all ecosystems in the project area and the continued exclusion of fire from these ecosystems would cause effects that may be undesirable. The project area is not a static ecosystem, "No Action" does not mean that nothing would change. Continued fire suppression and lack of prescribed fire has known effects. These include increased fuel loads and tree stocking levels over time. Both of these factors are known to increase fire intensity and severity. In the absence of planned fuel treatments, wildfire or other natural disturbance, predicted flame lengths, fuel loading, and tree stocking levels would increase in future years.

Modified Proposed Action

Direct and Indirect Effects. This alternative would reduce the fire hazard potential to the community of Nutrioso and other private and State lands within the analysis area and increase the fire resiliency of the surrounding forested ecosystems. This would be accomplished by substantially reducing the occurrence of ground fuels, ladder fuels and by providing appropriate crown spacing in key portions of the forested acres, thus reducing the potential for crown fire initiation and crown fire spread.

Modeling indicates that a simulated post-treatment wildfire in 2014 would occur as a surface fire across the analysis area. The effectiveness in moderating future fire behavior is not precisely known, because of the many factors affecting fire behavior. However, with few exceptions, reduced flame lengths and fire intensities increase the likelihood of firefighter success in control of a wildfire, should one start. Torching index, crowning index and estimated mortality would all be greatly reduced. Wildfires in the near future would not likely result in stand replacing wildfires. The majority of the area (72%) would be returned to a Fire Regime Condition Class 1 (see Table 2 above).

This alternative proposes to treat created and pre-existing slash through combinations of chipping, removal, lopping and scattering, piling and burning or otherwise utilized for soil stabilization. Slash treatments are identified in Appendix B.

Management actions under the proposed fuel reduction treatments would produce smoke. Objectives of the project cannot be achieved without producing some smoke, however this smoke would be produced under controlled conditions. Smoke would 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, such as modeled in 2014, it would produce less than half the smoke per acre of the No Action Alternative (less than .1 tons per acre of pm 2.5). Wildfires would be expected to be smaller and more easily controlled under this alternative, further reducing acres burned as well as less smoke produced per acre than a large-scale wildfire.

Cumulative Effects. Fire suppression, grazing, timber harvesting, and the roading of the landscape have changed the disturbance regime in the project area. This has caused significant changes in forest structure, density, and species composition since European influences began around the turn of the past century. This dramatically increases the potential of intense wildfire burning through the project area. The cumulative effects on fire behavior for this alternative are projected to vary depending upon future management actions. Periodic prescribed burning would effectively maintain initial treatments. Recent research has demonstrated that if prescribed or natural fire is not allowed to burn at least every ten years the effectiveness of initial treatments rapidly declines.

Vegetation

This section summarizes the effects analysis described in Project Record #159, Silviculture Specialist Report.

No Action

Direct and Indirect Effects. Even with no new management actions undertaken, all forested, woodland, and grassland vegetation conditions would not remain static. Changes from existing conditions would continue to occur on their own, as dynamic natural processes would most likely follow the trends already underway. Conifer encroachment into meadows would continue to increase the number of acres lost from grassland. Insect/disease/stress levels would remain.

Unhealthy and over-mature trees would continue to die at normal to above normal mortality rates, thus creating new snags, safety hazards and fuels buildup. Older snags would continue to fall at various rates into logs, and logs would continue to decay slowly. Most trees would 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 would succumb to density related mortality, but a surplus would remain as flammable ladder fuels and main canopy fuels. Fire-adapted tree species abundance would continue to decline as poorly fire-adapted, shade-tolerant species replace them in normal succession with the absence of major disturbance. Hardwood species would continue to struggle to maintain their place in the ecosystem.

No new stands would be allocated or managed as old growth. Fire hazard would remain high and no stands would be enhanced for old growth characteristics.

Cumulative Effects. Forest structure and wildlife habitats would continue trending as more decadent, densely stocked, multi-storied stands, with interconnected canopies and late successional tree species dominant in all stories. As stated above, openings would continue to decrease and the canopy becomes more enclosed. Bark beetle risk would continue to increase as competition increases for water and nutrients. The likelihood for sustained crown fire would continue to increase. As a result, overall forest health on most acres would also continue to decline, with diminished resiliency to survive severe environmental disturbances. The health and vigor of potential and existing old growth stands would continue to decline and the risk of losing the large tree component to a wildfire would increase.

Modified Proposed Action

Direct and Indirect Effects. Treated acres would be returned to a much more normal range of natural variability, with improved forest health, structure and resiliency to survive a typical wildfire, with fewer acres supporting an extreme or moderate burn severity. Stands thinned and/or prescribed burned within one-half mile of private lands would have very few ladder fuel trees left, leaving a more single-storied canopy or “even-aged” appearing stand structure of larger trees. The main canopy trees on these acres would occur as singles and in small groups spaced well apart from each other to interrupt crown fire spread. Most stands beyond one-half mile from private lands would still have ladder fuels reduced substantially, but also have a bit more diversity of size/age classes left in several locations where that diversity already exists. Main canopy trees left beyond one-half mile would vary from desired spacing on most acres, to partly-spaced on some acres, to not-well-spaced on fewer acres, based on various scattered treatment types designed to maintain a broken mix for landscape diversity.

The majority of large conifers over 16”dbh would be left uncut. However, modeling indicates that approximately 0.6 to 5 trees per acre over 16”dbh would be cut, on average, as scattered individuals or small groups. These trees would be removed across treatment areas 3A1, 3A2, 4A in/out, 4GW and 6A for sanitation (worst disease/insect infested, imminent mortality and ladder fuel trees) on approx. 12,714 acres total (36% of the total forest/woodland area). FLMP existing/potential old growth criteria would be met in stands identified for old growth management on 20% of project-forested acres. Proposed existing old growth stands scheduled for thinning would receive minor fuel reduction treatments that would maintain old growth characteristics. Proposed potential old growth stands scheduled for thinning would receive minor fuel reduction treatments and the large tree component would be enhanced, thus moving the designated stands toward an old growth condition.

Resulting residual stand densities and tree spacing created by thinning would be mostly consistent with those identified in the Apache Communities’ Wildfire Protection Plan. Most treated stand

densities would drop from an average range of 80-300 ft²/acre total basal area (BA) to an average of 50-90 total BA left on thinned and prescribed burned acres (avg. 30-45 BA left on PJ acres). Prescribed burned only acres would be reduced to a range of 60-140 total BA left on average. Along with thinning 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 survive drought and resist insect/disease attacks. Only 17% of the forested area would have conifer snags, all sizes dropped within 300' of private land boundaries and key fire control roads. Existing snags and potential snags of various sizes would be left uncut on at least 66% of the forested area, in addition to snags over 12"dbh left uncut across the remaining 17%. New snag recruitment by natural processes (such as lightning, old age, etc.) and prescribed burning scorch mortality are expected to replace some snags lost to cutting and/or snag-fall by decay.

Removal of most conifers from grasslands and riparian hardwood sites would return those acres to their true cover types, thereby restoring them as natural fuel breaks scattered across the landscape. 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 the pines and Douglas fir. All stands would continue to have oak, aspen, and riparian hardwoods left uncut. Thus, cover type acreages would be expected to shift, with slight reductions in area dominated by mixed conifer and oak woodland, to slight increases in the ponderosa pine and aspen types. Acres of Pinyon-juniper cover and shrublands would stay unchanged.

Cumulative Effects. High stand densities currently occur throughout the project area due to past treatment or lack of treatment. A significant portion of the project area received some commercial harvest in the last 30 years, although little follow-up treatment was accomplished. The project area would continue to have maintenance treatments accomplished intermittently to maintain low to moderate stand densities for fuels reduction and increased large tree growth.

With maintenance treatments, fuel loading would remain at low to moderate risk levels and stand health, tree vigor, and growth would increase. Larger trees would be released by removing smaller less vigorous trees from below. Reduced stocking would relieve competitive stress among remaining trees, improve vigor, and make them less prone to successful bark beetle attack.

Maintenance burning, which may be accomplished every 5 - 7 years, would maintain a large portion of the project area in the larger size tree classes (VSS 5 and 6). However, because of the age of the overstory, current drought conditions, the ongoing bark beetle outbreak, and the presence of dwarf mistletoe in some stands within the project area, a number of these trees would likely die within the near future. Vegetative structural stages 3 and 4 would continue to be thinned to allow the healthier trees to grow into the larger classes.

In the short term (10-15 years), regeneration areas would be created to increase the percentage of the area in VSS 1; however, the objective of these treatments is to reduce wildfire hazard, so maintenance treatments may be implemented to avoid the creation of thick stands of conifer regeneration.

In the long term (15 years +), the combination of these factors would result in deficits in replacement trees from the smaller size classes to grow into the larger classes. Sanitation and salvage treatments may become necessary to remove dead and dying ponderosa pine before these trees add to the fuel loading in the area.

Social and Economics

This section summarizes the effects analysis described in Project Record #161, Social and Economic Resources Specialist Report.

Economics

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

Alternative	Volume of Products Ccf ¹	Estimated Revenue from Products	Estimated Cost of Treatments
No Action	0	0	0
Modified Proposed Action	(Approximate) 138,629	\$346,580	\$11,704,984

¹Ccf = 100 cubic feet

Recreation

Developed recreation improvements include Hulsey Lake day use area, William's Valley sledding hill, Divide Trailhead, and Williams Valley snowmobile parking area. Nelson Reservoir, although not within the boundary of the project area, is downstream and within the action area of the proposed project. Dispersed recreation includes a multitude of activities such as hunting, fishing, hiking, wildlife viewing, horseback riding, ATV riding, bike riding, and forest products gathering. The Visual Quality Objective (VQO) of the Nutrioso WUI includes foreground retention primarily adjacent to U.S. Highway 180/191 and Forest Road 249, middle and background retention, middle ground and background partial retention, and background modification. The majority of the area is in the retention category.

No Action

Direct and Indirect Effects. Existing developed recreation sites and dispersed activities would not be impacted by this alternative, other than as a result of inherent stand dynamics, unless a wildfire were to occur, such as modeled in 2014 (refer to Fire, Fuels, and Air Quality above). In the scenario described above the visual quality of these sites could be impacted, although the sites themselves may be minimally affected, with Hulsey Lake having the greater chance of being impacted due to its location, and Nelson Reservoir having the potential of being inundated with sediment. The other developed sites are located along roads, in or near meadows, and on the southwest side of the project area and are somewhat protected from wildfires that could occur within the project area.

Cumulative Effects. Cumulative effects would be based on the forest health in the project area. Continued beetle infestations would increase the number of hazard trees and dead trees. Heavy fuel loading in the project area would subject the area to a higher probability of large-scale wildfire.

Modified Proposed Action

Direct and Indirect Effects. In the short term (5-10 years), increased use of roads by project area assigned vehicles and temporary closures of areas during project activities would disrupt some recreational opportunities. During periods of active treatments, forest users and community residents would likely experience short-term impacts on the visual appearance of the forest. Additionally, noise associated with these activities would be audible in the immediate area. In the

long term, reducing tree densities and treating fuels in the project area would result in a more open park-like appearance that would promote a more fire resilient and healthy forest.

In the long term (10 years +) over-story age class distribution and tree species diversity would be maintained due to, mainly, the inherent variability of the project area landscape. Created openings would blend in with the existing stand structure for the most part and would be limited within the foreground retention areas. No rotation age is planned as part of this project and the health and vigor of over-mature trees would be enhanced by reducing competition through thinning over-stocked younger trees. Treated healthy mature stands would remain to grow into over-mature stands. Created slash would be treated within one year, or sooner, after completion of thinning activities. No log landing areas would be created along Highway 191, and along Forests Road 249 log landings would not be created or would be minimized in size and rehabilitated within one year. Insect and disease potential would be reduced by improving the health and vigor of the residual trees.

After project area treatments are concluded, the resulting improvements of roads would provide increased ease in accessing the forest and access to forest products, such as firewood. Opportunities for wildlife viewing of certain animals would be increased, as sight distances increase within the treated area. Roads familiar to Forests users would be altered, as some would be closed to vehicle traffic when the Roads Analysis Procedure is implemented. Non-motorized dispersed recreation would be enhanced as the area recovers from the short term effects of treatment.

Cumulative Effects. The proposed project would not deter recreational activities over the long term (after treatment). Recreation activities that traditionally occur in the project area would continue into the reasonably foreseeable future. Proposed project activities are projected to occur in the next 5 to 10 years and the economics of the proposal are displayed in Table 3. The proposed project would not disproportionately affect minority or low-income populations, and therefore would not require further Environmental Justice analysis (Executive Order 12898).

Transportation System ---

This section summarizes the effects analysis described in Project Record #157, Transportation System Specialist Report.

No Action

Direct and Indirect Effects. No fuel treatments would be completed and the existing road system within the project 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.

Modified Proposed Action

Direct and Indirect Effects. Successful implementation of the proposed treatments for the project is dependent on the ASNFs road system. A Project-Level Roads Analysis Procedure (RAP) covering all road levels has been completed (Project Records #158, 168).

A list of roads that would be used for the project is included in Appendix I of the Specialist Report. A map illustrating recommended new roads, potential roads for decommissioning, roads within Streamside Management Zones, and road location by objective maintenance level can be found in Appendix II of the Specialist Report. Road maintenance treatments for identified system roads within the analysis area are described in the Specialist Report. Treatments would bring the roads into conformance with assigned maintenance levels and meet BMPs to minimize erosion and sedimentation.

To gain access to the proposed treatment areas and complete the vegetation treatments new, temporary roads would need to be constructed (approximately 3.6 miles) and Maintenance 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 would 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. Road maintenance, construction, and use would conform to the Project Road Specifications found in Appendix III of the Specialist Report.

Roads in fuel treatment areas within one-half mile of private land would require a higher degree of reconstruction and maintenance than roads beyond one-half mile of private land. To treat areas within the one-half mile buffer, roads would likely see more traffic for a longer time-period than in areas beyond one-half mile from private land.

No roads are currently located in portions of ASNFs System lands adjacent to the west, southwest, southeast and east portions of Nutrioso and steep, inaccessible terrain would not allow access to the areas from the ASNFs. Access to these areas would have to be through private lands, and some temporary roads would then have to be constructed on the ASNFs. If this cannot be done, portions of some of these areas would not be able to be treated by mechanical methods.

Cumulative Effects. Cumulative effects of this Alternative would be to reduce fuels and large-scale wildland fire potential while providing for increased public and firefighter safety. This would necessitate periodic re-entries into the treatment areas so that the prescriptions can be maintained, continued, and enhanced over time. Various roads classified as Maintenance Level 1 would need to be re-opened and re-closed when periodic re-entries occur. In addition, there are several roads designated as Key Fire Control Roads. Maintenance of these roads would need to be performed on a regular basis in order to maintain them in adequate condition.

Wildlife

This section summarizes the effects analysis described in Project Records #171, Biological Assessment and Evaluation and #170, Wildlife Specialist Report.

No Action

Direct and Indirect Effects. All wildlife species habitats would remain in their current condition until natural events or other planned activities change them. There would not be any effects as a result of the proposed mechanical or prescribed burning activities.

Cumulative Effects. As noted in the existing conditions section of the Wildlife Specialist Report and because of the close proximity of private lands, the project area is currently more predisposed to total loss by wildfire than what would be under "natural" conditions. However, there is no way to predict where or when or to what level the project area would be impacted by wildfire. Therefore, it

cannot be determined that this alternative is any better or worse for wildlife populations currently occupying the Nutrioso WUI.

Modified Proposed Action

Direct and Indirect Effects. Terrestrial and aquatic wildlife species are classified according to the status of their population and habitat. There are seven species that occur within the project area that are listed under the Endangered Species Act (ESA). The modified proposed action would directly and/or indirectly affect all of them, although it is not likely to adversely affect or jeopardize three of these species. The remaining four would be adversely affected by the modified proposed action: Mexican Spotted Owl, because forest conditions needed, such as high canopy closure and density, would be reduced; and the Chiricahua leopard frog, Little Colorado spinedace and loach minnow, because project soil disturbance effects would occur and current poor baseline watershed and riparian conditions are inadequate to dissipate all of the proposed project effects. Based on these determinations of effects, consultation with the US Fish and Wildlife Service has been initiated.

There are forty-eight other classified species associated with the project: eighteen Sensitive species identified by the Regional Forester; eleven management indicator species (MIS) identified in the ASNFs FLMP; twenty-four species of migratory birds, as directed by Presidential Executive Order; and one species of interest identified by Arizona Game and Fish Department.

These forty-eight species would be affected directly and indirectly by the proposed action in several ways: reduction in hiding/thermal cover, reduction in amount of nesting habitat, reduction in quality of foraging habitat for the species or its prey, disturbance to vital activities (e.g., reproduction, rearing), damage to plants, and overland/within stream sediment. All of the above species would be impacted to some level by the proposed action. Some species would be affected more than others would. Species more impacted include those dependent on forests with high stand density, high canopy closure, multi-layered canopies, down wood, snags, and those sensitive to disturbance and sediment.

Cumulative Effects. There are in total or in part twelve livestock grazing allotments authorized within the project area. Included in the decisions on these allotments are actions that will help to lessen impacts to wildlife and wildlife habitat such as proper grazing season, conservative grazing utilization standards in key ("critical") areas, and the exclusion of livestock grazing in some riparian areas. Both formal and informal consultations were completed on these allotments. A number of wildlife species specific Biological Opinions provide terms and conditions, due to adverse effects from grazing on allotments within the project area.

Within the project area there are approximately 230 miles Forest System roads, at various maintenance levels, which bring together people and activities that impact wildlife behavior, habitat effectiveness, and habitat quality. The RAP recommends a number of roads for Maintenance Level 1 (i.e., not maintained for highway vehicles). However, off-highway vehicles can still utilize Level 1 roads, which in turn, impact soils and watersheds. Therefore, a number of the Level 1 roads are recommended in the RAP for no motorized vehicle use in order to limit impacts to wildlife and wildlife habitat, riparian areas, soils and watershed.

The 2004 Three Forks Fire provided and continues to provide adverse affects to wildlife and wildlife habitat through loss of forage, cover, snags, down logs, loss of old growth, prey species habitat, and degraded water quality.

Based on the above discussion, the seven wildlife species listed under the ESA would be cumulatively affected by the proposed action. Two of the species, Bald Eagle and Southwestern

Willow Flycatcher, are not likely to be adversely affected and one species, Mexican gray wolf, is not likely to be jeopardized. The other four species (Mexican Spotted Owl, Chiricahua leopard frog, Little Colorado spinedace and loach minnow) are likely to be adversely affected, but project activities would not jeopardize the continued existence of the species. The eighteen Regional Forester designated Sensitive Species would be cumulatively impacted by the proposed action, but there would not be a trend toward federal listing for these species based on the implementation of the proposed project. The eleven MIS identified in the FLMP would be cumulatively impacted by the proposed project, but there would be no loss of forest-wide population viability or a trend toward federal listing for these species based on the implementation of the proposed project.

Heritage Resources

This section summarizes the effects analysis described in Project Record #164, Heritage Resources Specialist Report.

No Action

Direct and Indirect Effects. No direct or indirect impacts would occur to historic properties.

Cumulative Effects. Other than the risk of wildfire, no additional cumulative impacts are anticipated.

Modified Proposed Action

Direct and Indirect Effects. There would be no direct or indirect adverse impacts to historic properties. As per the *First Amended Programmatic Agreement Regarding Wildland Urban Interface and Other Large-Scale Hazardous Fuels Reduction Projects*, twenty percent of identified sites would be monitored during and after the project.

Cumulative Effects. There would be no cumulative effects to heritage resources.

Soils and Water

This section summarizes the effects analysis described in Project Record #163, Watershed and Soils Specialist Report and Project Record #152, Cumulative Watershed Effects Analysis.

No Action

Direct and Indirect Effects. Under the no action alternative, riparian area and stream channel conditions within the proposed project area would continue to maintain the existing trends of slow improvement and stabilization as they recover from the impacts caused by historical resource management actions. In the event of wildfire occurring under extreme conditions, riparian areas could burn. However, under more normal conditions, larger riparian areas would likely sustain little damage but smaller riparian areas would likely sustain damage from burning. Impacts to water quality in the event of wildfire, primarily due to sedimentation and ash inputs, would likely be greater than in the action alternative. No change would occur in existing water quality trends in streams and water bodies. Roads that are currently inadequately drained and hydrologically connected to stream channels would continue to contribute sediment to stream channels. Areas with Datil soils would continue to experience naturally high erosion rates. In the event of wildfire, erosion rates in Datil soils would be increased to potential rates contributing increased sediment levels to area stream channels.

Cumulative Effects. Existing conditions in combination with anticipated future projects would not result in water yield or runoff quantities that might cause significant cumulative impacts to 6th code watersheds in the project area. However, Canopy cover would continue to increase and further reduce forage in uplands, which may shift more of the large ungulate use to riparian areas, resulting in further long-term decline of riparian meadow conditions. Wildfire hazard would remain moderate to high. High severity burns over large areas would generally result in losses in soil productivity due to loss of topsoil, long term reductions in water quality due to added sediment, long term changes in stream hydrology and stream condition by increasing peak flows and reduction of on site water storage.

Modified Proposed Action

Direct and Indirect Effects. Reduced canopy cover in riparian areas may result in an increase in stream temperatures. A reduction in large woody material available for stream channel stability functions through future recruitment may occur in those riparian areas where end-lining and harvest of tree boles is practiced. These impacts would remain within acceptable levels due to implementation of BMPs and mitigating measures.

Increases in water yield and runoff rates would occur in response to vegetation removal. These increases in water yield have the potential to result in channel incision and consequent destabilization of stream channels. This effect would be avoided by assuring that the thinning and burning operations are spread over time and between watersheds consistent with recommendations of the Forest hydrologist in the Cumulative Watershed Effects Analysis (Project Record 152).

Unacceptable increases in the erosion rates and loss of organic soil carbon of highly erodible Datil soils would be mitigated through BMPs specific to Datil soils. Where prescribed fire on Datil soils produces more than the desired light severity burns, potentially severe erosion rates would be expected. Elsewhere, BMPs developed to maintain ground cover and to provide for stream-side buffer zones to filter sediment would keep sedimentation in streams within acceptable levels. Soil compaction would occur where mechanized vehicular equipment is used to access, cut, and skid or haul wood in areas away from roads.

The pH of water in streams in the project area would be expected to increase slightly on a temporary basis due to ash generated on watershed slopes from prescribed burning operations. Re-opened or reconstructed roads would present the greatest risk to water quality. Increased sedimentation from road surfaces would occur where existing roads are located adjacent to stream channels and insufficient area exists to allow for filtration of runoff from roads. However, BMPs designed to reduce erosion from roads, to provide for proper road drainage, to minimize impacts at stream crossings, and to maintain sediment filter buffers adjacent to streams would minimize the overall impacts from roads and prevent excessive sedimentation from most road surfaces. Long-term impacts of sedimentation generated from roads would be mitigated by road closure and/or obliteration once the project is completed.

Cumulative Effects. Cumulative effects of land disturbing activities can occur on-site or downstream of the activity. On-site effects may include changes to soil productivity from multiple activities such as ungulate grazing, use of heavy equipment, or unrestricted off highway vehicle use. Off-site or downstream effects may include changes in amount and timing of overland and concentrated water flow and input of sediment to streams.

The potential impacts from this proposed project was 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. An "Equivalent Disturbed Area (EDA) Analysis was used to compare the impacts of past, current and

future activities both on the Forest and on private land within the eight 6th Code watersheds containing the project area. The model used in this analysis calculates the runoff inducement potential of various treatments and indexes them to the runoff potential of open roads. Thus the EDA figure represents the percent of the watershed area, which would have runoff related disturbance levels equivalent to that of being in a roaded condition.

EDA model runs indicated that the reasonable dispersal over time of thinning and harvest treatments would maintain EDA levels comfortably below the conservative tolerance value of 15 percent set by the team. For example, dispersing the treatments in the two watersheds of greatest concern to three entries over 5 years and distributing other treatments over time would result in an EDA level in Auger watershed of 13.1% and in the San Francisco Headwaters watershed of 11.6%. The other six watersheds would have EDA values much lower. Based on the results of the EDA analysis, a BMP was developed to limit the number of acres of treatment within the Auger and San Francisco Headwaters within given time periods. Implementation of this BMP would avoid unacceptable cumulative impacts on watershed function by this proposed project.

Summary of Cumulative Effects

There would be unavoidable impacts associated with treatment activity included in the modified proposed action. These include a temporary disruption to wildlife species; a short-term increase in fire potential until treatment of activity fuels is completed; minor soil displacement prior to re-establishment of vegetation and ground cover; and short-term conflicts with residents and recreation visitors in the project area. The impacts would be short term in duration and limited in consequence at the landscape scale.

Aside from past activities near the project area already accounted for in the watershed impacts, there are no known current or proposed projects on adjacent ownerships proximate to the project area that would generate effects that would combine with those of the proposed action to constitute an accumulation of effects. The possible exception would be a combination of smoke from prescribed burns conducted by adjacent Forest Service districts and Native American Tribes during brief burning windows in the spring and fall. These burns are coordinated through State of Arizona smoke management procedures to mitigate cumulative effects.

Vegetation treatment acres are currently well below levels originally projected in the FLMP and dispersed widely in time and space. This reduced activity greatly diminishes the interaction of effects between projects and minimizes cumulative effects associated with such activity.

Vegetation modeling done in conjunction with effects analysis indicates that forest changes brought about by treatment are transitory. That is, treatment changes the trajectory of vegetative development but an overall return toward pre-treatment density is indicated in all cases, in the absence of additional treatments within the project area. While the proposed action was designed to prevent the significant loss of resource values that would result from a large-scale wildfire, the treatments themselves are not significant in their direct, indirect and cumulative effects to the human environment.

The analysis of effects as documented in this assessment indicates that there are no irreversible or irretrievable impacts associated with the modified proposed action. There are no irreversible resource commitments or irretrievable loss of resources. There are no major adverse cumulative or secondary environmental effects to the ecosystem. Physical and biological effects are limited to the action area of analysis. The modified proposed action does not involve highly uncertain, unique or unknown risks and does not significantly affect the quality of the human environment.

AGENCIES, GROUPS, AND PERSONS CONSULTED

INTERDISCIPLINARY TEAM

James D. Copeland (IDT Leader) – Wildlife Staff, Alpine R.D.

Linda WhiteTrifaro – Wildlife Biologist, Alpine R.D.

Bill Ripley – Zone Silviculture, Alpine and Springerville R.D.'s

Dan Mindar – Assistant District Fire Management Officer, Fuels, Alpine R.D.

Raymond Rugg – Zone Timber Staff, Alpine and Springerville R.D.'s

Bill Wall – Zone Fisheries Biologist, Alpine and Clifton R.D.'s

Jeff Rivera – Range, Watershed, Soils Staff, Alpine R.D.

Consultation With Others

Those Who Provided Input

Richard Davalos – District Ranger, Alpine R.D.

John MacIvor – District Ranger, Springerville R.D.

Jim Aylor – District Fire Management Officer, Alpine R.D.

Monica Boehning – Silviculture, Alpine R.D.

Georgia Morris – GIS Coordinator, Alpine R.D.

Dr. Charlotte Hunter – Forest Archeologist, Apache-Sitgreaves National Forests

David Mehalic – Apache Zone Archeologist, Apache-Sitgreaves National Forests

Tom Subirge – Soils,/Watershed/Riparian/Hydrology, Apache-Sitgreaves National Forests

Jim Probst – Soils,/Watershed/Riparian/Hydrology, Apache-Sitgreaves National Forests

Charles Laing – Forester, Alpine R.D.

Chris Bielecki – Transportation Planner, Apache-Sitgreaves National Forests

Delwin Wengert – Apache County Board of Supervisors

Dave Dorum – Habitat Specialist, Arizona Game & Fish Department

Chris Bagnoli – Unit 1 Game Manager, Arizona Game & Fish Department

Len Schlesinger – District Manager, Apache Natural Resource Conservation District

Many members of the public commented on the proposed action. All those who commented are listed in the project record.

Agencies, Groups and Persons Contacted But Did Not Provide Input

Letters of notification of the proposed action were sent to the agencies, groups and individuals listed on the Nutrioso Wildland Urban Interface Fuel Reduction Project mailing list (Project Record #042). This list is filed in the project record at the Alpine Ranger District in Alpine, Arizona.

APPENDIX A

Glossary of Terms used in the Environmental Assessment and Specialists' Reports.

Aspen (AA): Stands where the plurality of **Basal Area** and/or trees per acres of all live trees is dominated by aspen. Other tree species may also exist in lesser amounts.

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

Best Management Practices (BMPs): A combination of conservation practices that is determined after a problem assessment, examination of alternative practices and appropriate public participation 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.

Bole: The main stem of a tree, i.e., tree trunk.

Canopy fuels: the live and dead foliage, 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 highway 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**.

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 Inside Bark (DIB): The diameter of the small end of a log measured inside the bark.

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

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 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 Regime: A general classification of the role fire would play, based on fire frequency and severity, across a landscape in the absence of modern human mechanical intervention.

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.

Imminent Mortality: Trees with 80% or more of the live crown that is fading (loss of proper color), or trees with a broken top that only has 20% or less live crown left.

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.

Ladder Fuel: 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 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, delimiting, 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): Stands where the plurality of **Basal Area** and/or trees per acres of all live trees is dominated by one or more of the following – Douglas fir, white fir, southwestern white pine, and blue spruce. Other tree species may also exist in lesser amounts.

Oak Woodland (OW): Stands where the plurality of **Basal Area** and/or trees per acres of all live trees is dominated by Gambel oak. Other tree species may also exist in lesser amounts.

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**.

Open Road: A **Road** open to and maintained for public highway 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.

Pinyon/Juniper: Stands where the plurality of **Basal Area** and/or trees per acres of all live trees is dominated by pinyon pine and/or various juniper species. Other tree species may also exist in lesser amounts.

Ponderosa pine (PP): Stands where the plurality of **Basal Area** and/or trees per acres of all live trees is dominated by ponderosa pine. Other tree species may also exist in lesser amounts.

Pre-Settlement Trees: Trees greater than 150 years old that were present prior to the main influx of European settlement.

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.

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.

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

Roads Analysis Procedure (RAP): 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.

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

Severely Diseased: Trees 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.

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 surrounding a stream course with a width based on erosion hazard and existing vegetative groundcover conditions.

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

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.

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

Wildland Urban Interface (WUI): The line, area, or zone where structures and other human development meet or intermingle with undeveloped wildland and vegetative fuels as identified in the Community Wildfire Protection Plan.

APPENDIX B

Proposed treatments are summarized in Exhibits 1 and 2 below. All acres are approximate.

Exhibit 1: Treatments within 1/2 Mile of Private Land

Treatment	Vegetation	Slash
<p>3A1</p> <p>AA, MC, OW, PP</p> <p>Slopes <40%</p> <p>Boles removed</p> <p>5,166 acres</p>	<p>Target crown spacing for conifers ranges from 10-25' and averages 15–20'. The crown spacing will be primarily achieved by thinning conifers 3.0' tall to 16" dbh. Conifers >16" dbh will be retained, except those that are heavily to severely diseased, insect infested, facing imminent mortality, and/or trees that act as ladder fuels. In stands where oak and aspen occur, they will not be cut. Where appropriate, these species may be considered as residual trees in the target crown spacing when thinning conifers. Where conditions are appropriate, groups or clumps of trees may be left un-thinned, except for removing ladder fuels, and considered as a single unit with appropriate crown spacing around it. Areas may also be treated with periodic low intensity prescribed burns where feasible.</p>	<p>All boles >3.9" dib from the thinning will be removed from the project area. All other created and pre-existing slash will be mechanically treated (chipped, etc.), removed, or piled and burned; or otherwise utilized for soil stabilization. All snags within 300' of private land boundaries and along key fire control roads will be felled. Beyond the 300' strip, only conifer snags <12" may be cut.</p>
<p>3A2</p> <p>AA, MC, OW, PP</p> <p>Slopes <40%</p> <p>Currently without road access, boles cannot be removed</p> <p>2,304 acres</p>	<p>Target crown spacing for conifers ranges from 10-25' and averages 15–20'. The crown spacing will be primarily achieved by thinning conifers 3.0' tall to 16" dbh. Conifers >16" dbh will not be cut except those that are heavily to severely diseased, insect infested, facing imminent mortality, and/or trees that act as ladder fuels. In stands where oak and aspen occur, they will not be cut. Where appropriate these species may be considered as residual trees in the target crown spacing when thinning conifers. Where conditions are appropriate, groups or clumps of trees may be left un-thinned, except for removing ladder fuels, and considered as a single unit with appropriate crown spacing around it. In some areas the target BA will be exceeded due to the number of existing trees greater than 16" dbh. If access becomes available the defined areas will be treated under 3A1. Areas may also be treated with periodic low intensity prescribed burns where feasible.</p>	<p>All created and pre-existing slash <16" diameter will be treated, i.e., piled and burned, or otherwise utilized for soil stabilization. Bark beetle prevention measures will be implemented as necessary. All snags within 300' of private land boundaries and along key fire control roads will be felled. Beyond the 300' strip, only conifer snags <12" may be cut.</p>

Exhibit 1 continued: Treatments within ½ Mile of Private Land

Treatment	Vegetation	Slash
<p>3B</p> <p>AA, MC, OW, PP</p> <p>Slopes >40%</p> <p>1,578 acres</p>	<p>Areas may be treated with periodic low intensity prescribed burns where feasible. This treatment will retain old growth conditions that occur on 7 acres. There are an additional 106 acres of potential old growth that are also allocated within this treatment.</p>	<p>No treatment except with prescribed fire.</p>
<p>3C</p> <p>Grassland Restoration</p> <p>Slopes <25%</p> <p>Boles may be removed</p> <p>3,129 acres</p>	<p>Restoration is designed to promote and restore grasslands. All conifer trees >16" dbh will be retained. Retain all pinyon trees >12" drc and juniper trees >16" drc. Where oak and aspen occur, they will not be cut. Areas may also be treated with periodic low intensity prescribed burns where feasible.</p>	<p>Boles and created slash may be removed (except in the Greenwood Area) or lopped and scattered, or piled and burned, or utilized for soil stabilization. Bark beetle prevention measures will be implemented as necessary. Conifer snags <12" dbh may be cut.</p>
<p>4A</p> <p>PJ</p> <p>Slopes <40%</p> <p>Boles may be removed</p> <p>1,677 acres</p>	<p>Target crown spacing ranges from 20-35', however, all pinyon pines >12" drc and all other tree species >16" drc will be retained. Conifers over these diameters may be cut if heavily to severely diseased, insect infested, or facing imminent mortality. In stands where oak and aspen occur, they will not be cut. Alligator junipers (primarily) and pinyon pine (secondarily), when present, will be favored over other conifers. Areas may also be treated with periodic prescribed burns where feasible.</p>	<p>Slash will be lopped and scattered, or piled and burned, or utilized for soil stabilization. On slopes <25%, woody material may be removed. Conifer snags <12" dbh may be cut.</p>

Exhibit 1 continued: Treatments within 1/2 Mile of Private Land

Treatment	Vegetation	Slash
<p>4B</p> <p>PJ</p> <p>Slopes >40%</p> <p>1,260 acres</p>	<p>Areas may be treated with periodic prescribed burns where feasible. In the Greenwood Area, this treatment will be applied on some slopes less than 40%.</p>	<p>No treatment except with prescribed fire.</p>
<p>4GW</p> <p>PJ</p> <p>Slopes <40%</p> <p>No Mechanical treatment and no boles removed</p> <p>1,216 acres</p>	<p>Target crown spacing ranges from 20-35', however, all pinyon pines >12" drc and all other tree species >16 " drc will be retained. Conifers over these diameters may be cut if heavily to severely diseased, insect infested, or facing imminent mortality. In stands where oak and aspen occur, they will not be cut. Alligator junipers (primarily) and pinyon pine (secondarily), when present, will be favored over other conifers when trees are left in place. Areas may also be treated with periodic prescribed burns where feasible.</p>	<p>Slash will be lopped and scattered, or piled and burned, or utilized for soil stabilization.</p>

Definition of abbreviations – see attached Glossary

BA = basal area

dbh = diameter breast height

dib = diameter inside the bark

drc = diameter root collar

AA = Aspen

MC = mixed conifer

OW = oak woodlands

PJ = pinyon/juniper

PP = ponderosa pine

Total acres proposed for treatment within 1/2 mile of state and private land = approximately 16,330 analysis acres within 1/2 mile of state and private lands

Exhibit 2: Treatments Beyond ½ mile of Private Land

Treatment	Vegetation	Slash
<p>4A</p> <p>PJ Slopes <25%</p> <p>Boles may be removed</p> <p>955 acres</p>	<p>Target crown spacing ranges from 20-35', however, all pinyon pines >12" drc and all other tree species >16 " drc will be retained. Conifers over these diameters may be cut if heavily to severely diseased, insect infested, or facing imminent mortality. In stands where oak and aspen occur, they will not be cut. Alligator junipers (primarily) and pinyon pine (secondarily), when present, will be favored over other conifers when trees are left in place. Areas may also be treated with periodic prescribed burns where feasible. Modification of this treatment will be made to retain old growth conditions that occur on 230 acres. There are no potential old growth acres allocated in this treatment.</p>	<p>Slash will be lopped and scattered, or piled and burned, or utilized for soil stabilization. On slopes <25%, woody material may be removed. Conifer snags <12" dbh may be cut.</p>
<p>4B</p> <p>PJ Slopes <25%</p> <p>No Boles removed</p> <p>327 acres</p>	<p>Where necessary, target crown spacing ranges from 20-35', however, all pinyon pines >12" drc and all other tree species >16 " drc will be left. In stands where oak and aspen occur, they will not be cut. Alligator junipers (primarily) and pinyon pine (secondarily), when present, will be favored over other conifers. Areas may also be treated with periodic prescribed burns where feasible. Modification of this treatment will be made to retain old growth conditions that occur on 198 acres. There are an additional 84 acres of potential old growth that are also allocated within this treatment.</p>	<p>Slash will be lopped and scattered, or piled and burned, or utilized for soil stabilization.</p>
<p>4C</p> <p>PJ Slopes >25%</p> <p>643 acres</p>	<p>Areas may be treated with periodic prescribed burns where feasible. This treatment will retain old growth conditions that occur on 82 acres. There are an additional 183 acres of potential old growth that are also allocated within this treatment.</p>	<p>No treatment except with prescribed fire.</p>

Exhibit 2 continued: Treatments Beyond ½ mile of Private Land

Treatment	Vegetation	Slash
<p>5A1 AA, MC, OW, PP Slopes <40% Boles removed 12,274 acres</p>	<p>Target crown spacing for conifers ranges from 10-25' and averages 15–20'. The crown spacing will be primarily achieved by thinning conifers 3.0' tall to 16" dbh. Conifers >16" dbh will not be cut except those that are heavily to severely diseased, insect infested, and trees that act as ladder fuels. In stands where oak and aspen occur, they will not be cut. Where appropriate, these species may be considered as residual trees in the target crown spacing when thinning conifers. Where conditions are appropriate, groups or clumps of trees may be left un-thinned, except for removing ladder fuels, and considered as a single unit with appropriate crown spacing around it. Areas may also be treated with periodic low intensity prescribed burns where feasible. Modification of this treatment will be made to retain old growth conditions that occur on 312 acres. There are an additional 739 acres of potential old growth that are also allocated within this treatment.</p>	<p>All boles >3.9" dib from the thinning will be removed from the project area. All other created and pre-existing slash will be mechanically treated (chipped, etc.), removed, or piled and burned; or otherwise utilized for soil stabilization. All snags within 300' of key fire control roads may be cut. Beyond this 300' strip, only conifer snags <12" may be cut. Bark beetle prevention measures will be implemented as necessary.</p>
<p>5A2 AA, MC, OW, PP Slopes <40% No road access- boles cannot be removed 2,459 acres</p>	<p>Areas may be treated with periodic low intensity prescribed burns where feasible. This treatment will retain old growth conditions that occur on 75 acres. There are an additional 1198 acres of potential old growth that are also allocated within this treatment.</p>	<p>No treatment except with prescribed fire.</p>

Exhibit 2 continued: Treatments Beyond ½ mile of Private Land

Treatment	Vegetation	Slash
<p>5B</p> <p>AA, MC, OW, PP Slopes >40%</p> <p>No boles removed</p> <p>2,389 acres</p>	<p>Areas may be treated with periodic low intensity prescribed burns where feasible. This treatment will retain old growth conditions that occur on 117 acres. There are an additional 1323 acres of potential old growth that are also allocated within this treatment.</p>	<p>No treatment except with prescribed fire.</p>
<p>5C</p> <p><u>Within</u> <u>PACs</u></p> <p>1,720 acres</p>	<p>Areas may be treated with periodic low intensity prescribed burns where feasible. This treatment will retain old growth conditions that occur on 208 acres. There are an additional 1486 acres of potential old growth that are also allocated within this treatment.</p>	<p>No treatment except with prescribed fire.</p>
<p>5WL</p> <p>AA, MC, PP, OW</p> <p>ALL SLOPES</p> <p>802 acres</p>	<p>Areas may be thinned from below to maintain a minimum 110 basal area (BA), retaining the largest trees possible. Areas currently less than 110 BA will not be thinned. In stands where oak and aspen occur, they will not be cut. Areas may also be treated with periodic low intensity prescribed burns where feasible. This treatment will retain old growth conditions that occur on 37 acres. There are an additional 765 acres of potential old growth that are also allocated within this treatment.</p>	<p>Boles >3.9" dib from the thinning may be removed from the project area. All other created and pre-existing slash may be mechanically treated (chipped, etc.), removed, or piled and burned; or otherwise utilized for soil stabilization. Bark beetle prevention measures will be implemented as necessary. All snags within 300' of key fire control roads may be cut. Beyond the 300' strip along key fire control roads, all snags will be retained.</p>

Exhibit 2 continued: Treatments Beyond ½ mile of Private Land

Treatment	Vegetation	Slash
<p>6A</p> <p>Restoration - Presettlement</p> <p>Slopes <40% Boles removed</p> <p>1,396 acres</p>	<p>Restoration is designed to promote and protect pre-settlement (PS) trees and stand conditions. All PS trees will be retained; younger trees within competitive distances will be removed unless needed for replacement (R). R trees will be identified based on remnant evidence. Average of ~1.5 trees >15.9" dbh or 2-3 trees <16" dbh will be used for Rs. Where appropriate and where pre-settlement evidence is lacking, additional healthy trees may be left. In stands where oak and aspen occur, they will not be cut. Areas may also be treated with periodic low intensity prescribed burns where feasible. Modification of this treatment will be made to retain old growth conditions that occur on 11 acres. There are no potential old growth acres allocated in this treatment.</p>	<p>All boles >3.9" dib from the thinning will be removed from the project area. All other created and pre-existing slash will be mechanically treated (chipped, etc.), removed, or piled and burned; or otherwise utilized for soil stabilization. All snags within 300' of key fire control roads will be cut. Beyond the 300' strip along key fire control roads, all snags will be retained. Bark beetle prevention measures will be implemented as necessary.</p>
<p>6B</p> <p>Grassland Restoration</p> <p>Slopes <25% Boles may be removed</p> <p>1,457 acres</p>	<p>Restoration is designed to promote and restore grasslands. All conifer trees >16" dbh will be retained. Retain all pinyon trees >12" drc and juniper trees >16" drc. Where oak and aspen occur, they will not be cut. Areas may also be treated with periodic low intensity prescribed burns where feasible.</p>	<p>Boles and created slash may be removed (except in the Greenwood Area) or lopped and scattered, or piled and burned, or utilized for soil stabilization. Bark beetle prevention measures will be implemented as necessary. All snags within 300' of key fire control roads will be cut. Beyond the 300' strip along key fire control roads, all snags will be retained.</p>

Total acres proposed for treatment outside ½ mile of state and private land = approximately 24,422 analysis acres outside of state and private land.

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APPENDIX C

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

1. Thinning and harvest activities in the Nutrioso Creek/Auger 6th code watershed (generally the 3A1, 3A2, 5A1, and 5A2 treatment areas) shall be limited to 2000 acres within any two year period and to 3000 acres within any 4 year period. Thinning and harvest activities in the San Francisco Headwaters/Judd Lake 6th code watershed (generally the 3A1, 3A2, 5A1, and 5A2 treatment areas) shall be limited to 1500 acres within any two year period and 2500 acres within any 4 year period. These restrictions do not apply to prescribed fire entries into those treatment areas.
2. 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 BMPs

1. **Use of Project Area Maps for Designating Stream Courses for Water Quality Protection-** Locations of protected stream channels and filter strips (Streamside Management Zones) 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.

Stream Channel and Wetland Protection - Stream channels and other wetlands to be protected will be shown on the project contract maps along with their associated Streamside Management Zones (SMZs). SMZs shall be designated along intermittent and perennial stream channels (see section 5, page 3). Stream channels shall be crossed at designated crossings only and shall be pre-approved by a Forest Service (FS) Officer. Unless approved by a FS Officer, there shall be no mechanized activities within the SMZ. 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 a FS Officer, debris generated from treatment activities will be removed from

stream channels. Trees that may be removed from SMZs are those trees with exposed root systems that have lost their value in providing bank stability and are less than 16.0"dbh. Trees designated for removal shall be felled outside the stream channel. Trees, in or on the banks of stream courses, with unexposed root systems that are providing bank and stream channel stability are not to be removed. A FS Officer will identify exceptions where restoration or additional thinning is needed for resource concerns. The contract administrator 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.

2. **Riparian Treatment Areas, including Wetlands** - Areas designated for riparian treatment by a FS Officer, shall be indicated on the project area contract map and have the following recommendations. Non-riparian species within these treatment areas may be removed to reduce competition for desired woody and herbaceous riparian species. Created slash may be placed in minor drainages to aid in rebuilding of deeply incised gullies and headcuts, although no burning of slash in drainages or depressions shall be allowed. Consult the District during harvesting and slash treatments to ensure proper slash placement. Ensure that sediment from disturbed areas does not directly enter the stream system through combinations of seeding of primarily native species, water-bars, wattles or spreading slash.
3. **Treatment of Ephemeral Drainages** - The following are required for tree removal activities around ephemeral channels:
 - a. No skidding shall be allowed down ephemeral channels, through low points or across swales;
 - b. No road construction shall be allowed in or immediately adjacent to ephemeral streams;
 - c. Minimize the amount of logging debris deposited in ephemeral channels by removing excess debris by hand or end-lining, except in areas designated by a FS Officer;
 - d. Trees shall not be cut if the root system is important in maintaining the integrity of the bank;
 - e. Log decks shall not be located within ephemeral channels, depressions, or swales;
 - f. A minimally disturbed filter strip of vegetation and litter shall be maintained between skid trails/log decks/roads and the channel;
 - g. The number of skid trail and road crossings across these channels shall be minimized.
4. **Streamside Management Zone (SMZ) Designation** –
 - a. SMZ width is based on erosion hazard, existing vegetative groundcover conditions, and stream bank and riparian conditions. SMZ widths, which include ephemeral channels, shall be designated as follows:
 - i. Slight erosion hazard = 75 feet (slope distance) on both sides of the stream course beginning at the high water mark within the stream channel. This includes TES Mapping Units: 4, 16, 208, 502, 503, 518, 523, 535, 537, 543, 550, 551, and 572.
 - ii. Moderate to Severe erosion hazard = 150 feet (slope distance) on both sides of the stream course beginning at the high water mark within the stream channel, or modified as needed to best feasibly protect specific streams/reaches. This includes

TES Mapping Units: 140, 515, 536, 538, 567, 574, 577, 591, 592, 667, 672, and 690. The "no go" TES mapping units also have a Severe erosion hazard and are located on slopes over 40%. Therefore, they are too sensitive to justify mechanical treatment, therefore, shall not have any mechanical ground disturbance and include mapping units: 141, 516, 565, 570, 585, 650, and 673.

- iii. For intermittent and perennial stream reaches not meeting the Apache-Sitgreaves National Forests Land and Resource Management Plan (ASNFs LRMP) Standards for Management Area 3, SMZ widths shall be 150 feet (slope distance) on both sides of the stream course, based on stream bank and riparian condition.
 - b. Activities permitted within the SMZ are limited to non-mechanized treatments, unless approved by a Forest Officer. Directional falling of trees shall be away from the stream channel. Ground skidding, decking of logs and machine piling (permitted only on existing roadbeds that are located within SMZs), road construction, and burning of concentrated slash are prohibited within the SMZ. Stream channels to be protected within SMZs will be identified on watershed and project area contract maps. Stand prescriptions shall include a sketch of the SMZ location and width.
 - c. To enhance and protect SMZ micro-climate, beyond ½ mile of private land, crown spacing for the SMZ shall be one-half of upland crown spacing. Exceptions to the adjusted crown spacing will be identified by a FS Officer where restoration or additional thinning is needed for resource concerns. Protect all deciduous and riparian vegetation.
 - d. To provide SMZs with trees large enough for future stream channel placement, conifer trees greater than 16" dbh shall be identified by a FS Officer and protected from thinning. These trees shall not be considered in determining residual crown spacing.
5. **Log Landing Location** - Log landings (decking areas) shall not be allowed in meadows, riparian areas, stream channels, and SMZs. A FS Officer may authorize landings 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, SMZs, and riparian areas.
 7. **Wetlands and Meadow Protection During Tree Removal Activities** – Wetlands and Meadows 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 a FS Officer.
 8. **Prescribed burning treatments** - For the retention of long term soil productivity and to reduce erosion, prescribed burning treatments shall be accomplished when the lower duff layer (decomposed organic matter) in contact with the soil surface is moist enough so a cool burn can be assured to avoid hydrophobic soil conditions. Cool burns allow for effective ground cover retention, helping to reduce overland flow and soil erosion. These burning conditions also allow for nitrogen to be condensed into the soil instead of being volatilized into the air. Cool burns also reduce negative impacts to soil structure that may ultimately

reduce water infiltration rates. Conditions conducive to low and moderate burn intensities will be based on soil moistures within the riparian drainages.

- a. Fire control lines shall not be constructed on slopes greater than 40% or within SMZ's. Exceptions will be identified by a FS Officer and specific mitigations will be determined at that time.
 - b. Ignition shall be above slope breaks of active floodplain. Fire will be allowed to burn down into the channel with a goal of <15% burned area within the active flood plain.
 - c. Livestock grazing will be coordinated with prescribed burning, especially relative to drainages and their floodplains. Livestock use may be deferred, if necessary.
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 contract administrator 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.

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 with an erosion control seed mix consisting of primarily native species. Slash or chips will 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 contract administrator in conjunction with the contractor. To minimize soil disturbance by equipment use, trees are to be felled to the lead and the contract administrator 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 the front 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. Additionally, four TES units were identified with severe limitations for mechanized tree removal due to severe erosion hazard (140, 667, 536, 567). Proper skid trail design and skidding practices as mentioned above, along with timely implementation of erosion control practices will generally mitigate potential soil loss.

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. Emphasis added: The contract administrator will use their full authority to ensure that extra care is exercised by equipment operators when working on soils of moderate and severe erosion hazard (soils derived or influenced by the Datil geologic formation) within the Nutrioso area. All bare ground and ruts shall be treated with slash or mulch to prevent initiating severe sheet and gully erosion.
5. **Soil Productivity/Coarse Woody Debris** - Outside the ½ mile buffer around private land; to maintain or improve soil productivity on sensitive soils, manage towards a minimum of 6-12 tons/acre of coarse woody debris in pine types, in the 3" + size class where FS resource specialist(s) deems necessary. Where 6-12 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. Retention of a minimum of 9-14 tons/acre on mixed conifer sites of large woody material (3"+) will help maintain long term soil productivity if litter and duff are left intact.

Inside the ½ mile buffer around private land; to maintain or improve soil productivity on sensitive soils, manage towards a minimum of 3-6 tons/acre of coarse woody debris in pine types, in the 3" + size class where a FS Officer deems necessary. Retention of a minimum of 5-10 tons/acre on mixed conifer sites of large woody material (3"+) will help maintain long term soil productivity if litter and duff are left intact.

Ground cover shall be maintained on all sensitive soils inside and outside the ½ mile buffer. "Sensitive soils" have moderate or severe erosion hazard and include TES Mapping Units: 140, 515, 536, 538, 567, 574, 577, 591, 592, 667, 672, and 690. The "no go" TES mapping units also have a severe erosion hazard and are located on slopes over 40%. Therefore, they are too sensitive to justify mechanical treatment, therefore, shall not have any mechanical ground disturbance and include mapping units: 141, 516, 565, 570, 585, 650, and 673. Additionally, there will be no mechanical ground disturbance in pinyon-juniper treatments on sensitive soils (listed above) on slopes less than 40%.

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 contract administrator will verify that the contractor has implemented erosion control practices prior to the closure of the project contract.

Conduct Implementation and Effectiveness Monitoring for Best Management Practices – The desired result of BMP monitoring is to document forest practices and BMPs that 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.

8. **Prescribed Burning in Sensitive Upland Soils** – Soils derived or influenced by the Datil geologic formation.
 - a. Prescribed burning in steep and erosive "no go" soils (TES mapping units: 141, 516, 565, 570, 585, 650, and 673) shall not exceed low severity overall to avoid removal of critical ground cover. Areas exceeding low severity burns may need to be re-covered with mulch to avoid initiating severe sheet and gully erosion.
 - b. Prescribed burning in accessible moderate and severe erosion hazard soils (TES Mapping Units: 140, 515, 536, 538, 567, 574, 577, 591, 592, 667, 672, and 690) shall not exceed low severity overall in order to retain critical ground cover. Areas exceeding low severity burns may need to be re-covered with mulch to avoid initiating severe sheet and gully erosion.

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 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. **Road Obliteration** - Roads recommended for obliteration will be shown on the proposed Road Inventory map. These roads will be drained, seeded (with primarily native species) and closed by the contractor where the road is located within a tree removal unit. Other roads will be obliterated to the extent that funding is available for obliteration.

Roads to be obliterated will be cross-ripped at the road entrance(s) to disguise the road location. Depressions such as berms, ditches and ruts will be filled as needed to restore to natural contours, cut slopes will be sloped to stable grade, the road surface will be sloped as needed to control concentrated run-off. All connected disturbed areas (CDA) consisting of high runoff areas like roads, skid trails, mines, burns, or highly compacted soils that drain directly into the stream system, where possible, will be disconnected from stream systems. The entire road length will be ripped to a minimum depth of 6 inches. Ripping shall be continuous throughout the entire length and from edge to edge of the roadway, including disturbed areas. Ripping will not occur within stream channels. Consideration should be made where ripping may be more detrimental to water quality if the road has already been stabilized. Grade dips are installed where necessary to reduce concentrated surface run-off and erosion. At the completion of ripping, all remaining material from the roadside such as rocks, downed woody material, brush and logging slash shall be scattered across the ripped area by hand or by machine. This is especially important at the beginning and end of the road to be obliterated. The area shall be seeded with an erosion control seed mix of primarily native species. Success of re-vegetation shall be evaluated the following year, and where necessary, the road should be lightly scarified and reseeded to meet erosion control objectives.

4. **Long Term Road Closures** - Closed roads will be disguised or blocked and in some instances signed to traffic, lightly scarified and reseeded with an erosion control seed mix of primarily native species. Road berms 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 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.
11. Minimize severity of slash pile fires. It is best to burn slash piles with low-intensity, short-duration fires. Ignite slash piles when fuel moisture and relative humidity is high to avoid loss of seeds, nutrients, and microscopic plants and animals.

APPENDIX D

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 Management Attainment Report
- 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
- Silviculturist re-certification field reviews
- Log accountability and surveillance plot inspections
- 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
- Fire prevention/detection patrols – lookouts, aircraft, engines
- 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

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. Consult with zone pest management specialists on needed action if problems are detected. The District Silviculturist in conjunction with the Range Staff is responsible for this activity.
- b). Visit roads closed under this proposal approximately one year following implementation to determine effectiveness. The Staff in charge of roads 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.