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Summary of the Draft Environmental Impact Statement for the Perk- Grindstone Fuel Reduction Project

Lincoln National Forest, Lincoln
County, New Mexico



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Summary

This document provides a brief summary of the contents of the EIS for the Perk-Grindstone Fuel Reduction Project. The full EIS is over 200 pages long and contains detailed descriptions of the proposed action and alternatives, including the many specific mitigation measures and monitoring requirements. The full EIS also contains detailed descriptions of the affected environment and environmental consequences for each resource topic summarized in this document. The EIS also contains two appendices: appendix A, which describes the past, ongoing and foreseeable future activities considered in the cumulative effects analysis, including maps of the wildfires and fuel reduction projects in and around the area; and appendix B, which describes the Forest Service designated sensitive plant and wildlife species that were reviewed and then dropped from further analysis for this project. Scientific literature references supporting the information in this summary are also contained in the EIS.

The forest supervisor of the Lincoln National Forest is the official who will decide whether or not to authorize implementation of one of the action alternatives for this project as described in the EIS, including the proposed project-specific amendments to the forest plan.

Proposed Action

The Lincoln National Forest proposes to conduct forest thinning and prescribed burning treatments on about 4,783 acres of the 5,200-acre Perk-Grindstone Fuel Reduction Project area for the purpose of reducing the potential for a large and severe crown fire in the area. The project is proposed in accordance with the Healthy Forest Restoration Act and various national policies designed to protect communities from severe wildfires and restore the functionality of fire-adapted ecosystems.

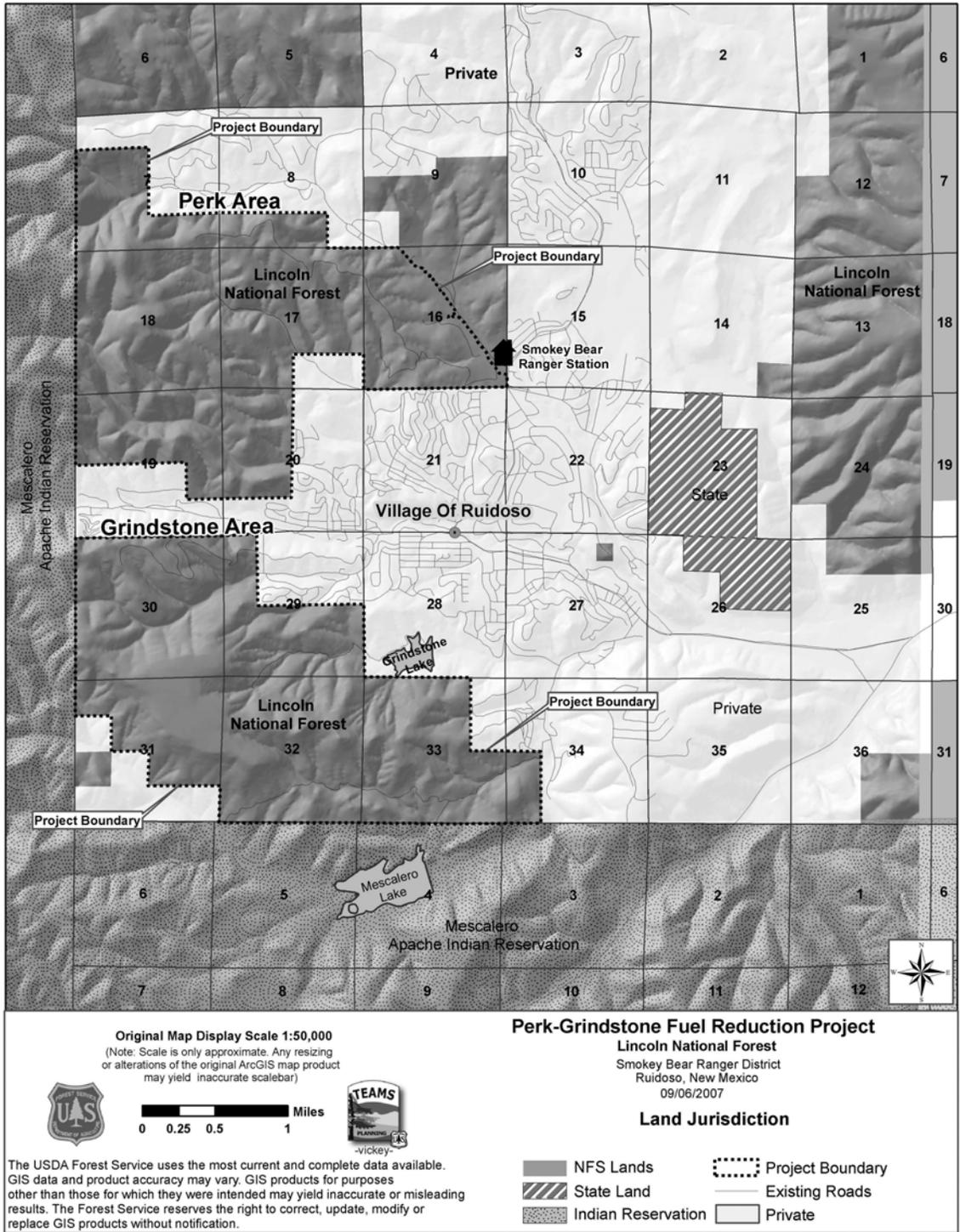
The project area is located in Lincoln County, New Mexico, between the Village of Ruidoso and the Mescalero-Apache Reservation. The project area contains two distinct blocks of national forest lands—Perk on the north and Grindstone on the south—divided by a residential subdivision of Ruidoso called Upper Canyon.

The Village of Ruidoso is a cooperating agency in the preparation of the EIS. They have a jurisdictional interest in this project as it relates to community protection. In 2000, Ruidoso was ranked as the number one at-risk community for catastrophic wildfire in New Mexico and as the number two at-risk community in the Nation. In 2004, a community wildfire protection plan was collaboratively developed for the greater Ruidoso area wildland-urban interface, in accordance with the Healthy Forest Restoration Act.

The project is tentatively scheduled to start in the summer or fall of 2008 and would be implemented in stages over approximately 3 to 5 years, up to a maximum of 10 years.

Existing and Desired Conditions

The project area consists of rugged and densely forested mountains. Primary vegetation cover types are dry mixed conifer and ponderosa pine forest along with some scattered piñon-juniper and oak woodlands. There are no perennial streams or water bodies in the project area, although Grindstone Reservoir (part of Ruidoso's municipal water supply) and some year-round streams lie just outside the project area boundary. About 30 percent of the project area has very steep slopes, exceeding 40 percent grade. The only roads within the project area are primitive dirt roads, which are closed to public use, except in Sawmill Canyon where small all-terrain vehicles are permitted.



Current forest conditions and fire regimes in the ponderosa pine, dry mixed-conifer, and piñon-juniper forest types that dominate the project area are substantially different from a century ago, due to 100 years of fire suppression and other human activities. The lack of frequent, low to moderate intensity surface fires in these forests caused a dramatic change in forest composition and structure in these once fire-adapted ecosystems. There are much higher numbers of small size trees and fewer large trees and canopy openings than what historically occurred. The prevalence of dense forest stands has increased the abundance of shade-tolerant white fir trees and decreased the amount of ponderosa pine and Douglas-fir trees. The white fir that now dominate the area are easily killed by fire, whereas large ponderosa pine and Douglas-fir trees are adapted to survive surface fires. The dominance by closed canopy forest stands has also resulted in a gradual loss of grass, forb, and shrub cover on the forest floor. The reduction in the herbaceous (grass-forb) cover has further limited the area's ability to support surface fires. Overall, the lack of surface fires and resulting changes in forest composition and structure has reduced wildlife habitat quality, biological diversity, and the long-term sustainability of this ecosystem.

Historically, frequent surface fires would thin out most of the seedlings and saplings and maintain wider spacing between trees and groups of trees. Those fires would have created a forest structure dominated by larger trees and a greater abundance of grasses, forbs, and shrubs. Today, most of the project area averages hundreds of trees per acre that are from 2 to 18 inches in diameter, many of which are fire-susceptible white fir. The area averages only 6 to 12 trees per acre over 18 inches in diameter. The overcrowding is suppressing the growth of large trees, making them highly vulnerable to being attacked and killed by dwarf mistletoe and bark beetles.

If a surface fire starts, the abundance of smaller understory trees and down woody material would act as "ladder fuels," moving surface fires into the overstory canopy, thereby initiating a crown fire. The uncharacteristically dense stands that dominate the landscape, including high numbers of dead and dying trees, would greatly perpetuate the spread and intensity of a crown fire through the area. A crown fire in the project area could exceed the capability of fire-fighting crews to suppress the fire before serious damage occurs. There are over 1,000 residential properties and businesses in the Ruidoso area within a mile of the project area boundary. A sustained crown fire normally spreads at about 3 to 10 miles per hour, which is 2 to 4 times faster than a surface fire. Within an hour of ignition, a wildfire start in the project area under dry, windy, "high fire danger" conditions would be expected to develop into a fast-spreading crown fire. A large crown fire would result in serious consequences to the community, municipal water supply, and natural resources in the area.

The desired condition is to restore fire-adapted forest composition and structural characteristics that support primarily surface fires, rather than large size crown fires. The desire is to have a more complex mosaic of stand densities across the landscape. There would be a shift toward more large size trees and less small understory trees, to achieve a more balanced size class distribution and reduce the amount of ladder fuels. There would be more canopy gaps or widely spaced groups of trees, to reduce the potential for crown fire spread and allow dominant trees to grow into large trees with less risk of pre-mature mortality from bark beetles. There would also be a greater abundance of grasses, forbs and shrubs, intermixed with denser patches of trees.

Purpose of and Need for Action

Thus, there is an urgent need for action to reduce the crown fire potential, in order to protect life, property, and resources in this wildland-urban interface. The primary project objective is to

reduce the percentage of the landscape classified as having a high, very high, or extreme crown fire hazard potential, from 60 percent to less than 25 percent of the landscape. Achieving this objective would entail reducing forest stand density, especially in the smaller understory trees that create ladder fuels.

In order to meet project objectives and implement this project, the forest plan for the Lincoln National Forest would need to be amended to exempt this project from adhering to some specific standards and guidelines. The amendments would be needed for this project because it may not always be possible to meet these standards and guidelines to: (a) limit tree cutting to a diameter limit of 9 inches within all protected Mexican spotted owl habitat; (b) retain canopy covers of 40, 50 and 60+ percent in all mid-age and mature stands, for northern goshawk; (c) meet retention and partial retention visual quality objectives immediately or within 1 year after project completion; and (d) not use any mechanized equipment on slopes over 40 percent.

Public Involvement and Issue Identification

The Forest Service made diligent efforts to reach out to and involve interested people throughout the project planning process. Beginning in December 2004 and continuing through September 2007, various public participation opportunities were offered through letters, public notices, media announcements, news articles, Internet information, public meetings and workshops, phone calls, and e-mails. The interdisciplinary team that planned this project considered the internal and external comments received in order to identify issues and develop alternatives and mitigation measures. The “significant” issues were identified as those that could not be adequately addressed by mitigation measures to completely avoid adverse impacts. The following significant issues were identified and used to develop alternatives to the proposed action.

1. Proposed helicopter logging operations may be too expensive to implement in a timely manner to meet the urgent need for this fuel reduction project.
2. Proposed helicopter logging may increase the safety hazard to manual thinning crews working below the helicopters, especially due to the high number of dead standing trees.
3. Cutting trees over 9 inches in diameter within Mexican spotted owl protected habitat areas may impact owl reproduction success and is not consistent with the spotted owl recovery plan or forest plan.
4. Reducing canopy cover to below forest plan standards and guidelines for mid-age and older stands, or in woodland habitat, may reduce the quality of goshawk nesting habitat and is not consistent with the forest plan.

The first two issues regarding helicopter logging were used to develop alternative 3. The two specific wildlife issues were used to develop and evaluate an alternative that was later eliminated from detailed study, and then to develop project-specific amendments to the forest plan.

Other issues were identified that related to the effects of the proposed actions that would be adequately addressed by mitigation measures. These other issues and associated mitigation measures are concerned with protecting soil, water, fish, wildlife, air quality, scenery, recreation opportunities, old-age forest, and native plant communities.

Alternatives

Three alternatives are considered in this EIS: no action; proposed action (helicopter removal); and ground-based thinning.

Alternative 1—No Action

The no action alternative for this project includes consideration of two possible scenarios:

1. Continuation of current forest conditions and trends, while continuing to keep wildfire ignitions from spreading to over 10 acres, in accordance with forest plan direction.
2. Occurrence of a large, high-intensity crown fire that would alter forest conditions and trends. This scenario is based on the expected inability to keep all wildfire ignitions from becoming large crown fires if thinning and burning treatments are not implemented

Alternative 2—Helicopter Emphasis (Proposed Action)

Alternative 2 would involve the following activities on about 4,783 acres or 92 percent of the project area:

- Construct or reconstruct approximately 14 miles of roads, mostly on existing system or unauthorized roads, with only 0.5 mile of new road construction (off existing routes). Of those 14 miles of roads used for the project, after project use, close 8.5 miles of road and decommission the remaining 5.5 miles. Use gates or other barriers to close roads that need to be held in storage for future use to maintain desired forest and fuel conditions. Restore native vegetation and natural appearing topography on the decommissioned roadways that are not needed for future management. Re-vegetate bare soil areas such as areas used as log skidding trails and log landings.
- Use thin-from-below treatment types to meet fuel reduction objectives, retaining the larger trees and a smaller representation of the smaller trees, in an uneven and clumpy mosaic across the project area. In “community defense zone” units and other areas directly adjacent to the community boundary, thin heavier in the understory where needed to achieve a low to moderate crown fire hazard rating. In spotted owl and goshawk nesting habitat areas, especially in mature or old growth mixed conifer stands, thin fewer large trees and maintain or enhance old growth habitat characteristics. In sanitation thinning units, cut primarily dead and “dying” trees (those expected to be dead within about 3 years), and retain all live trees over 9 inches in diameter. On all treated acres, retain all trees and snags over 18 inches in diameter. Lower diameter limits apply on specific treatment units to further promote retention of mature and old growth habitat.
- Move the cut wood pieces 6 inches in diameter or larger to landings along roads using a combination of helicopter, tractor, skyline, and cable-winch removal systems. Use haul trucks to remove woody material from landings for possible utilization.
- Use a low to moderate intensity broadcast burn that mostly stays on the surface to reduce activity-generated slash (tree tops and limbs) and some seedlings and saplings, in nearly all thinning units. The exception is in approximately 300 acres of the project area along the community boundary where slash would be piled and burned in piles rather than being scattered and broadcast burned.

- Conduct broadcast burn-only treatments on about 525 acres where thinning is not necessary prior to burning, due to the low numbers of trees over 6 inches in diameter.
- Apply the specific mitigation measures listed in the EIS to avoid or minimize potential adverse impacts to wildlife, water, soil, scenery and other resources. Follow the monitoring requirements in the EIS to ensure that mitigation requirements are followed and project objectives are being achieved.

Alternative 3—Ground-Based Alternative

This alternative was developed in response to the issues related to the high economic cost and safety hazards associated with proposed helicopter logging operations. Thus, this alternative would use manual thinning and mastication methods instead of helicopters in most areas too steep or too far away from roads. With manual and mastication methods, cut wood would be left on site, which avoids the need for skid trails, landings, roads or log haul traffic in these treatment units. Mastication and manual thinning would occur on about 30 percent and 18 percent of the treatment acres, respectively.

This alternative would treat 4,855 acres (93 percent) of the project area. This alternative would apply the same thinning and burning treatments, except it includes an additional 74 acres of “burn-only” treatment. Road management actions necessary to implement this alternative are the same as described for alternative 2, except about 20 miles of road would be constructed or reconstructed, rather than 14 miles, to utilize skyline and ground-based methods where practical. Like alternative 2, most of the road construction or reconstruction would be on existing routes, with less than 4 miles of new road construction. Of the 20 miles to be used for the project, after project use, 11 miles of road would be closed and 9 miles would be decommissioned.

Comparison of Alternatives

The following table compares the proposed treatment activities and outputs of alternative 2 and alternative 3.

Comparison of treatment activities for alternatives 2 and 3.

	Alternative 2	Alternative 3
Thinning and Burn-only Treatment Types		
Thin trees up to 18” diameter	2,458 acres	2,458 acres
Thin trees up to 9” diameter	845 acres	845 acres
Sanitation thin – mostly dead/dying trees ≤ 18”	502 acres	502 acres
Community defense zone thinning ≤ 18”	363 acres	363 acres
Community defense zone thinning ≤ 9”	162 acres	162 acres
Broadcast burn only – no tree thinning	451 acres	525 acres
Total thinning and burn-only treatment acres	4,782	4,855

	Alternative 2	Alternative 3
Thinning and Burn-only Treatment Types		
Thinning Treatment Methods		
Helicopter log removal after manual felling	2,742 acres	0 acres
Skyline log removal after manual felling	402 acres	855 acres
Cable log removal after manual felling	4 acres	12 acres
Ground-based log removal, with either manual or machine felling	1,183 acres	1,133 acres
Mastication– no manual felling or log removal	0 acres	875 acres
Manually felling, no log removal	0 acres	1,455 acres
Post-thinning Slash Burning Treatments		
Pile slash and burn slash piles in thinning units	303 acres	763 acres
Broadcast burn slash in thinning units	4,028 acres	3,567 acres
Roadwork and Landings		
Total road construction or reconstruction	14 miles	20 miles
Road closure after project use	5.5 miles	11 miles
Road decommissioning after project use	8.5 miles	9 miles
Number of landings (log decks) needed	35–40	35–40
Implementation Costs		
Cost estimate for all proposed activities	\$5.9 million	\$3.5 million
Wood Utilization Volume Estimates		
Piñon-juniper firewood and wood biomass from 6 to 9” diameter stems removed from treatment units	10,189 ccf ¹	4,054 ccf
Sawtimber volume from 9 to 18” pine or fir trees	7,640 ccf	6,550 ccf

¹ ccf = 100 cubic feet of wood; 1 cubic foot equals a 12 by 12 by 12 inch solid cube of wood; 1 cubic foot of wood contains 12 board feet; and a board foot is a wood plank that is 1 inch by 1 inch by 1 foot.

Environmental Consequences

Vegetation, Fuels, and Fire

The no action alternative would have no direct effects on vegetation but fire suppression would become more difficult as conditions worsen with time. Forest stands would remain heavily stocked, averaging 350 to 550 trees per acre over 2 inches in diameter, and most trees would continue to be under 12 inches in diameter. There would continue to be a lack of large trees. Over 80 percent of the project area would continue to exceed 55 percent of the maximum stand density index, which is considered the “zone of imminent mortality.” About 60 percent of the project area would continue to have a high, very high or extreme crown fire hazard potential.

With the no action “with crown fire” scenario, nearly all the trees and ground vegetation would be killed within the area burned in a high-intensity crown fire. Entire forest stands, covering hundreds if not thousands of acres, would be replaced by grasses and shrubs until conifer trees become re-established. It would take decades to restore young forest stands, and 150 to 200 years to restore the mature or old growth stands consumed in the fire. Where conifer seed sources are lacking, forest tree cover may be lost for an indefinite time.

Under alternative 2 or 3, the fire-adapted tree species would again become more dominant, with significantly less abundance of white fir trees. Proposed treatments would significantly reduce the percentage of the project area exceeding 55 percent of the stand density index, to an average of approximately 14 to 19 percent. Reducing stand density in the smaller trees would reduce ladder fuels and crown bulk density, which in turn reduce potential for crown fire ignition and spread. Both alternatives would reduce the acreage having a high, very high, or extreme crown fire hazard rating, to about 21 percent of the project area.

Invasive and Sensitive Plants

Under the no action alternative, weed populations would continue to remain relatively localized along roads and drainage bottoms, and cover less than 100 acres of the entire 5,200-acre project area. Under the no action “with crown fire” alternative, the area burned by a high-intensity crown fire would likely result in hundreds to thousands of acres of exposed soil and new weed populations. Under alternatives 2 and 3, a slight increase in areas where bare soil is exposed and open to more sunlight, such as along new roads, skid trails, and landing sites, would encourage weed establishment and spread. However, prevention measures together with annual monitoring and weed control treatments would likely keep weed populations within existing baseline levels.

Surveys for potential sensitive plants found no sensitive plants occur in the project area. Therefore, proposed actions would not affect sensitive plant species. Mitigation measures would protect sensitive plants if any are found prior to or during project implementation.

Wildlife

The no action alternative would have no direct effect on the Mexican spotted owl or its critical habitat, but the quality and quantity of critical, protected and restricted owl habitat would continue to decline. There would continue to be a loss of large trees, including most mature, fire-adapted tree species. Lack of canopy openings with grass, forb and shrub species would continue to limit foraging habitat availability. Under no action “with crown fire,” a large crown fire would

adversely affect the owl by potentially destroying much of the critical, protected and restricted habitat in the area, including nest sites. Also, the fire and fire suppression activities would likely occur during the breeding season. Under alternatives 2 and 3, there would be a slight reduction in stand density, including reducing a portion of the trees over 9 inches in diameter, and some closed canopy stands would become more open. Overall, treatments would retain the primary constituent elements needed for critical spotted owl habitat, and promote development of larger, more mature trees and old growth habitat characteristics. Treatments would promote increased structural diversity, and ultimately provide the best long-term protection against habitat losses from a severe crown fire. Prohibiting operations in protected owl habitat during breeding season would protect the owls from disturbance that could otherwise impact their reproduction.

There are four Forest Service sensitive species (bald eagle, northern goshawk, Sacramento mountain salamander, and red squirrel) and five Forest Service management indicator species (juniper titmouse, pygmy nuthatch, red squirrel, elk, and mule deer) that occur or have suitable habitat in the project area. None of the alternatives would result in a significant change in the forest-wide population or habitat trend, or result in a trend toward Federal listing or loss of viability for any of these species. Under the no action alternative, habitat conditions in the project area would continue to decline for these fire-adapted forest and woodland habitats, due to the continued lack of large and frequent surface fires. The no action “with crown fire” would result in destroying habitat suitability within the severely burned area. As most of the sensitive and management indicator species depend on mature and old growth habitat components to some extent, their nesting/roosting or thermal cover habitat would be lost for over 100 years. Alternatives 2 or 3 would maintain or enhance habitat trends in the project area for these species, such as by increasing the balance and diversity of age classes and stand densities over the landscape, and promoting greater dominance by large, mature trees. Disturbance during breeding season would be mitigated to a large extent, based on mitigation measures. There would be short-term reductions of canopy cover below the forest plan thresholds for a portion of the goshawk habitat, although the vegetative structural class distribution would improve and all other goshawk habitat requirements would be met. National bald eagle management guidelines would be met for the bald eagle, which winters just outside the project area. The salamander would be protected primarily by limiting operations in potential salamander habitat to dry periods when salamanders are underground. Migratory birds and game species of interest and their habitats would not be expected to be adversely affected in the long term under any of the alternatives.

Water and Soil

The no action alternative and alternatives 2 and 3 would yield approximately the same sediment delivery rates to stream channels in the area, averaging 2,800 to 2,900 tons per year, or 0.54 to 0.56 tons per acre per year. However, alternatives 2 or 3 would have a slight short-term increase in sediment delivery of 5,079 tons (or about 0.98 tons per acre per year) for the first year. The intermittent and ephemeral streams in the project area are low gradient channels, and mitigation measures include no treatment stream buffers, rehabilitation of disturbed soils, and numerous other erosion and sediment control measures. Overall, there would be no significant sedimentation impacts to the perennial streams or reservoir that lie downstream and outside the project area. Upgrading road drainage patterns, realigning poorly located roads, and stabilizing channel crossings, would reduce road related sediment in the long run. Under the no action “with crown fire,” sediment delivery the first year after a crown fire would be about 193,128 tons per year or over 37 tons per acre per year. The expected rainstorms and runoff after a crown fire

would move large quantities of topsoil, ash, sediment and woody material into the adjacent Grindstone Reservoir, adversely impacting the municipal water supply.

Soil erosion and other soil qualities would be within acceptable rates with either alternative 2 or 3, or the no action alternative. Erosion rates would remain at about 1 ton per acre per year. This is primarily due to the alternative design features and mitigation measures that minimize soil disturbance, bare soil exposure, and erosion. Under no action “with crown fire,” soil erosion and other soil qualities would be detrimentally impacted, with an erosion rate increasing to approximately 29 tons per acre per year for the first year, and 7 tons per acre per year for subsequent years, until adequate vegetative cover is restored. It would possibly take decades to restore soil quality to background levels.

Air Quality

Under the no action alternative, there would be no prescribed burning related smoke accumulations. Under the no action “with crown fire,” smoke accumulations would be substantial, with a daily load of particulate matter 3 to 5 times higher than with prescribed burns. Accumulations of particulate matter could seriously impair human health, especially for people with respiratory conditions. Heavy smoke accumulations could last in the greater Ruidoso area for weeks at a time, depending on the weather and fire. Air pollutant levels would exceed State and Federal standards for up to 13 miles away. Under alternatives 2 or 3, smoke emission reduction techniques would be expected to result in rapid dissipation of smoke from prescribed burns. There would periodically be trace amounts of smoke noticeable in the local community from prescribed burning, lasting 1 to 7 days, and remaining well within air quality standards.

Scenery

The no action alternative would meet the visual quality objectives assigned in the forest plan to the project area, which are mostly retention and partial retention. No action “with crown fire” would result in a largely denuded landscape, seriously detracting from the existing character of the heavily forested landscape. There would be a large area of dead trees, blackened ground, eroded soils, and bulldozed fire lines. Under alternatives 2 or 3, for the first few years after implementation, the action alternatives would not meet the retention or partial retention objective of having little to no evidence of human activities. This is because stumps, slash, and exposed soil areas would be evident until disturbed sites are rehabilitated and vegetative ground cover restored. However, within 5 years and beyond, scenic quality would be protected or enhanced due to the treatment design and mitigation measures. Thinning and burning treatments would improve vegetative diversity, increase the abundance of grasses, flowering plants and shrubs, and create more open views through the forest.

Recreation

With no action, recreation opportunities would not be affected, although increasing numbers of dead trees would cause a rise in the hazard of trees falling on people recreating in the area. No action “with crown fire” would result in a temporary decrease in recreation opportunities and the quality of the recreation experience for people who enjoy hiking, camping, hunting and other activities in the area, due to loss of forest trees, shade, and vegetation. Alternatives 2 or 3 would result in temporary restrictions on recreation in portions of the project area where equipment is in operation. Other portions of the project area would remain open for use. None of the Forest

Service system roads in the project area are classified as open roads, and this would not change as a result of the project. Roads and trails available for hiking, horseback riding and mountain biking would be in an improved condition.

Heritage Resources

None of the alternatives would have an impact on heritage resources. The six recorded historic properties found in the area and any that may be found during implementation would be adequately avoided and protected from damage, based on required mitigation measures.

Health and Safety

The no action alternative would not result in any increase in safety hazards to workers or the public. The no action “with crown fire” alternative would pose severe health and safety risks to the public and to firefighters, likely resulting in injuries. Under alternatives 2 and 3, there would be safety hazards to forest workers, typical of other fuel reduction projects occurring around the country. The most prevalent safety hazard would be the risk of dead trees or large dead branches falling on workers. This hazard would be greater with alternative 2 due to the use of helicopters that would hover above the trees and workers. Alternatives 2 and 3 would slightly and periodically increase the amount of log truck traffic coming from the project area through some secondary roads and residential areas to access the main arterial roads and highways through Ruidoso. Other risks to health and safety of workers or the public would be low.

Noise

The no action alternative would cause no increase in noise level. The no action “with crown fire” alternative would result in a high magnitude, short duration increase in noise from fire suppression engines, trucks, helicopters, and airplanes lasting for several days or weeks. Alternative 2 or 3 would result in a lower magnitude and slightly longer duration increase in noise levels in the area, primarily from chain saws, mechanical road construction or thinning equipment, and in alternative 2 from helicopters frequently flying back and forth. The noise would be mostly audible within about ½ mile from the portion of the project area where operations are occurring, and would subside when operations move to other parts of the area. Noise would most likely affect residents living directly adjacent to the treatment area or people recreating in the Cedar Creek recreation area.

Social and Economic Values

The no action alternative would not affect community services, employment or other social or economic values in Ruidoso. Although, this alternative may result in increased homeowners fire insurance rates for residents with properties in the high-risk zone directly adjacent to the project boundary. The no action “with crown fire” would divert the community’s emergency services such as police, medical, fire, and water supply to fire suppression efforts. A fire could damage or destroy the community service delivery system, affecting its availability for months. The burden of smoke effects or loss of personal property to wildfire would be likely borne by the residents nearest the project area. As the area is not primarily populated by low income or minority groups, there would be no disproportionate effect on those populations. There would be short-term economic benefits to Ruidoso and Lincoln County resulting from fire fighting and rehabilitation crews and associated income. No new permanent jobs or income would be generated. The

economic costs of a crown fire would likely be substantial as a result of suppression and rehabilitation costs, loss of tourism revenues, property losses and damage to public services including the municipal water supply system. The Angora Fire that recently burned 3,100 acres in a small mountain community near Lake Tahoe, California, cost a total of \$11.7 million.

Alternative 2 or 3 would provide a maximum of approximately 6,500 to 7,600 ccf (100 cubic feet) of sawtimber volume and 4,000 to 10,000 ccf in biomass or firewood volume. However, market demand and economic value is quite low for small diameter trees of primarily white fir species that would make up the bulk of the harvested volume. Short-term economic benefits could be as high as \$5.3 to 5.9 million in income from 140 to 172 jobs, including all direct, indirect and induced jobs and income.

Alternatives 2 and 3 would cost \$5.9 and \$3.6 million respectively for treatments, plus several million in additional funds for the Forest Service to prepare, layout, survey, administer and monitor the project over a 5- to 6-year period. Alternative 2 would be estimated to cost \$1 to 2 million annually for the next 5 years, which would exceed the budget allocation expected for this project. The lack of funds for alternative 2 could impede the Agency's ability to rapidly reduce the risk of a severe crown fire. Alternative 3 would be more cost efficient and would pose less risk of a delay in implementation due to funding constraints during the life of this project. Neither of the action alternatives would adversely affect homes, businesses, or community services in the Ruidoso area. Project implementation would reinforce community cohesion, as there is strong public support for the project. In addition, there would be no disproportionate affect on minorities or low-income groups.

Cumulative Effects

The analysis in the EIS, including appendix A, considered the past, present and reasonably foreseeable future actions that were relevant to anticipated effects from either of the alternatives. The direct and indirect effects of the action alternatives were evaluated in combination with the estimated effects from other activities that may occur in the same area at the same time. The analyses found that there would be no significant adverse cumulative effects from the proposed project activities in combination with other activities in the same affected environment. The only significant cumulative effect would be the reduction in the potential for a large-scale, high-severity crown fire.