Final Environmental Impact Statement

Piute Fire Restoration Project

Kern River Ranger District, Sequoia National Forest
Kern County, California
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Piute Fire Restoration Project
Final Environmental Impact Statement
Kern County, California

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Abstract: This final environmental impact statement (FEIS) discusses the potential significant environmental impacts associated with the Piute Fire Restoration Project on the Kern River Ranger District of the Sequoia National Forest. In addition to the proposed action, this FEIS includes one action alternative that would avoid or minimize potentially adverse impacts. The purpose of this project is to prevent future high-intensity, stand-replacing wildfires by reducing long-term fuel loading; to recover the economic value of trees killed or severely damaged by the fire; to recruit and retain both short- and long-term large down logs and snag habitat; to revegetate conifer stands and other plant and animal habitats that were burned; to improve long-term soil productivity by repairing roads and establishing effective ground cover in severely burned areas; and to reduce safety hazards to the public and forest workers from falling trees. The no action alternative represents the existing and projected future condition against which the other alternatives are compared. The proposed action would use commercial timber harvest to salvage dead and dying trees, would use mechanical equipment to treat fuels and small dead trees by chipping or masticating, and would plant tree seedlings in treatment areas. Road construction would not be required to implement the proposed action. Existing roads would be used and would require repair to reduce erosion and facilitate treatments and product removal. Alternative C, the noncommercial funding alternative, would be similar to the proposed action but would be implemented without commercial removal of fire-killed trees.
Summary

Proposed Action
The Kern River Ranger District of the Sequoia National Forest proposes to salvage dead and dying trees, treat excess fuels, and plant trees in the Piute Fire Restoration project area. The main actions proposed include:
1. Harvest merchantable dead and dying conifers on approximately 350 acres.
2. Remove hazard trees. Hazard trees are dead trees, or trees that are predicted to die within three years, and live trees that are sufficiently damaged to pose a risk of falling within the next three years.
3. Pile and burn excess fuels. Mechanically treat non-merchantable dead trees by chipping or masticating, or hand treat leaving the residual fuels on site for ground cover (about 1,900 acres).
4. Plant native tree species (about 500 acres).
5. Repair and maintain existing roads.

Purpose and Need
The purpose and need for this project includes:
1. Reduce the risk of future high-intensity, stand-replacing wildfire by reducing long-term fuel loading to facilitate future fire management activities.
2. Recover the economic value of trees killed or severely damaged by the fire in an expeditious manner for the purposes of reducing the cost of reforestation activities and supplying wood fiber to the American public.
3. Recruit and retain large down logs and snag habitat in the short and long term to provide sufficient burned forest habitat for dependent species.
4. Revegetate conifer stands and other plant and animal habitats that were burned.
5. Improve long-term soil productivity by establishing effective ground cover in severely burned areas, to minimize soil erosion and begin to replace soil organic material.
6. Reduce safety hazards to the public and forest workers from falling trees.

Issues
Public concerns are conflicts or potential problems that the public believes may occur if the proposed action is implemented. The Forest Service considers these concerns and looks for ways to avoid them. Project design features are practices designed to avoid potential conflicts. If the project cannot be designed to avoid specific potential problems or if there is public controversy regarding the ability of the Forest Service to mitigate these concerns, these potential problems or concerns are carried forward by the interdisciplinary team as “significant” issues. In this case,
the team identified four significant issues: Noise and dust, wildlife and wildlife habitat, fire and fuels, soil and water quality.

Alternatives Considered in Detail

No Action (Alternative A)
Under this alternative, no silvicultural or fuels treatments would take place in the Piute Fire Restoration project area at this time. In addition, no tree planting or hazard tree abatement would occur.

Proposed Action (Alternative B)
Under this alternative, approximately 350 acres of merchantable dead and dying conifer trees would be salvaged, approximately 1,900 additional acres would be treated to remove excess fuels, and approximately 500 acres would be planted with native seedlings.

Noncommercial Funding Alternative (Alternative C)
During development of the alternatives, the interdisciplinary team acknowledged comments received by some individuals and special interest groups who oppose any commercial use of National Forest resources. Many had suggestions that were outside the scope of the project or were not useful for meeting the purpose of the project. However, in response to these suggestions, the interdisciplinary team developed a modified alternative that included a 15-inch diameter limit on commercial harvest, a 10-inch diameter limit on fuels treatments, and approximately 8 miles of road closures. The draft environmental impact statement (DEIS) analysis of Alternative C found that there was no commercial value associated with the salvage of dead trees less than the 15-inch diameter limit. The alternative was analyzed as having no economic value.

Before publication of this FEIS, however, the United States District Court for the Eastern District of California denied the Sierra Forest Legacy’s request for an injunction in SFL v. Rey, with the caveat that all new fuels reduction projects analyze a noncommercial funding alternative. In compliance with this order, Alternative C was clarified as a noncommercial funding alternative. Fuel treatments would be designed and implemented with appropriated funds under this alternative. This alternative would cut, pile and burn trees less than 10 inches d.b.h. to achieve fuel reduction objectives on approximately 1,900 acres. Standing dead trees in the 10- to 15-inch d.b.h. size class that would contribute to an excess of the 10 to 15 tons/acre desired condition for surface fuels in the future, would be piled and burned, masticated or otherwise treated to reduce fuels on the 347 acres proposed for salvage in Alternative B. This design feature would provide extra fuels reduction in the area where there is the highest standing volume of dead trees and therefore the greatest potential future fuel loading. The proposal to decommission approximately 8 miles of roads in this alternative is responsive to the need to reduce soil erosion, improve soil productivity, and public comment requesting that open roads be
minimized to reduce the need for hazard tree removal and disturbance associated with road reconstruction.

**Alternatives Considered but Not Given Detailed Study**

Public comments received in response to the proposed action provided suggestions for alternatives. The Forest Service considered all these alternatives, but did not study all of them in detail. Reasons for excluding proposed alternatives from detailed study include: proposed activities do not meet the purpose and need for the project; suggestions are outside the scope of the project intent; suggested alternatives are duplicative of the alternatives considered in detail; alternatives contain components that are not technically or economically feasible; or proposed alternatives are so lacking in detail as to be purely speculative. The following alternatives were considered, but not given detailed study: Effective Restoration, True Restoration, Diameter Limit, 2001 Sierra Nevada Forest Plan Amendment, and Minimize Impacts.

**Affected Environment**

The 37,000-acre Piute Fire area is located in the Piute Mountains, approximately 7 air miles south of Lake Isabella and northeast of the Walker Basin. Elevations in the project area range from 4,500 to 8,500 feet and the area topography is characterized by steep slopes/cliffs, moderate slopes as well as subdued topography with gentle basins. Soils in the project area are predominately granitic in origin with fine sandy loam and loamy textures. The Piute Mountains have Eastside Sierra forest types. Major tree species include Jeffrey pine, white fir, black oak, singleleaf pinyon pine, and western juniper. Less common, or restricted to localized areas, are grey pine, sugar pine, live oaks, and blue oak. No federally listed plant or animal species occur in the area, although there is potential habitat for 10 Forest Service sensitive species. The area provides livestock grazing as part of the Piute, Loco Bill Canyon, Nichols Peak/Erskine Creek, and Basin Allotments and is also used by hunters and other recreationists including motorcycle and ATV use. See Chapter 3 of the FEIS for a complete description of the affected environment.

**Environmental Consequences**

Table S-1 (next page) provides a comparison of environmental consequences to various resources by alternative. Chapter 4 of the FEIS discloses the potential environmental effects of the proposed action and its alternatives. This includes the consideration of direct, indirect, and cumulative effects. In addition, this chapter discusses any adverse environmental effects that cannot be avoided, the relationship between short-term uses of the environment and the maintenance and enhancement of long-term productivity, and any irreversible or irretrievable commitment of resources. Direct effects are caused by the action and occur at the same time or place as the action. Indirect effects are caused by the action and are later in time or farther removed in distance. Cumulative effects are the impacts that result from the action when added to other past, present, and reasonably foreseeable future actions regardless of which agency or person undertakes such actions.
Appendices
This EIS is also supported by a number of appendices, which provide additional material relevant to this analysis. The appendices include:

- **Appendix A - Additional Supporting Literature.** The interdisciplinary team consulted over 400 publications during the preparation of this EIS. Some of those documents are cited directly, others are incorporated by reference. Each document is a part of the project record for this statement.

- **Appendix B – Best Management Practices.** Best management practices (BMPs) are effective in preventing serious deterioration of stream water quality as a result of forest harvesting, or other management actions such as fuels treatments. The interdisciplinary team has selected specific BMPs for this project.

**Table S-1. Comparison of environmental consequences by alternative**

<table>
<thead>
<tr>
<th>Resource</th>
<th>No Action</th>
<th>Proposed Action</th>
<th>Noncommercial Action</th>
</tr>
</thead>
<tbody>
<tr>
<td>Botanical Resources</td>
<td>No effect to sensitive plants.</td>
<td>May affect individuals, but not likely to result in a trend toward federal listing.</td>
<td>May affect individuals, but not likely to result in a trend toward federal listing.</td>
</tr>
<tr>
<td>Cultural Resources</td>
<td>May adversely affect cultural resources through natural mortality where fire weakened trees may uproot and/or fall within archaeological sites and disturb them.</td>
<td>Low risk to cultural resources due to project design features such as directional felling and site monitoring.</td>
<td>Proposed road closures benefit cultural resources.</td>
</tr>
<tr>
<td>Roadless Resource</td>
<td>No treatments in IRAs.</td>
<td>No treatments in IRAs.</td>
<td>No treatments in IRAs.</td>
</tr>
<tr>
<td>Watershed Resources</td>
<td>No additional soil disturbance; gradual recovery.</td>
<td>Some soil disturbance from project activities; immediate increase in ground cover.</td>
<td>Some soil disturbance from project activities; immediate increase in ground cover.</td>
</tr>
<tr>
<td>Wildlife Resources</td>
<td>No immediate effect on sensitive animal species. Opportunity for accelerating establishment of forested habitat would be foregone. Greatest amount of down woody material over time. Down woody debris provides important habitat but also increases risk of later high intensity fire. Highest retention of standing burned forest.</td>
<td>May affect individuals, but not likely to result in a trend toward federal listing. Accelerated development of forested habitats to support California spotted owls, and goshawks. Greatest increase in short-term down woody material and least risk of high intensity fire in the future. Moderate to high retention of standing burned forest.</td>
<td>May affect individuals, but not likely to result in a trend toward federal listing. Moderate increase in immediate down woody material, moderate long-term effects on down woody material, and moderate to high retention of standing burned forest.</td>
</tr>
</tbody>
</table>

- **Appendix C – Travel Analysis Report.** A roads analysis was completed under the requirements of the 2005 National Forest Travel Management Rule (36 CFR 212.50). The rule is intended to help ensure that additions to the National Forest System road network are those deemed essential for resource management and use; that the construction, reconstruction, and maintenance of roads minimizes adverse environmental...
impacts; and that unneeded roads are decommissioned and restoration of ecological processes are initiated. The product of a travel analysis is a report for decision makers and the public that documents the information and analyses used to identify opportunities and set priorities for future national forest road systems.

- **Appendix D – Response to Comments on the DEIS.** The Forest received 14 comment letters in response to its circulation of the DEIS. Under the Council of Environmental Quality’s (CEQ) regulations regarding the preparation of final environmental impact statements, the Forest Service provides responses to comments submitted during the circulation of the draft environmental impact statement. The CEQ direction for responding to comments is found at 40 CFR 1503.4.

- **Appendix E – Wildlife Analysis.** As a part of each project, the Sequoia National Forest analyzes potential effects to wildlife species, as well as habitat. In this case, the interdisciplinary team completed a biological assessment and biological evaluation (BA/BE) to assess the effects of the proposal on Forest Service sensitive species (S) and federally threatened, endangered, or proposed species (as listed by the U.S. Fish and Wildlife Service), which are known or have the potential to occur within the project area. The BA/BE is included in Appendix E in its entirety. In addition, the interdisciplinary team completed a Management Indicator Species (MIS) Report to evaluate and disclose the impacts of the Piute Fire Restoration Project on the habitat of the thirteen (13) management indicator species identified in the Sequoia National Forest Land and Resource Management Plan (LRMP) as amended by the Sierra Nevada Forests Management Indicator Species Amendment (SNF MIS Amendment) Record of Decision. The MIS Report is also included in its entirety.
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Preface

Document Structure

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

- **Chapter 1 - Purpose and Need for Action:** This chapter includes information on the history of the project proposal, the location of the project, and the purpose of and need for the project. This section also details how the Forest Service informed the public of the proposal and how the public responded.

- **Chapter 2 - Alternatives, including the Proposed Action:** This chapter provides a description of the agency’s proposal for this project, as well as alternative methods for achieving the agency’s stated purpose. These alternatives were developed based on significant issues raised by the public and other agencies. In addition, a noncommercial alternative is included in compliance with SFL v. Rey. This discussion also includes project design features. Finally, this chapter provides a summary table of the environmental consequences associated with each alternative.

- **Chapter 3 - Affected Environment:** This chapter describes the existing condition within the project area. It is organized by resource area.

- **Chapter 4 - Environmental Consequences:** This chapter describes the environmental effects of implementing the proposed action and other alternatives. This section focuses on effects relative to significant issues.

- **Additional Sections:** Additional sections include other required disclosures, a list of preparers, citations to referenced material, and other information.

- **Appendices:** The appendices provide additional, detailed information to support the analysis presented in this document.

Additional documentation, including more detailed analyses of project-area resources, may be found in the project planning record located at the Kern River Ranger District Office in Kernville, California.
Changes between the Draft and Final EIS

Addition of Climate Change Discussion
A section discussing climate change has been added to the “Air Quality” portions of the FEIS on pages 26, 53, and 54.

Changing Alternative C to a Noncommercial Funding Alternative
Alternative C, the modified action alternative, originally included the potential for commercial harvest of trees up to 15 inches d.b.h. The analysis in the DEIS found that there was no commercial value associated with harvesting dead trees within the 15-inch diameter limit. The alternative was analyzed as having no commercial value where fuels reduction and hazard tree felling would be paid for through service contracts if funding became available. However, before publication of this FEIS, the United States District Court for the Eastern District of California denied the Sierra Forest Legacy’s request for an injunction in SFL v. Rey, with the caveat that all new fuels reduction projects analyze a noncommercial funding alternative. In compliance with this order, the Sequoia National Forest has revised Alternative C to make it specifically noncommercial. This is noted on page 16 of the FEIS.

Changes to Appendices
Responses to comments on the draft EIS have been added to the final EIS in Appendix D. The wildlife analysis that was formerly Appendix D in the draft EIS, is now Appendix E.
Chapter 1. Purpose and Need for Action

Introduction

The Kern River Ranger District of the Sequoia National Forest is proposing fire restoration and salvage activities on approximately 2,300 acres of National Forest System lands that were burned in the 2008 Piute Fire. Activities would include salvaging dead and dying trees to recover their economic value, reforesting burned areas, retaining snag and down log habitat, repairing existing roads, removing trees that could be hazardous to the public, and reducing hazardous fuels in the area. Methods to accomplish activities would include using commercial timber harvest to remove large, merchantable trees, using mechanical equipment to treat fuels and small dead trees by chipping or masticating, and planting tree seedlings in treatment areas. Road construction would not be required to implement the proposed action. Repair of existing roads would reduce erosion and facilitate treatments and product removal. See Alternative B, the proposed action, on page 15 for details.

Location

The Piute Fire Restoration Project is located in Kern County, California approximately 7 air miles southeast of Lake Isabella, California (see Figure 1). The project area for this analysis is the approximately 32,890-acre portion of the Piute Fire that burned on National Forest System lands. The legal description is T. 28 S., R. 33 E., Sections 11, 13, 14, 22-26, and 36; T. 28 S., R. 34 E., Sections 8, 9, 16-20, and 29-32; T. 29 S., R. 34 E., Section 6; Mount Diablo Base and Meridian.

Background

The Piute Fire began on June 28, 2008, burned approximately 37,000 acres, including about 32,890 acres of the Sequoia National Forest, about 2,600 acres of public lands managed by the USDI Bureau of Land Management (BLM), and 1,500 acres of privately owned land both within and outside the National Forest boundary. It was contained on July 25, 2008. The fire burned approximately 1,700 acres within the Clear Creek Forest Health Improvement and Fuels Reduction Project (Clear Creek Project), which included proposals for thinning trees and reducing surface and ladder fuels. As a result of the fire, the revised environmental assessment (EA) for the Clear Creek Project no longer provides an accurate description of the existing conditions, and many of the proposed project activities may no longer be appropriate. The 1,700 acres of the Clear Creek Project that burned in the Piute Fire are now included in the project area and in the analysis for this restoration project (see Map 1 in map packet). The remaining Clear Creek project area outside of the burn is addressed as part of the cumulative effects discussion for this project.
Figure 1. Location of the Piute Fire Restoration Project
The fire created a mosaic of dead and live vegetation across the following plant communities: Jeffrey pine forest, pinyon-juniper woodland, mixed-fir forest, live oak forest, chaparral and montane chaparral, and desert shrub. Of the approximately 30,310-forsted acres, including approximately 18,700 acres of mixed conifer or Jeffrey pine and 8,000 acres of pinyon juniper forest, within the fire area, approximately 18,890 acres burned severely with 75 to 100 percent tree mortality. This included 11,370 acres of mixed conifer and Jeffrey pine forest. As a result of the fire, these areas have changed from mid- and late-seral forest conditions to early-seral forest conditions. The remaining 11,420 acres of forest or woodland burned with less intensity, and had either low (0 to 49 percent) or moderate (50 to 74 percent) mortality. It will take at least 100 years to reestablish large trees (larger than 24 inches d.b.h.) and, with appropriate silvicultural treatments, at least 250 years to develop patches of old trees with decadence features beneficial to wildlife (SNFPA FEIS Vol. 1, Ch. 2, p. 141-143).

The Sierra Nevada Forest Plan Amendment Record of Decision (SNFPA ROD; USDA Forest Service 2004), provides direction for ecosystem restoration following catastrophic events. These restoration activities are included in all land allocations and call for managing disturbed areas to achieve long-term fuels profiles, to restore habitat, and recover the value of some dead and dying trees (SNFPA ROD, p. 6). SNFPA land allocations within the Piute Fire boundary are old forest emphasis, general forest, threat zone, defense zone, protected activity centers for spotted owls, spotted owl home range core areas, and riparian conservation areas adjacent to perennial, seasonal, and ephemeral streams (see Map 2 in map packet).

**Purpose and Need**

The Piute Fire resulted in severe effects to forest resources such as soil, riparian areas, wildlife habitat and heritage resources over an uncharacteristically large area (Burd 2008; Courter and Stewart 2008; Jimenez 2008). The innumerable fire-killed trees, if left untreated, will contribute to extremely high fuel loading over time. Without fuels and watershed treatments to restore the fire area, additional erosion and high fire severity impacts are likely over the short and long term. The goal of this project is to move the project area toward desired future conditions as defined by the SNFPA and discussed below.

Specifically, there is a need in the Piute Fire area to:

1. **Prevent a future high intensity, stand-replacing wildfire by reducing long-term fuel loading to facilitate future fire management activities (prescribed fire and resource benefit fire).** The estimated historic low intensity fire return interval is approximately 10 to 25 years for mixed-conifer and Jeffrey pine forested areas in the project area. Establishment of old forest requires survival and growth of individual trees and forested stands over the next 250 or more years without the occurrence of another high intensity stand-replacing fire. As a result, there is a need to modify high intensity fire behavior through fuel treatments and effective fire management.
Currently, surface fuel loading is very low in areas that burned at moderate to high intensity. As dead trees fall over time, surface fuels will increase significantly, affecting future fire behavior and suppression capabilities. Additionally, shrub species will likely resprout rapidly in many areas of the fire. High volumes of large woody debris combined with dense brush can lead to fuel loads that could burn at high intensity, leading to another large stand-replacing fire. Heavy fuels also create difficulty in suppressing wildfires. Fireline construction is significantly slowed where fire lines intersect numerous large logs. Referred to as “resistance to control” this can lead to larger fires because fire lines are slower to construct or have to be relocated to areas with less vegetation and where they can be readily constructed (on flatter ridge tops for example). Large woody debris also increases fire severity by increasing burning “residence” time, further impacting impaired watersheds, soils, and cultural resource sites. High volumes of small woody debris, from small trees and limbs of larger trees, increase a fire’s rate of spread and fireline intensity, reducing the ability of firefighters to suppress the fire and increasing the ultimate fire size. Dead trees that aren’t removed, will contribute to extremely high fuel loading within 10 to 20 years.

The McNally Fire (2002) burned through areas previously burned by the Flat (1975) and Bonita (1977) fires, demonstrating the consequences of both active and passive management on reestablishment of forest habitats, future fire behavior and fire effects, and watershed restoration. Burned areas that were actively managed with salvage harvest and reforestation show much less severity of fire effects on vegetation from the McNally Fire than areas that were allowed to recover naturally (Sherman Pass Restoration Final EIS; USDA Forest Service 2004b).

The SNFPA ROD (pp. 45-48) identifies a management objective of designing economically efficient treatments to reduce hazardous fuels in defense zones, threat zones, spotted owl home range core areas, old forest emphasis areas, and general forest areas. The use of prescribed burning and resource benefit fires would be an economically efficient means to reduce hazard fuels in the Piute Fire area. However, high volumes of down logs may preclude the use of prescribed fire or resource benefit fires without killing a significant portion of trees growing on the site, jeopardizing the development of old forest characteristics, and having a greater risk of escaped fires.

2. **Recover the economic value of timber killed or severely injured by the fire in an expeditious manner for the purposes of reducing the cost of reforestation activities and supplying wood fiber to the American public.** The Forest Service has a role to play in providing a wood supply for local manufacturers and sustaining a part of the employment base in rural communities (SNFPA ROD p. 4). The SNFPA provides for salvage logging following wildfires for the objective of recovering economic value from dead and dying trees (SNFPA ROD, p. 52).
Based on the Piute Fire Reforestation and Salvage Needs Initial Assessment (August 2008), it is estimated that approximately 2.7 million board feet (MMBF) of merchantable timber was killed by the fire and is readily accessible from existing roads. Local timber industry representatives have expressed interest in harvesting the burned timber and have the capacity to process this material in the coming year (Mill Owner 2009, Personal Communication). Dead trees deteriorate rapidly relative to wood quality, volume, and value. By the first year following the fire, most trees have significant worm holes and weather checking, deteriorating about one-third of the cubic volume on trees between 11 and 24 inches diameter (FSH 2409.12, Timber Cruising Handbook, Chapter 20 - Estimating Tree volume and Weight - (R5 Supplement 2409.12 -2005 -2)). By the second year, 47 to 74 percent of the volume of trees less than 24 inches diameter is lost (Lowell et al. 1992). This volume loss corresponds to significant value loss. The value of trees removed covers the cost of their removal and associated fuel treatments; it can also be used to pay for other restoration work including road repair and resurfacing, road closures, treatment of additional fuels, reforestation, and watershed improvement projects.

3. **Recruit and retain both short and long-term large down logs and snag habitat, to provide sufficient burned forest habitat for dependent species.** Many birds and mammals require snags and down logs for habitat. Over the next several years, dead trees and burned logs retained in the fire area will provide the primary source of snags and down logs for early seral dependent wildlife. Some dead trees standing today may also contribute in the short term to the decaying, fallen log component of future old forests and spotted owl habitat. Retaining snags and trees with decadence features in areas of low fire mortality can also contribute to the desired future condition for large down logs in combination with large trees that grow over the next 100 to 250 years. There is a risk that these important elements of old forest structure and function could be lost to stand-replacing wildfire.

4. **Revegetate conifer stands and other plant and animal habitats that were burned.** Approximately 18,890 acres of the Piute Fire area have at least 50 percent tree mortality. It will take at least 100 years to reestablish large trees (larger than 24 inches d.b.h.) and, with appropriate silvicultural treatments, at least 250 years to develop patches of old trees with decadence features beneficial to wildlife (SNFPA FEIS Vol. 1, Ch. 2, p. 141-143). Replanting trees in treatment units would help reestablish conifer stands in a shorter time frame than natural recovery would allow.

5. **Improve long-term soil productivity by establishing effective ground cover in severely burned areas, to minimize soil erosion and begin to replace soil organic material.** Nearly one-half of the Piute Fire area was affected by moderate and high soil burn severity based on the Burned Area Emergency Response (BAER) team’s initial survey of the total fire area. High and moderate burn severity areas have limited effective ground cover and generally have moderate to high tree mortality. The BAER report predicted fire-induced increases in
erosion to be approximately 600 percent of the pre-fire erosion rate (Jimenez 2008). The process of dead tree removal would provide immediate and effective ground cover in the form of limbs, treetops, and small tree boles that would be left on the ground following tree removal. This ground cover would otherwise be delayed if all dead trees were left standing.

High-intensity, short-duration monsoonal rainstorms occurred over the fire area in July 2008, resulting in severe erosion, flooding, and debris flows on the west side of the fire area (Erskine Creek, Thompson Creek, and Clear Creek drainages; see Map 3 in map packet).

6. Reduce safety hazards to the public and forest workers from falling trees. Trees defined as hazardous pose a significant safety hazard to forest visitors and workers and will be removed. The Piute Roadside Hazard Tree Removal Project (USDA Forest Service 2009) is currently removing hazardous trees along roads in the Piute Fire area. The Roadside Hazard Removal project removes trees that are currently dead or deemed hazardous using the Hazard Tree Procedures for Forest Plan Compliance (2004). It does not propose to remove trees that may die within the next 3 years due to the effects of the fire. If left, these new dead trees could fall, presenting a risk to both the public and forest workers. These new potential hazard trees are covered under this proposed action.

Forest Plan Direction

The goal of this project is to move the area toward desired future conditions as defined by the Sequoia National Forest Land and Resource Management Plan (LRMP), as amended by the Sierra Nevada Forest Plan Amendment (SNFPA ROD pp. 36-48), and consistent with the Mediated Settlement Agreement to the Sequoia National Forest LRMP.

- Desired conditions for both old forest emphasis areas and general forest areas (SNFPA ROD p. 48) include high levels of horizontal and vertical diversity, trees of varied sizes, ages, and species composition, and enough dead trees, standing and fallen to meet habitat needs of old forest associated species, while allowing for successful establishment of early seral stage vegetation.
- Desired conditions for threat zones (SNFPA ROD p. 46) consist of reduced wildland fire behavior under high fire weather conditions (hot, dry summer days), which includes flame lengths of less than four feet at the head of a fire, reduced rates of spread at the head of the fire, reduced hazards to firefighters by removing snags from locations likely to be used for fire suppression, and doubling of fireline construction rates.
- Desired conditions for defense zones (SNFPA ROD p. 45) are fairly open stands, dominated by larger, fire-tolerant trees, surface and ladder fuel conditions such that crown fire ignition is unlikely, and discontinuity of crown fuels that result in very low probability of sustained crown fire.
- Desired conditions for spotted owl protected activity centers and home range core areas (SNFPA ROD pp. 45-46) include at least two tree canopy layers, dominant and
codominant trees that average at least 24 inches d.b.h., 50 to 70 percent canopy cover, some very large snags, and higher than average levels of snags and down woody material.

- In riparian conservation areas (SNFPA ROD pp. 42-43), the desired condition is to meet the water quality goals of the Clean Water Act and Safe Drinking Water Act, with streams that are fishable, swimmable, and potable after normal treatment; habitat that supports viable populations of native and desired non-native plant, invertebrate, and vertebrate riparian and aquatic-dependent species.

Meeting the desired conditions described above requires survival and growth of individual trees and forested stands over many years without the occurrence of another large stand-replacing wildfire. To reach this desired state, long-term fuel loading should be mitigated, thereby reducing the impacts of fires on the future forest. It is also important to maintain sufficient levels of snags and down logs to provide some characteristics of old forest habitat.

**Decision to be Made**

The Forest Supervisor, Sequoia National Forest, is the official responsible for making this decision. The Forest Supervisor will decide whether to adopt and implement the proposed action, an alternative to the proposed action, or take no action to remove fire-killed and damaged trees, repair roads, and restore areas damaged by the fire in the project area.

The proposed action is consistent with the Sequoia National Forest Land and Resource Management Plan as amended by the Sierra Nevada Forest Plan Amendment Record of Decision, dated January 21, 2004.

**Public Participation**

A notice of intent (NOI) to prepare an environmental impact statement (EIS) was published in the Federal Register on January 22, 2009. Publication of the NOI began the scoping period for the Piute Fire Restoration Project. During the scoping period, the proposal was provided for review and comment to 113 neighboring landowners; local tribal organizations; Federal, State, and local agencies; individuals; groups and organizations potentially interested in or affected by this project. The Kern River Ranger District received 16 written comments on the proposed action. Those comments were used to identify public concerns, refine the proposed action, and develop alternatives. The complete collection of public comments is included in the project record. At the conclusion of the scoping period, the Kern River Ranger District hosted a field trip to discuss proposed treatments on site. That field trip occurred on May 16, 2009 and was attended by 22 members of the public.

A notice of availability (NOA) of the draft EIS was published in the Federal Register on November 6, 2009. Publication of the NOA began the 45-day comment period for the Piute Restoration draft EIS. During the comment period, the Sequoia National Forest hosted three public meetings to present the document and respond to questions. These were held in
Ridgecrest, Kernville, and Bakersfield, CA during the week of November 16, 2009. The meetings were attended by approximately a dozen people. Finally, the Sequoia National Forest received 14 written comment letters on the draft EIS by the close of the comment period on December 21, 2009. Responses to these comments are included as Appendix D.

Issues

Public Concerns

Public concerns are conflicts or potential problems that the public believes may occur if the proposed action is implemented. The Forest Service considers these concerns and looks for ways to avoid them. Project design features are practices designed to avoid potential conflicts. If the project cannot be designed to avoid specific potential problems or if there is public controversy regarding the ability of the Forest Service to mitigate these concerns, these potential problems or concerns are carried forward by the interdisciplinary team as issues.

In this case, issues were separated into two groups: significant and non-significant. Significant issues were defined as those directly or indirectly caused by implementing the Proposed Action. Non-significant issues were identified as those: 1) outside the scope of the Proposed Action; 2) already decided by law, regulation, Forest Plan, or other higher level decision; 3) irrelevant to the decision to be made; or 4) conjectural and not supported by scientific or factual evidence. The Council on Environmental Quality (CEQ) NEPA regulations explain this delineation in Sec. 1501.7, “…identify and eliminate from detailed study the issues which are not significant or which have been covered by prior environmental review…” (Sec. 1506.3). Public comments and documentation explaining their categorization can be found at the Sequoia National Forest Supervisor’s Office as part of the project record. In this case, there were four public concerns identified as significant issues (Table 1, next page).

Significant Issues

Significant issues may require the development of alternatives to the proposal. For this project, the interdisciplinary team met to discuss the four significant issues and used specific proposals provided by the conservation community to design an alternative to the proposed action. Alternative C (page 16) incorporates actions—such as diameter limits on fuels treatments and road closure proposals—that seek to resolve the significant issues.
Table 1. Significant issues

<table>
<thead>
<tr>
<th>Preliminary Concern</th>
<th>How Issue is Addressed</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Noise and Dust</strong> - The project will affect local</td>
<td>Estimate of fugitive dust levels at key residential locations along haul route.</td>
</tr>
<tr>
<td>residents with increased equipment and logging traffic,</td>
<td></td>
</tr>
<tr>
<td>resulting in dust and noise impacts.</td>
<td></td>
</tr>
<tr>
<td><strong>Wildlife and Wildlife Habitat</strong> - There was a concern</td>
<td>The desire for higher levels of large snags is addressed in Alternative C by limiting tree cutting to trees less than 15 inches in diameter. Effects to spotted owls and other affected species are disclosed in the BE/BA and summarized in the FEIS, Chapter 4.</td>
</tr>
<tr>
<td>that the removal of dead trees would adversely impact</td>
<td></td>
</tr>
<tr>
<td>wildlife. Several respondents felt that the Proposed</td>
<td></td>
</tr>
<tr>
<td>Action would not leave enough dead trees for specific</td>
<td></td>
</tr>
<tr>
<td>wildlife species that require large numbers of snags for</td>
<td></td>
</tr>
<tr>
<td>optimal habitat. The viability of spotted owls and other</td>
<td></td>
</tr>
<tr>
<td>species that utilize mature forest habitat was a</td>
<td></td>
</tr>
<tr>
<td>concern.</td>
<td></td>
</tr>
<tr>
<td><strong>Fire and Fuels</strong> - Some respondents felt that no fuels</td>
<td>Chapter 4 of the EIS includes a section on fuels where future fire risk is predicted based on fire/fuel modeling.</td>
</tr>
<tr>
<td>reduction was necessary and that the risk of future</td>
<td></td>
</tr>
<tr>
<td>fires was low in severely burned areas. Other</td>
<td></td>
</tr>
<tr>
<td>respondents thought that the current standing dead</td>
<td></td>
</tr>
<tr>
<td>trees could become fuel for a future fire once they fall</td>
<td></td>
</tr>
<tr>
<td>to the ground. They felt that fuels reduction should be</td>
<td></td>
</tr>
<tr>
<td>a restoration goal to help prevent another catastrophic</td>
<td></td>
</tr>
<tr>
<td>fire. Some respondents felt that the removal of large</td>
<td></td>
</tr>
<tr>
<td>diameter trees would increase the risk of fire.</td>
<td></td>
</tr>
<tr>
<td><strong>Soils and Water Quality</strong> - Some respondents felt that</td>
<td>This issue was used to develop Alternative C, which does not remove larger logs. Smaller trees treated to reduce future fuels would be either retained as mulch or burned on site to retain nutrients and organic material. Chapter 4 of the EIS includes a section on Soils and another on water quality. Erosion potential and the cumulative effects of sediment in the affected watersheds are described in the affected environment.</td>
</tr>
<tr>
<td>the salvage logging proposed under this project would</td>
<td></td>
</tr>
<tr>
<td>adversely affect long-term soil productivity, disturb</td>
<td></td>
</tr>
<tr>
<td>soil structure, and increase erosion and sediment flows</td>
<td></td>
</tr>
<tr>
<td>downstream. They also felt that removing logs would</td>
<td></td>
</tr>
<tr>
<td>permanently remove from the site valuable minerals</td>
<td></td>
</tr>
<tr>
<td>contained in the logs. These respondents cited the</td>
<td></td>
</tr>
<tr>
<td>Beschta Report (Beschta et al. 1995) in support of</td>
<td></td>
</tr>
<tr>
<td>their arguments.</td>
<td></td>
</tr>
</tbody>
</table>

Other Related Efforts in the Piute Fire Area

This EIS addresses treating the dead and dying tree component of the landscape. Other recovery projects to begin to meet the desired condition include roadside hazard tree removal, reforestation, and wildlife habitat and meadow restoration. The Piute Fire Roadside Hazard Tree Removal Project consists of the removal of hazard trees for safety purposes along approximately 32 miles of roads affected by the Piute Fire (see subsection 2, below). Reforestation activities across the fire area are anticipated by Forest Service silviculturists to ensure successful establishment of native tree species (see subsection 3, below). The specific areas and methods for wildlife habitat and meadow restoration are currently being formulated (see subsection 4, below). Other activities that are being implemented by the Forest Service in the fire area as part of the BAER efforts include emergency stabilization treatments (repair of roads and trails and erosion control on selected mining and heritage sites), a minimum one-year closure within the fire area to off-highway vehicles and grazing, seasonal road closures including the installation of gates and fencing, and monitoring of the effectiveness of treatments and for noxious weeds.
1. **Clear Creek Forest Health Improvement and Fuels Reduction Project.** The Piute Fire burned approximately 1,700 acres of the Clear Creek Forest Health Improvement and Fuels Reduction project area. That project proposed to use a combination of commercial thinning, mastication, piling and burning, and prescribed underburning to improve forest health and reduce fire hazards on approximately 4,505 acres of National Forest System lands. A decision notice regarding the Clear Creek project was issued in 2007. The Clear Creek Project decision was subsequently withdrawn and the Clear Creek Thinning Timber Sale was suspended until further environmental documentation could be prepared. A revised environmental assessment (EA) was prepared during 2008 to clarify some of the issues associated with that project. However, prior to distribution of the revised EA for public comment, the Piute Fire started and significantly changed the condition of the Clear Creek project area. The Clear Creek Project planning efforts were subsequently abandoned. The portions of the Clear Creek Project that burned with stand-replacing effects are addressed and analyzed in the Piute Fire Restoration FEIS with respect to restoration needs and opportunities. Portions of the Clear Creek Thinning Timber Sale that did not burn or burned at low intensity remain under contract. Although the purpose and need for these treatments remains valid, the fire has changed the urgency for implementation and immediate implementation may not be prudent in the light of the cumulative effects from the fire. The portion of the Clear Creek Thinning Timber Sale Contract not affected by salvage and restoration under the Piute Fire Restoration Project cannot be implemented until there is further project development, environmental analysis and documentation. As such, it was not considered a reasonably foreseeable action for the purposes of cumulative effects analysis in this document. The cumulative effects discussion acknowledges that immediate implementation of the Clear Creek Project in unburned or lightly burned areas could exacerbate the conditions that the Piute Fire Restoration Project is designed to ameliorate.

2. **Piute Fire Roadside Hazard Tree Removal Project Environmental Assessment.** On April 27, 2009, Sequoia National Forest Supervisor Tina Terrell signed the “Decision Notice and Finding of No Significant Impact for the Piute Fire Roadside Hazard Tree Removal Project” (Roadside Hazard Project; USDA Forest Service 2009). Forest Supervisor Terrell’s decision included a commercial timber sale to remove hazard trees for safety purposes along approximately 32 miles of roads affected by the 2008 Piute Fire. This project included portions of the roadside hazard component of the Clear Creek Project where appropriate and is currently ongoing. Road numbers 28S27, 28S27A, 28S25, 28S24, 28S17, 28S17B, 27S02, 28S23, 28S18, 28S18A, 28S47, 28S47A, 28S47B, and a portion of the Piute Mountain Road (County Road 501) were included. Hazard trees were identified using the Sequoia National Forest Hazard Tree Identification Guidelines (USDA Forest Service 2004c). Hazard trees include fire-damaged and fire-killed trees that meet the above guidelines, as well as unburned trees that are dead or have damage and/or defects that meet the above guidelines. The selected trees are located within 200 feet from each side of the road prism.
The Roadside Hazard Project was designed to be implemented as soon as possible during the 2009 field season to maintain open and safe access for the public and forest workers. The Sequoia National Forest does not consider the Roadside Hazard Project to be a connected action as defined by 40 CFR 1508.25(a)(1). Actions are connected if they “automatically trigger other actions, . . . cannot or will not proceed unless other actions are taken, [or] . . . depend on the [other] action for their justification.” The Roadside Hazard Project involves the mitigation of hazards along existing roads. Mitigating those hazards has not automatically triggered this proposal. Moreover, the mitigation of those hazards is not dependent on this or any other action; it can and will proceed independently. Mitigation of hazards is justified by the need to protect the public and forest workers from falling trees along existing roads.

3. **Piute Fire Reforestation.** Additional reforestation is proposed under a separate environmental document where circumstances do not provide for economically feasible salvage. This project includes only tree planting and associated treatment of small trees (generally less than 15 inches d.b.h.), primarily for the purpose of preparing the site. These are routine actions with low potential for effects that are typically addressed in a category of actions excluded from further documentation in an environmental assessment or environmental impact statement. This project would affect approximately 3,427 acres, including planting trees on 2,897 acres with no other treatment, mechanical site preparation and treatment on 501 acres and 50 acres of wildlife habitat enhancement. Appropriate environmental analysis will be done following public scoping, which began in October 2009.

The Sequoia National Forest does not consider the reforestation project to be a connected action as defined by 40 CFR 1508.25(a)(1). The reforestation project has not been triggered by this project, does not depend on this project, and can be implemented independently of this project.

4. **Moreland Mines Reclamation.** The Moreland Mines Reclamation project is undergoing NEPA evaluation and is planned for implementation in 2010 and 2011. This project will close mines and rehabilitate the sites at nine abandoned mines in the Alaska Flat and Weldon Meadow area. Four of these sites are in the Piute Restoration Project treatment areas. These sites are Evening Star, Mary Etta, Weldon Meadow and Weldon Meadow Dolomite. Mine reclamation activities include removing debris from burned structures and other trash, closing the hazardous mine openings, re-contouring the slopes to natural conditions, and closing the access roads (except for Mary Etta, which is open to public use).

5. **Wildlife Habitat and Meadow Restoration.** Specific areas and methods for wildlife habitat and meadow restoration are currently being formulated. Appropriate environmental analysis will be initiated at the time that any proposal is fully developed.
Chapter 2 – Alternatives, Including the Proposed Action

Introduction

This section describes and compares the alternatives considered by the Forest Service for the project area. It includes a discussion of alternatives considered but not studied in detail, a description and map of each alternative considered in detail, a list of integrated project design features, and a comparison of these alternatives focusing on the purpose and need for the project as well as the potential environmental effects. These descriptions are intended to present the alternatives in comparative form, sharply defining the issues and providing a clear basis for choice among options by the responsible official and the public (40 CFR 1502.14).

The Forest Service interdisciplinary team used information from scoping in conjunction with field-related resource information to formulate a range of reasonable alternatives. Other influences on the scope of the project include Forest Plan direction (desired future condition, goals and objectives, standards and guidelines) and federal laws, regulations, and policies. The interdisciplinary team considered eight alternatives: three were considered in detail and five were eliminated from detailed study.

Alternatives Considered but Eliminated from Detailed Study

Federal agencies are required by NEPA to rigorously explore and objectively evaluate all reasonable alternatives and to briefly discuss the reasons for eliminating any alternatives that were not developed in detail (40 CFR 1502.14). Public comments received in response to the proposed action provided suggestions for alternatives. The Forest Service considered all these alternatives (USDA Forest Service 2009b). Some of them are developed in detail and others are not given detailed study. Reasons for excluding proposed alternatives from detailed study include: proposed activities do not meet the purpose and need for the project; suggestions are outside the scope of the project intent; suggested alternatives are duplicative of the alternatives considered in detail; alternatives contain components that are not technically or economically feasible; or proposed alternatives are so lacking in detail as to be purely speculative. The following alternatives were considered, but not studied in detail for the reasons summarized below.

Alternative 1 - Effective Restoration

One respondent suggested that restoration treatments that focused on just 2,300 acres of the approximately 19,000 that suffered high conifer mortality would be insufficient. This respondent proposed developing additional alternatives that removed more of the fire-killed timber using helicopter and cable-yarding systems, as well as more aggressive fuels treatments over larger areas.
Current direction reserves decisions regarding harvesting and road construction in inventoried roadless areas (IRAs) to the Secretary of Agriculture (USDA Office of the Secretary 2009). Much of the additional acreage suggested for treatment in this alternative is in an IRA. Likewise, fuel treatments require access—access that is not readily available to much of the project area. Finally, the value of fire-killed timber in inaccessible areas is too low to make helicopter yarding economically feasible. The team concluded there were very few additional burned areas that could be treated in a cost-effective manner. This alternative was considered but was not studied in detail because it was not economically viable (USDA Forest Service 2008).

**Alternative 2 - True Restoration**

One respondent provided a restoration formula that suggested 1) no economic recovery of fire-killed trees in moderate and high mortality areas; 2) decommissioning of all forest roads not required for access to private land; 3) no hazard tree cutting except where required for public access; and 4) no livestock grazing for 20 years.

This alternative was considered but not studied in detail because it did not meet the project’s purpose and need, including the need to reduce long-term fuel loadings and the need to accelerate the recovery of burned conifer habitat. In addition, several of the suggestions were identical to the proposed action and did not require additional alternative development—for example, a proposal to forgo new road construction. The suggestions made by this respondent were considered to be significant issues and were used by the interdisciplinary team to develop the noncommercial alternative described below (see Alternative C, p. 16).

**Alternative 3 - Diameter Limit**

This respondent suggested an alternative that would limit the cutting of fire-killed trees to 10 inches in diameter in fuel treatment areas and 15 inches in diameter in salvage harvest areas. This proposal was not considered as a stand-alone alternative because it did not include any additional details regarding actions necessary to meet the purpose and need, including the need for reforestation and road repair; however, it was adopted by the interdisciplinary team in developing the noncommercial funding alternative described below (see Alternative C, p. 16).

**Alternative 4 - 2001 Sierra Nevada Forest Plan Amendment**

This respondent suggested that the Forest design an alternative to be consistent with the 2001 Sierra Nevada Forest Plan Amendment (Framework). The 2001 SNFPA held that:

- following stand-replacing events (events that result in 75 percent mortality of trees), do not conduct salvage in at least 10 percent of the area affected by the stand-replacing event (p. A-28);
- in Old Forest Emphasis allocations retain all snags greater than 15 inches d.b.h. following stand–replacing events except to address imminent hazards to human safety (p. A-42).

This is essentially the same as Alternative C, which is considered in detail (see Alternative C, p. 16).
Alternative 5 - Minimize Impacts

Another respondent included this as an alternative: “We recommend that the Draft EIS (DEIS) evaluate a range of alternatives, including an alternative which minimizes adverse impacts to water quality, cumulative watershed effects, aquatic resources, and air quality.” All action alternatives are designed to minimize adverse impacts to biological, physical and social resources. In addition, this alternative lacked specificity to warrant development. For these reasons, this alternative was eliminated from detailed study.

Alternatives Considered in Detail

Three alternatives are considered in detail in this document: no action, the proposed action, and the modified action alternative.

Alternative A - No Action

The Council on Environmental Quality (CEQ) regulations (40 CFR 1502.14(d)) require that a "no action" alternative be analyzed. Under the no action alternative, the proposed restoration treatments and fuels management activities would not take place at this time. Consideration of such activities in the future would not be precluded. Existing activities such as personal use fuelwood, livestock grazing, fire protection, and motorized and nonmotorized recreation would continue. The economic value of fire-killed timber would be lost and fuel loadings would increase; the proposed planting and road repair would not occur. The no action alternative serves as a benchmark against which to compare the environmental effects of the action alternatives.

Alternative B - Proposed Action

The proposed action is designed to move the project area toward the desired future condition (see Map 4 in map packet). Note that the acreage amounts have changed from the initial scoping letter due to refinements of the proposed action and GIS mapping of treatment unit sizes. The proposed action includes the following activities:

1. Snag habitat for wildlife and future down logs would be retained while merchantable dead and dying conifers would be harvested in stands with greater than 50 percent tree mortality. Sites with potential restoration needs were identified from a Burned Area Emergency Response (BAER) evaluation of effects of the fire on vegetation. LANDSAT satellite imagery and field examinations were the tools used to evaluate effects of the fire on vegetation. Areas with at least 50 percent mortality in mature forest were evaluated for ability to naturally regenerate. Trees would be designated for removal using guidelines developed from California field studies by the Forest Service Pacific Southwest Region Forest Health Protection staff. Fire-damaged trees would be assessed by species, size (d.b.h.) and percent crown killed. Direct sampling of the cambium would not be used to evaluate trees for removal. The intent is to use a probability of mortality threshold of 0.8 for Jeffrey pine and a probability of mortality threshold of 0.7 for white fir. Details on the marking
guidelines are based on the paper “Marking Guidelines for Fire-Injured Trees in California” (Smith and Cluck 2009). All stumps larger than 18 inches would be treated with Sporax to prevent spread of Annosus root disease.

2. Hazard trees would be removed in conjunction with this project including trees predicted to die within three years using the guidelines cited above. Hazard trees removed would be dead trees, or trees that are predicted to die within three years, and live trees that are sufficiently damaged\(^1\) to pose a risk of falling within the next three years.

3. Ensure adequate ground cover and treat fuels: lop slash and scatter concentrations to within 18 inches of the ground or mechanically treat by chipping or masticating slash in logged areas. Yarding of whole trees or treetops may be specified in areas where lopping, chipping, or mastication, will result in excessive fuel loading. Pile and burn these excess fuels. Mechanically treat non-merchantable dead trees in logged areas by chipping or masticating, or hand treat leaving the residual fuels on site for ground cover. Fuels, slash, and small trees, in excess of material needed for ground cover and wildlife habitat, may be removed by piling and burning, chipping, removal as biomass or some combination of these activities.

Mechanically treat non-merchantable dead trees in fuel treatment units. Pile and burn fuels in areas where fuel loading is in excess of 10 to 15 tons/acre. Leave an average of three of the largest snags per acre. Retain at least five logs per acre that are at least 20 inches in diameter and 10 feet long.

4. Ground-based equipment (e.g., tractor, skidder, feller/buncher, tractor end lining) would be used to remove merchantable trees and to treat fuels.

5. Native tree seedlings would be planted in treatment units.

6. Up to 32 miles of existing roads would be repaired and receive maintenance where conditions warrant to reduce erosion and where needed for management activities.

<table>
<thead>
<tr>
<th>Restoration Treatments</th>
<th>Acres</th>
</tr>
</thead>
<tbody>
<tr>
<td>Remove fuels–ground-based logging</td>
<td>347</td>
</tr>
<tr>
<td>Treat fuels–mechanical &amp; hand methods</td>
<td>1,981</td>
</tr>
<tr>
<td>Plant tree seedlings in treatment areas</td>
<td>503</td>
</tr>
<tr>
<td>Total</td>
<td>2,328</td>
</tr>
</tbody>
</table>

**Table 2. Proposed action – proposed restoration treatment methods**

**Alternative C - Noncommercial Funding Alternative**

During development of the alternatives, the interdisciplinary team acknowledged comments received by some individuals and special interest groups who oppose any commercial use of National Forest resources. In response to these suggestions, the interdisciplinary team developed

\(^1\) dead tops or limbs; decay, fire, mechanical damage that has reduced soundness, forked tops, leaning trees, etc.
an alternative that incorporates portions of the suggested alternatives (see Map 4 in map packet). Alternative C, the noncommercial funding alternative, includes the following.

1. Within the approximately 350 acres proposed for salvage under Alternative B, snag habitat for wildlife and future down logs would be retained while reducing fuels up to 15 inches d.b.h. and hazards to Forest workers in plantations. Standing dead trees in the 10- to 15-inch d.b.h. size class that would contribute to an excess of the 10 to 15 tons/acre desired condition for surface fuels in the future would be piled and burned, masticated or otherwise treated to reduce fuels on the 347 acres proposed for salvage in Alternative B. This design feature would provide extra fuels reduction in the area where there is the highest standing volume of dead trees and therefore the greatest potential future fuel loading.

2. Hazard trees removed in conjunction with this project would be identified using only the Sequoia National Forest Hazard Tree Guidelines for Forest Plan Compliance (2004). Hazards would not be identified using the mortality guidelines. All hazard trees over 20 inches in diameter would be left on the ground to provide habitat for small mammal prey species. Hazard trees between 10 and 20 inches d.b.h. would be left on the ground to provide woody cover except where they exceed the desired fuels condition of 10-15 tons per acre. Where the desired fuels conditions are exceeded, excess down woody debris may be piled and burned or chipped.

3. Ground-based equipment (e.g., tractor, skidder, feller/buncher, tractor end lining) would be used to treat fuels.

4. Adequate ground cover would be maintained and fuels would be reduced. Slash would be treated with lop and scatter methods leaving concentrations within 18 inches of the ground, or it would be mechanically treated by chipping or mastication. Yarding of whole trees or treetops under service contracts may be specified in areas where lopping, chipping, or mastication would result in fuel loads in excess of 10 to 15 tons/acre. Dead trees (less than 10 inches d.b.h.) would be treated for fuels reduction by a combination of hand felling (felling, cutting into lengths less than 4 feet long, and scattering concentrations of slash) and mechanical piling, mastication and burning. Some residual fuels will be left on site for ground cover.

5. Native tree seedlings would be planted in treatment units.

6. Existing roads would be repaired and receive maintenance where conditions warrant to reduce erosion if they are needed for future management or recreational access. Road segments that are not required for this project, or for future forest management activities, or for access to private property, including some roads that have been severely damaged as a result of the 2008 flooding where their utility does not justify the expense of repair, would be proposed for decommissioning and restoration. These segments have been inventoried by a forest engineer and timber sale administrator, and have been analyzed by the interdisciplinary team (USDA Forest Service 2009c). The proposal
includes approximately eight miles of the 35 miles of National Forest System (NFS) road within the project area (Table 3).

This alternative originally included the potential for commercial harvest of trees up to 15 inches d.b.h. The original analysis, however, found that there was no commercial value associated with the 15-inch diameter limit. The alternative was analyzed as having no economic value or commercial funding.

Before publication of this FEIS, the United States District Court for the Eastern District of California denied the Sierra Forest Legacy’s request for an injunction in SFL v. Rey, with the caveat that all new fuels reduction projects analyze a noncommercial funding alternative. In compliance with this order, Alternative C has been clarified as a noncommercial funding alternative. Fuel treatments would be designed and implemented with appropriated funds under this alternative.

### Table 3. Alternative C road segments proposed for decommissioning, in miles

<table>
<thead>
<tr>
<th>Road Number</th>
<th>Decommissioned Length</th>
<th>Proposal</th>
</tr>
</thead>
<tbody>
<tr>
<td>27S02E</td>
<td>0.44</td>
<td>Decommission entire length</td>
</tr>
<tr>
<td>27S02F</td>
<td>0.50</td>
<td>Convert first .5 mile to motorized trail; decommission remaining .5 mile</td>
</tr>
<tr>
<td>28S17A</td>
<td>0.52</td>
<td>Decommission entire length</td>
</tr>
<tr>
<td>28S18A</td>
<td>0.34</td>
<td>Decommission entire length</td>
</tr>
<tr>
<td>28S23</td>
<td>0.89</td>
<td>Maintain first .75 mile; decommission remaining .89 mile</td>
</tr>
<tr>
<td>28S24</td>
<td>0.34</td>
<td>Maintain for 5.78 miles to trailhead; decommission remaining .34 mile</td>
</tr>
<tr>
<td>28S24C</td>
<td>0.96</td>
<td>Decommission entire length</td>
</tr>
<tr>
<td>28S24D</td>
<td>0.30</td>
<td>Decommission entire length</td>
</tr>
<tr>
<td>28S29</td>
<td>0.50</td>
<td>Decommission entire length</td>
</tr>
<tr>
<td>28S30</td>
<td>0.47</td>
<td>Decommission entire length</td>
</tr>
<tr>
<td>28S33</td>
<td>0.62</td>
<td>Decommission entire length</td>
</tr>
<tr>
<td>28S43</td>
<td>2.09</td>
<td>Decommission entire length</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>7.97</strong></td>
<td></td>
</tr>
</tbody>
</table>

### Project Design Features Common to All Action Alternatives

Project design features represent practices established to protect Sequoia National Forest resources. Project design features have been developed to meet the goals of the Sequoia LRMP as well as other laws, regulations, and directives while avoiding potential significant environmental effects. Project design features are applicable to all action alternatives where corresponding activities are present.
<table>
<thead>
<tr>
<th>Project design feature (by resource area)</th>
<th>Description of project design feature</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Cultural Resources</strong></td>
<td></td>
</tr>
<tr>
<td>CU-1</td>
<td>Protect known cultural resources per the LRMP, and according to standard protection measures outlined in II (A) of the First Amended Programmatic Agreement among the USDA Forest Service, Pacific Southwest Region, the Advisory Council on Historic Preservation, and the California State Historic Preservation Officer, Regarding the Process for Compliance with Section 106 of the National Historic Preservation Act for Undertaking on the National Forests of the Pacific Southwest Region (Region 5 Programmatic Agreement 2001).</td>
</tr>
<tr>
<td>CU-2</td>
<td>In order to protect known sites and mitigate damage to sites that may be discovered during ground-disturbing activities, special provision C6.24# will be included in all contracts.</td>
</tr>
<tr>
<td>CU-3</td>
<td>Salvage (Alternative B only) and hazard trees located within cultural site boundaries should be felled (following consultation with the archaeological monitor) to eliminate the risk to the public and also to provide for the controlled placement of that tree rather than chancing resource damage by the uncontrolled falling of a hazard tree. No equipment will be allowed within cultural sites.</td>
</tr>
<tr>
<td>CU-4</td>
<td>Sites within or adjacent to the project area will to be flagged and avoided. The district archaeologist will be advised prior to working within 50 meters of historic properties. Monitoring will be at the discretion of the District Archaeologist.</td>
</tr>
<tr>
<td>CU-5</td>
<td>Should any additional cultural resources be located, the find must be protected from operations and reported immediately to the Heritage Resource Staff. All operations in the vicinity of the find will be suspended until the site is visited, appropriately recorded and evaluated by the District Archaeologist. District archaeologist will assess the site for protection needs.</td>
</tr>
<tr>
<td><strong>Fuels</strong></td>
<td></td>
</tr>
<tr>
<td>FU-1</td>
<td>Where wildlife limited operating periods do not apply, burning may be implemented throughout the year.</td>
</tr>
<tr>
<td>FU-2</td>
<td>A burn plan will be approved prior to any prescribed burning.</td>
</tr>
<tr>
<td>FU-3</td>
<td>Low-intensity fire will be allowed to back into riparian areas but riparian vegetation will not be intentionally ignited with the exception that it is essential for holding or preventing a high intensity fire run.</td>
</tr>
<tr>
<td>FU-4</td>
<td>Road culverts and drains will be inspected after burning and will be cleaned out as needed.</td>
</tr>
<tr>
<td>FU-5</td>
<td>Retain 10 percent of the activity-created slash piles to provide wildlife habitat.</td>
</tr>
<tr>
<td><strong>Minerals, Special Uses, and Lands</strong></td>
<td></td>
</tr>
<tr>
<td>ML-1</td>
<td>Ensure that contaminated mine tailings are not disturbed by avoiding the identified sites at the French Meadow Mine and the French Camp site.</td>
</tr>
<tr>
<td><strong>Noxious Weeds</strong></td>
<td></td>
</tr>
<tr>
<td>NW-1</td>
<td>Any noxious weed occurrences found during project layout and implementation should be reported to the Forest botanist.</td>
</tr>
<tr>
<td>NW-2</td>
<td>Require equipment washing prior to arrival at project area under timber sale contract provision B6.35#.</td>
</tr>
<tr>
<td>NW-3</td>
<td>Avoid known infestations during project implementation.</td>
</tr>
<tr>
<td>NW-4</td>
<td>Use weed-free erosion control materials.</td>
</tr>
<tr>
<td><strong>Recreation</strong></td>
<td></td>
</tr>
<tr>
<td>RE-1</td>
<td>To minimize impacts to recreational users and traffic, contract operations, including timber hauling under alternative B, would not occur during weekends, major holidays, and the Friday preceding the start of general deer hunting season.</td>
</tr>
<tr>
<td>RE-2</td>
<td>Equipment access trails would be restored and closed to motorized travel with earth barriers, large trees, cul logs, and/or rocks after operations are complete.</td>
</tr>
</tbody>
</table>
### Table 4. Project design features

<table>
<thead>
<tr>
<th>Project design feature (by resource area)</th>
<th>Description of project design feature</th>
</tr>
</thead>
<tbody>
<tr>
<td>RE-3</td>
<td>National Forest System trails would be protected and restored to the designed tread widths and clearing limits under Forest Service Standards in Forest Service Handbook 2309.18. Using cull logs, rocks, or large trees may be necessary to create pinches to avoid unintended motorized use opportunities for larger vehicle widths.</td>
</tr>
<tr>
<td>RE-4</td>
<td>Following guidance from Forest Service Handbook 2309.18, grade reversals, knicks, and rolling grade dips would be incorporated in the reconstruction of trails to drain water from the trails whenever possible, not waterbars. Waterbars are less effective and harder to install correctly. Even when installed correctly, waterbars have a high-probability of failure (USDA 2007).</td>
</tr>
<tr>
<td>RE-5</td>
<td>Clearly delineate National Forest System trails, with signs if necessary, to prevent users from going off trails and creating additional user-created routes.</td>
</tr>
<tr>
<td>RE-6</td>
<td>For public safety, treatment areas may be temporarily closed to public use during the operational periods. Closed areas could be implemented with contract area subdivisions and requirements to complete operations in one subdivision before starting another. Closures could be by signs, travel barriers, or temporary gates.</td>
</tr>
<tr>
<td>RE-7</td>
<td>In cases where the aforementioned activities will prevent access to an area during hunting season, public outreach using signs, visitor contacts, and the internet should inform hunters in advance of closures and provide alternative access opportunities.</td>
</tr>
</tbody>
</table>

#### Sensitive Plants

| SP-1                                     | In salvage units, if new populations of Region 5 sensitive plant populations are discovered, they will be flagged for avoidance by all mechanical ground disturbing activities. All known sites will also be flagged and avoided by all mechanical ground disturbing activities. |
| SP-2                                     | In fuels units, if new populations of Region 5 sensitive plant populations are discovered, these areas will be under a limited operating period for mechanical ground disturbing activities. All known sites will also be under a limited operating period for all mechanical ground-disturbing activities. |

#### Silviculture

| SV-1                                     | Trees will be designated for removal using guidelines developed from California field studies by the Forest Service Pacific Southwest Region FHP staff. Fire-damaged trees will be assessed by species, size (d.b.h.) and percent crown killed. Direct sampling of the cambium will not be used. (Alternative C hazard trees only) |
| SV-2                                     | Treat all stumps larger than 18 inches with Sporax to prevent spread of Annosus root disease. Follow specifications for application and use under provision C6.41# of the contract (hazard trees only under Alternative C). |
| SV-3                                     | To ensure the success of planted seedlings, hand-grub brush in new planting areas as needed within five years to release young trees from competition. |

#### Transportation

| TR-1                                     | Contract provisions will require dust abatement measures on all National Forest System native surface and graveled roads. Water will be used for all dust abatement. If water is limited or unavailable, timing restrictions may be imposed to minimize the impacts of fugitive dust. (Alternative B only) |
| TR-2                                     | Log truck traffic will be restricted to reduce noise and traffic impacts. Unless agreed otherwise, no log hauling will occur on Saturdays and Sundays, Memorial Day, July 4, and Labor Day holidays, and the Friday preceding the start of general deer hunting season (Alternative B only). |
| TR-3                                     | The timber harvest area will be closed to firewood gathering during timber sale operations. The area will be reopened to firewood gathering after timber sale operations are completed (Alternative B only). |
| TR-4                                     | Traffic control or closures on roads and trails will be used during, felling, mastication or other contract operations when necessary for public safety. |
### Table 4. Project design features

<table>
<thead>
<tr>
<th>Project design feature (by resource area)</th>
<th>Description of project design feature</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Wildlife</strong></td>
<td></td>
</tr>
<tr>
<td>WL-1</td>
<td>Implement appropriate limited operating periods to protect threatened, endangered, and sensitive (TES) species as outlined in the LRMP, as amended by the SNFPA.</td>
</tr>
<tr>
<td>WL-2</td>
<td>Retain up to 10 tons per acre of large (greater than 12-inch diameter class) downed woody debris per acre over the treatment unit, starting with the largest available. Optimum logs are greater than 20 inches diameter and that are at least 20 ft long for soil and wildlife habitat. Small piles of 3 to 5 or more cull logs in the 12- to 20-inch diameter range may substitute where such material is available. Use cull logs whenever possible to meet down log requirements.</td>
</tr>
<tr>
<td>WL-3</td>
<td>Include contract provisions C6.24 and C6.315 in the event that the nest or den site of any TES species is located during management activities (or other appropriate mitigation measures under Alternative C).</td>
</tr>
<tr>
<td>WL-4</td>
<td>If a goshawk nest is located during project activities, 200 acres of suitable habitat surrounding it will be allocated as a PAC. Management activities within one-quarter mile of the PAC will be restricted between February 15 and September 15 unless surveys confirm that goshawks are not nesting.</td>
</tr>
<tr>
<td>WL-5</td>
<td>If a spotted owl nest is located during project activities, 300 acres of suitable habitat surrounding the spotted owl nest will be allocated as a protected activity center (PAC) and an additional 300 acres for a home range core area. Management activities within one-quarter mile of the PAC will be restricted between March 1 and August 15.</td>
</tr>
<tr>
<td>WL-6</td>
<td>Retain at least three snags per acre of the largest available in treated stands. Snags may be grouped or averaged over ten acres to maximize wildlife value and minimize exposure of forest workers to safety hazards.</td>
</tr>
<tr>
<td><strong>Watershed Resources</strong></td>
<td></td>
</tr>
<tr>
<td>WS-1</td>
<td>In treatment units, provide for an average of 5 logs/acre that are at least 20 inches diameter and 10 feet long (BMP 1.8, 1.19).</td>
</tr>
<tr>
<td>WS-2</td>
<td>Apply riparian conservation objective (RCO) widths by stream type. Fell, lop, and scatter coarse woody material up to 20 tons per acre within riparian conservation areas (RCAs) to trap sediment and facilitate establishment of vegetation.</td>
</tr>
<tr>
<td>WS-3</td>
<td>Limit detrimental soil disturbance to 15 percent of each treatment unit outside of RCAs. Within RCAs, limit detrimental soil compaction to less than five percent of the area (BMP 1.83, 1.19). Scarify main skid trails in all units having more than 15% detrimental soil compaction, landings or portions of not associated with system roads, and all temporary roads.</td>
</tr>
<tr>
<td>WS-4</td>
<td>A streamside management zone (SMZ) of 50 to 75 feet for ground-based equipment will be applied to seasonally flowing streams (BMP 1.13).</td>
</tr>
<tr>
<td>WS-5</td>
<td>Minimize soil erosion and increase soil productivity by spreading slash or fine organic matter for 50% cover where needed for erosion control (BMP 1.22, 1.17).</td>
</tr>
<tr>
<td>WS-7</td>
<td>Equipment access trails will be water-barred within 25 feet of landings and roads. Water-bars will also be placed on all main access trail sections with spacing dependent on slope and soil type in compliance with the Timber Management Handbook (BMP 1.13).</td>
</tr>
<tr>
<td>WS-8</td>
<td>Distribute residual chips from mastication so they are in a mosaic pattern, not continuous across entire stands (BMP 6.2, 6.3).</td>
</tr>
<tr>
<td>WS-9</td>
<td>Schedule salvage removal and mechanical fuel treatments in the same season when feasible. Emphasize use on the same skid pattern for both activities (BMP 1.5) (Alternative B only).</td>
</tr>
<tr>
<td>WS-10</td>
<td>In general, restrict mechanized equipment to established access trails where present and appropriate (BMP 1.10).</td>
</tr>
</tbody>
</table>
Comparison of Alternatives

This section compares how the alternatives meet the purpose and need for this project as well as desired future conditions and treatment goals.

Table 5. Comparison of how well each alternative achieves the purpose and need

<table>
<thead>
<tr>
<th>Alternative</th>
<th>No Action</th>
<th>Proposed Action</th>
<th>Noncommercial Funding Alternative</th>
</tr>
</thead>
<tbody>
<tr>
<td>Prevent future high intensity wildfire by reducing long-term fuel loading.</td>
<td>No reduction in fuels; in time 80 to 90 percent of proposed treatment areas exceed heat/unit area thresholds.</td>
<td>Fuel treatments on ~1900 acres; in time none of proposed treatment areas exceed heat/unit area thresholds.</td>
<td>Limited fuel treatments on ~1900 acres; in time 70 to 80 percent of proposed treatment areas exceed heat/unit area thresholds.</td>
</tr>
<tr>
<td>Recover the economic value of timber killed or severely injured by the Piute Fire.</td>
<td>No value recovered.</td>
<td>$360,233 in local economic benefits.</td>
<td>Economics not feasible. 2 This is the noncommercial alternative.</td>
</tr>
<tr>
<td>Recruit and retain both short and long-term large down logs and snag habitat.</td>
<td>No reduction in current snag levels; delayed accumulation of down logs.</td>
<td>Short-term reduction in medium and large snags in treatment areas.</td>
<td>Short-term reduction in medium and large snags in treatment areas.</td>
</tr>
<tr>
<td>Revegetate conifer stands.</td>
<td>No trees planted.</td>
<td>~500 acres of planting.</td>
<td>~500 acres of planting.</td>
</tr>
<tr>
<td>Improve long-term soil productivity by establishing effective ground cover in severely burned areas.</td>
<td>Ground cover reestablished as dead trees fall.</td>
<td>Ground cover accelerated through felling and masticating.</td>
<td>Ground cover accelerated through felling and masticating.</td>
</tr>
<tr>
<td>Reduce safety hazards to the public and forest workers from falling trees.</td>
<td>Hazards not mitigated.</td>
<td>Dead and dying tree hazards in treatment areas mitigated.</td>
<td>Dead tree hazards in treatment areas mitigated.</td>
</tr>
</tbody>
</table>

Table 6. Comparison of treatments and outputs among alternatives

<table>
<thead>
<tr>
<th>Alternative</th>
<th>No Action</th>
<th>Proposed Action</th>
<th>Noncommercial Funding Alternative</th>
</tr>
</thead>
<tbody>
<tr>
<td>Fuels treated (acres)</td>
<td>0 acres</td>
<td>2,328 acres</td>
<td>2,328 acres</td>
</tr>
<tr>
<td>Fire-killed commercial timber removed (MMBF)</td>
<td>none</td>
<td>2.7 MMBF</td>
<td>none</td>
</tr>
<tr>
<td>Economic value of fire-killed timber ($)</td>
<td>$0.00</td>
<td>$9,403.00</td>
<td>$0.00</td>
</tr>
<tr>
<td>Trees planted (acres)</td>
<td>0 acres</td>
<td>503 acres</td>
<td>503 acres</td>
</tr>
<tr>
<td>Roads repaired (miles)</td>
<td>0 miles</td>
<td>32 miles</td>
<td>24 miles</td>
</tr>
<tr>
<td>Roads decommissioned (miles)</td>
<td>0 miles</td>
<td>0 miles</td>
<td>7.97 miles</td>
</tr>
</tbody>
</table>

2 Based on deterioration of small diameter timber, it is not expected that the timber identified in this alternative will have any value at the time the Record of Decision is signed for this project. See page 31.
Table 7. Comparison of predicted environmental effects of each alternative

<table>
<thead>
<tr>
<th>Resource Area</th>
<th>No Action</th>
<th>Proposed Action</th>
<th>Noncommercial Funding Alternative</th>
</tr>
</thead>
<tbody>
<tr>
<td>Botanical resources</td>
<td>No effect on any sensitive plant species.</td>
<td>May affect individuals, but not likely to result in a trend toward federal listing.</td>
<td>May affect individuals, but not likely to result in a trend toward federal listing.</td>
</tr>
<tr>
<td>Cultural resources</td>
<td>May adversely affect cultural resources through natural mortality where fire weakened trees may uproot and/or fall within archaeological sites and disturb them.</td>
<td>Low risk to cultural resources due to project design features such as directional felling and site monitoring.</td>
<td>Proposed road closures benefit cultural resources.</td>
</tr>
<tr>
<td>Roadless resource</td>
<td>No treatments in IRAs.</td>
<td>No treatments in IRAs.</td>
<td>No treatments in IRAs.</td>
</tr>
<tr>
<td>Watershed resources</td>
<td>No additional soil disturbance; gradual recovery.</td>
<td>Some soil disturbance from project activities; immediate increase in ground cover.</td>
<td>Some soil disturbance from project activities; immediate increase in ground cover.</td>
</tr>
<tr>
<td>Wildlife resources</td>
<td>No immediate effect on sensitive animal species. Opportunity for accelerating establishment of forested habitat would be foregone. Greatest amount of down woody material over time. Down woody debris provides important habitat but also increases risk of later high intensity fire. Highest retention of standing burned forest.</td>
<td>May affect individuals, but not likely to result in a trend toward federal listing. Accelerated development of forested habitats to support California spotted owls, and goshawks. Greatest increase in short-term down woody material and least risk of high intensity fire in the future. Moderate to high retention of standing burned forest.</td>
<td>May affect individuals, but not likely to result in a trend toward federal listing. Moderate increase in immediate down woody material, moderate long-term effects on down woody material, and moderate to high retention of standing burned forest.</td>
</tr>
</tbody>
</table>
Chapter 3 - Affected Environment

Air Quality

*General Meteorology, Climatology, and Transport Mechanisms*

The analysis area lies within the Kern County Air Pollution Control District but in close proximity to the San Joaquin Valley Unified Air District. The Class I Domeland Wilderness airshed lies to the north east of the analysis area.

Air movement is restricted in both vertical and horizontal directions. Vertical air movement is restricted by radiation and subsidence inversions. The meteorology of the San Joaquin Valley has a significant influence on pollutant transport and ozone and secondary particle formation in the region. Weather patterns moving from California’s Central Valley carry pollutants generated in the valley and deposit them in the central and southern Sierra Nevada foothills and mountains (Zabic and Seiber 1993). An assessment of the impacts of transported pollutants on ozone concentrations by the California Air Resources Board in 1993 indicates that transport of pollutants from the broader Sacramento Area, San Francisco Bay Area, and the San Joaquin Valley has overwhelming impact on the central and southern Sierra Nevada including the project area.

The following District regulations may directly or indirectly affect prescribed burning in the planning area:

**Public Nuisance (Rule 4102)** – Prohibits air discharge of material that causes nuisance or annoyance to any considerable number of people.

**Prescribed Burning and Hazard Reduction (Rule 4106)** – This rule was adopted June 21, 2001, in response to California’s Title 17, and is designed to permit, regulate, and coordinate the use of prescribed burning and hazard reduction burning while minimizing smoke impacts on the public.

**Fugitive Dust (Regulation 8)** – The existing Regulation 8 rules were developed to implement control strategies for major sources of dust. These include: construction, demolition, excavation, extraction, handling/storage, landfills, paved/unpaved roads, and open areas. EPA has recently cited deficiencies in these existing rules and the District is evaluating a series of new rules aimed at further reductions in particulates.

**Current Air Quality Conditions**

The Central Valley District is considered to be in Federal non-attainment (not meeting standards) for ozone and PM$_{10}$ (particulate matter less than 10 microns in diameter). The District is considered to be in severe non-attainment for ozone and serious non-attainment for PM$_{10}$ (Procter 2003).
Visibility conditions in the Sierra Nevada improve from south to north and from low elevations to high elevations. Visibility conditions at Sequoia and Kings Canyon National Parks, one of the southernmost and lowest elevation areas, are some of the worst visibility conditions among western Class I Areas, which are one of the three classes of areas provided for in the Clean Air Act for the Prevention of Significant Deterioration program. Class I areas are the "cleanest" area and receive special visibility protection. They are allowed very limited increases (increments) in sulfur dioxide and particulate matter concentrations in the ambient air over baseline concentrations. The Interagency Monitoring of Protected Visual Environments (IMPROVE) site at Dome Land Wilderness is considered representative of visibility conditions in the planning area. This site shows high nitrate concentrations, indicating an urban influence.

Amounts of ozone have increased in the San Joaquin Valley as a result of increased levels of nitrogen compounds and volatile organic compounds. The Forest Service and National Park Service have tracked injury to conifers in the southern Sierra Nevada since 1991. Some of the earliest plots have been evaluated for over 20 years. The data confirms injury in Jeffrey and ponderosa pines, with the bulk of injury occurring in stressed trees. There are inadequate monitoring and research data to fully understand the physiological effects.

Nitrogen compounds in the air have shown an overall increase compared to the native system though the total amount has not been quantified. Bytnerowicz (2003) found that wet deposition of nitrogenous and sulfurous pollutants were the highest at elevations below 7,000 feet on the western slopes of the Sierra Nevada. Deposition from urban and agricultural sources may be approaching saturation in southern areas of the Sierra. Fugitive dust from roads has not been monitored. Nor has traffic on unsurfaced roads and motorized trails within the project area been tracked.

Project area emissions of greenhouse gases such as carbon dioxide, which may play a role in climate change, are not currently monitored, but are likely to be quite small. While the difficulties of modeling and measuring carbon emission pulses associated with wildfires have been well documented (Wiedinmyer and Neff 2007), greenhouse gas emissions associated with the 2008 Piute Fire, in contrast, were likely quite large. Though only a portion of the fire area burned intensely—with high rates of vegetative consumption and mortality—it has been shown that greenhouse gas emissions from wildfires in California annually contribute 24 million metric tons (MMT) of carbon dioxide (CO₂) to the statewide total (California Energy Commission (CEC) 2006); this is approximately four times the average emissions associated with forestry each year (CEC 2006).

Archeology

Fifteen cultural resource sites have been previously identified within the project area and an additional 30 cultural resource sites have been identified through current survey efforts. Many portions of the analysis area have been previously surveyed for cultural resources. These surveys often had variable coverage depending upon types of treatments. These previous surveys, though
conducted to current standards of their times, are not as intensive or as thorough compared to today’s standards. For the purposes of this project, the entire area was resurveyed to meet current standards.

**Field Methods**

The project area consists of approximately 2,300 acres within the Piute Fire area. The area of potential effect (APE) for this project consists of the approximate 2,300 acres directly affected by this proposed project. Most of the project area has been previously surveyed for cultural resources over the past 20 to 30 years. Of the APE, 100 percent was surveyed for this project with a combination of intensive and general coverage from June 2009 through October 2009. Coverage was dictated by a combination of terrain (many of proposed project areas cross slopes which exceed 50 percent), vegetation, and degree of previous survey coverage. Steeper slopes that had been previously surveyed and that had little likelihood of harboring previously undiscovered resources received general survey coverage. Those parts of the APE located on slopes less than 50 percent received intensive survey in the form of transects spaced approximately on 15 meter centers (terrain and vegetation permitting).

**Results**

A total of 15 previously identified sites and 30 newly identified sites were located as a result of this project. The identified sites in the project area are comprised of a mixture of historic-era remains (cabin remnants, mining operations, can dumps) and prehistoric remains including lithic scatters, bedrock mortar features, and possible lithic quarry sites.

**Botany**

The botanical review looked at the potential for this project to affect federally listed plant species, and R5 Forest Service sensitive plant species.

Springville clarkia (*Clarkia springvillensis*), is listed by the FWS as threatened, and is restricted to the foothills of the Tule River drainage. There is neither potential habitat nor likelihood for it to exist within the analysis area for this project; therefore, it may be eliminated from further consideration and preparation of a separate Biological Assessment (BA) is not required. Bakersfield cactus (*Optunia basilaris* var. *treleasei*), is listed by the FWS as threatened. It is endemic to a limited area of central Kern County in the vicinity of Bakersfield. There is neither potential habitat nor likelihood for it to exist within the Piute Fire Restoration Project or analysis area, therefore, it may be eliminated from further consideration and preparation of a separate BA is not required.

Keck’s checkerbloom (*Sidalcea keckii*) has potential to occur on the Sequoia National Forest, but currently is only known from outside the Forest to the west in clay soils below 1,400 feet. The proposed critical habitat for *Sidalcea keckii* falls entirely outside the national forest boundary. As such, this species may be eliminated from further consideration as well.
Eight R5 sensitive plant species were determined to have suitable habitat in the project area. However, only three of these have known populations that were confirmed and recorded within the project area during the survey process. All three species are located in numerous locations within areas proposed for management. One population of Palmer's mariposa lily, six populations of unexpected larkspur, and six populations of Piute buckwheat are known within units proposed for mechanical ground disturbance. San Bernardino aster, mountain moonwort, water fan lichen, three-ranked hump-moss, and broad nerved hump-moss are water-loving plants found in meadow environments. All equipment will be excluded from wet meadow and riparian areas. Additionally, these species were not found during surveys.

Most occurrences of unexpected larkspur and Piute buckwheat are found in conjunction with carbonate-influenced soils on or near marble outcrops within the project area. In addition to the past plant surveys, the areas of marble outcrop and carbonate-influenced soil were mapped within the Piute Fire Restoration project area off of air photos with field verification. Species accounts for species found within proposed treatment units follow.

**Palmer’s Mariposa Lily**

Palmer’s mariposa lily (*Calochortus palmeri* var. *palmeri*) is sparsely distributed across central and southern California from the Tehachapi Mountains and the La Panza Range south to the San Rafael, San Gabriel, San Bernardino, San Jacinto, and Santa Rosa mountains. The California Natural Diversity Database reports 33 occurrences of *Calochortus palmeri* var. *palmeri*. Although some of these are outside of National Forest System lands; at least 28 occurrences appear to occur within the Sequoia, San Bernardino, Angeles, and Los Padres National Forests.

**Taxonomy and Natural History:** *Calochortus palmeri* var. *palmeri* is a monocot in the lily family. *Calochortus palmeri* is separated into two varieties (C. *palmeri* var. *munzii* and C. *palmeri* var. *palmeri*) based on differences in their nectaries, the presence of bulblets, and whether the bracts are alternate or opposite. The ranges of these two varieties overlap, and plants in the San Jacinto and Santa Rosa mountains may prove to be *C. palmeri* var. *munzii*.

**Habitat Description:** *Calochortus palmeri* var. *palmeri* occurs in meadows, seeps, and vernally moist areas in chaparral, mixed conifer forest, and yellow pine forest at elevations of 3,300-7,200 feet (1,000–2,200 meters). Hoover describes habitat for *Calochortus palmeri* var. *palmeri* as being "along streamlets where soil is wet during growing season but drying in summer."

**Occurrence Status:** The northern most extent of *Calochortus palmeri* var. *palmeri* occurs on the Sequoia National Forest. Populations are located in the Breckenridge and Piute Mountain areas, in the extreme southern part of the Forest. In the Piute Mountains, many new populations (containing hundreds of plants) have been found during project surveys in recent years.

On the Los Padres National Forest, counts of flowering plants found near Chuchupate Ranger Station, were conducted in 1998 (30 plants), 2000 (140 plants), and in 2002 (92 plants). In 2003, an apparent banner year for the species, over 1,200 flowering plants were counted. The
variation in the number of plants observed is probably due to annual variations in the number of plants that produce flowering stems rather than due to increases or decreases in the total number of plants. The same person using the same methodology conducted all of these counts. Two newly discovered occurrences of Calochortus palmeri var. palmeri in and near Godwin Canyon consisted of over 2,000 plants.

On the San Bernardino National Forest, two new occurrences were discovered in 2004. One occurrence is located in the Maloney Canyon and Stove Flats area, half a mile south of Squint’s Ranch. This area was burned in 2003 in the Old Fire. Approximately 7,000 individuals were found in this area. The second occurrence is located in Grout Creek, north of Gray’s Peak, approximately 1½ miles north of Highway 38. Approximately 60 individuals were found at this location.

**Threats:** Calochortus palmeri var. palmeri can be affected by overgrazing, trampling, flooding, erosion, off-highway vehicles, and development projects. The species is most vulnerable to impacts from grazing between April and August, when the plant is flowering and setting seed. This taxon is also affected by dispersed and developed recreation. At least seven occurrences of Calochortus palmeri var. palmeri are located in protected areas: one on the San Bernardino National Forest near Big Bear Lake, where it occurs within a fenced meadow area with Sidalcea pedata, and the other six [American Canyon, Chuchupate, Chorro Grande, Godwin Canyon (two occurrences), and Manzana Creek/White Ledge] are in areas free of human disturbance on the Los Padres National Forest. Calochortus palmeri var. palmeri is reported to be "declining rapidly" due to grazing in wet meadow but there is little in the way of documented evidence that this is occurring. Recent focus on the Piute mountain area (of the Sequoia National Forest) for timber, fuels, and forest health projects, and off-highway vehicle use has both threatened populations and expanded knowledge of Calochortus palmeri var. palmeri populations in this area.

**Unexpected Larkspur**

Unexpected larkspur (Delphinium inopinum) has 32 reported occurrences, containing from approximately 10 to 100 plants in the smaller occurrences to (more often) hundreds or thousands in the larger colonies.

**Range/Distribution:** Delphinium inopinum is found in disjunct populations mostly in the Sequoia National Forest (the majority on the Monarch Divide, Slate Mountain, and the Piute Mountains), the Sierra National Forest (Monarch Divide), as well as in Sequoia National Park and on BLM land (near Lamont Peak), from Fresno County through Tulare, Inyo, and Kern Counties.

**Trend:** Unknown, assumed stable.

**Protection of Occurrences:** Occurrences along the Monarch Divide (Sierra and Sequoia National Forests) are in a remote area in the Monarch Wilderness, with no need of special protection. Some of the large colonies in the Slate Mountain complex are within a candidate
Botanical Area, but no specific protection measures have been established, other than management as a current Forest Service sensitive species. Populations outside these areas are protected (flag and avoid) where potential for damage exists.

**Threat(s):** On the Sequoia National Forest, the Summit National Recreation Trail (31E14) runs through the middle of the Slate Mountain colonies, putting them at some risk of adverse impact from 2-wheeled motorized and non-motorized traffic. Past and potential proposed recreation projects and timber sales on Slate Mtn. have also created potential threats requiring special management. The Piute Mountain occurrences also have potential threats from logging, mining, and motorized trail bike recreation.

**Fragility/habitat specificity:** *Delphinium inopinum* inhabits dry, rocky outcrops and open, rocky ridges in pine and red fir forests, at approximately 6,000 to 8,800 feet elevation. It is often found in association with Forest Service sensitive species *Eriogonum twisselmannii*, *E. breedlovei* var. *breedlovei*, and *Oreonana purpurascens*. The more rugged sites along the Monarch Divide are relatively stable, but the saddle along the top of Slate Mountain and the Piute habitats may be vulnerable to disturbances.

**Piute Buckwheat**

Piute buckwheat (*Eriogonum breedlovei* var. *breedlovei*) has approximately 10 known occurrences (with more likely). Two larger sites had counts of 700 and 850 plants each, and two small ones had less than 100. Most averaged approximately 100 to 200 plants each in 1997 monitoring surveys.

**Range/Distribution:** *Eriogonum breedlovei* var. *breedlovei* is endemic to the Piute Mountains of Kern County. All known occurrences are on Sequoia National Forest lands.

**Trend:** Vigor of most occurrences confirmed in 1997 and 2004 monitoring surveys, and the trend is considered stable.

**Protection of Occurrences:** Several sites are protected by inaccessibility of rock outcrops. Sites near potential timber harvest units are flagged for avoidance.

**Threats:** Timber harvest, logging, mining (potential).

**Fragility/habitat specificity:** *Eriogonum breedlovei* var. *breedlovei* is found primarily on metamorphic (limestone/dolomite) rock outcrops ridges, and summits (with at least occurrences on granitic), in open Jeffrey pine forests. Elevations range from approximately 7,000 to 8,300 feet. The species is often found in association with *Delphinium inopinum*.

**Economics**

**Access**

Access into the Piute Mountains is limited with only three main roads accessing the mountain top areas. Piute Mountain Road (County Road 501) traverses across the mountain from Kelso Valley on the east through Claraville to Walker Basin on the southwest. Jawbone Canyon Road
(County Road 589) accesses Claraville from the southeast. Saddle Springs Road (Forest Road 27S02) provides access from the Caliente-Bodfish Road near Bodfish to the northwest portion of the Piute Mountains, including the Piute Fire Restoration Project Area. The easiest access to the project area is on Piute Mountain Road from the east.

**Industrial Concerns**

The last remaining lumber mill in southern California is the Sierra Forest Products (SFP) mill located in Terra Bella. The closest mill following SFP is the Sierra Pacific Industries (SPI) mill in Chinese Camp, just west of Sonora, approximately three hours drive to the north. (This is the driving time from Terra Bella; the driving time from the project area is much longer.) The haul route is 135 miles to the SFP mill, and approximately 9.5 hours round trip, including “standby time.” Log truck haul costs from the project area to the nearest mill, SFP, exceed $97 per thousand board feet (MBF).

**Harvest and Logging Values (Market)**

Timber values are expected to be approximately $110/MBF for Alternative B. These are “log pond” values or the price of logs delivered to a mill. Prices the government receives for the logs are significantly lower after accounting for logging, haul, risk, and special protection costs. Due to the small logs produced, it is expected that the timber sales would appraise at a deficit. Table 8 (next page) provides a detailed breakdown of these estimated calculations as well as a general comparison of economic considerations for each alternative.

Approximately 89 percent of the proposed harvest or salvage volume was dead as of spring 2009 and 11 percent was estimated to be green timber expected to die based on the marking guidelines used to predict mortality. Of the dead volume 80 percent is white fir (or 71 percent of the total project volume). The Region 5 Supplement 2409.12-2005-2 of the Forest Service Handbook (FSH) 2409.12, Chapter 20 – Estimating Tree Volume and Weight, Exhibit 22.31e Tree Deterioration Guide – True Fir, estimates that after two years, fire-killed white fir, less than 15 inches in diameter, deteriorates to only 18 to 27 percent of its pre-fire useable volume. Hauling log loads that are only 25 percent “salvageable timber” is not economically feasible. Harvest alternatives considered under this analysis include only trees in excess of 16 inches d.b.h.

Helicopter logging costs will be $300 to $400 per MBF, excluding haul costs, causing any such alternative considering helicopter to be uneconomical. Potential purchasers may not be interested in the project because of these costs.

At current market rates and logging costs, a timber sale is expected to be a deficit offer, meaning the government appraises it to cost the average purchaser more than the purchaser would earn. The receipts to the government, (due to the application of minimum rates) could be used to help subsidize some of the understory ladder fuels thinning and/or underburning.
Table 8. General economic comparison between alternatives

<table>
<thead>
<tr>
<th>Stumpage Calculations</th>
<th>Alternative A No Action</th>
<th>Alternative B Proposed Action – Salvage Total or Average</th>
<th>Alternative C Noncommercial Funding Alternative</th>
</tr>
</thead>
<tbody>
<tr>
<td>Volume (MBF)</td>
<td>0</td>
<td>3,296</td>
<td>0</td>
</tr>
<tr>
<td>Cost Center ($/MBF)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Logging Cost Stump to Truck Haul</td>
<td>0</td>
<td>96.16</td>
<td>*24.86</td>
</tr>
<tr>
<td>Other Purchaser Logging Costs</td>
<td>0</td>
<td>39.15</td>
<td>0.00</td>
</tr>
<tr>
<td>BD Deposit</td>
<td>0</td>
<td>8.26</td>
<td>0.00</td>
</tr>
<tr>
<td>Sub-Total Stump to Mill Cost 10% Risk</td>
<td>0</td>
<td>338.97</td>
<td></td>
</tr>
<tr>
<td>Total Stump to Mill Cost</td>
<td>0</td>
<td>372.87</td>
<td></td>
</tr>
<tr>
<td>Delivered Log Price</td>
<td>0</td>
<td>$109.29</td>
<td>0.00</td>
</tr>
<tr>
<td>Appraised Deficit</td>
<td></td>
<td>$266.42</td>
<td></td>
</tr>
<tr>
<td>Appraised Indicated Stumpage</td>
<td>0</td>
<td>$2.85</td>
<td>0.00</td>
</tr>
<tr>
<td>Total Appraised Value</td>
<td>$0</td>
<td>$9,403</td>
<td>$0</td>
</tr>
<tr>
<td>Project Costs</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>NEPA Analysis</td>
<td>$340,000</td>
<td>$340,000</td>
<td>$340,000</td>
</tr>
<tr>
<td>Sale Preparation &amp; Contract</td>
<td>$0</td>
<td>$142,816</td>
<td>*$21,422</td>
</tr>
<tr>
<td>Sale/Contract Administration</td>
<td>$0</td>
<td>$64,635</td>
<td>*$16,159</td>
</tr>
<tr>
<td>Road Decommissioning</td>
<td>NA - Decision Only</td>
<td>NA - Decision Only</td>
<td>NA - Decision Only</td>
</tr>
<tr>
<td>Fuel Treatment – Acres Non Salvage</td>
<td>$0</td>
<td>1,981</td>
<td>2,328</td>
</tr>
<tr>
<td>Fuel/Safety Treatment – Acres Salvage</td>
<td>$0</td>
<td>347</td>
<td>0</td>
</tr>
<tr>
<td>Fuel Treatments – Other than TSC</td>
<td>$0</td>
<td>$1,471,431</td>
<td>$1,760,753</td>
</tr>
<tr>
<td>Regeneration Acres</td>
<td>0</td>
<td>510</td>
<td>510</td>
</tr>
<tr>
<td>Nursery – Seedlings</td>
<td>$0</td>
<td>$29,453</td>
<td>$29,453</td>
</tr>
<tr>
<td>Hand Plant Conifers</td>
<td>$0</td>
<td>$44,625</td>
<td>$44,625</td>
</tr>
<tr>
<td>Hand Release Year 1</td>
<td>$0</td>
<td>$89,250</td>
<td>$89,250</td>
</tr>
<tr>
<td>Hand Release Year 2</td>
<td>$0</td>
<td>$0</td>
<td>$0</td>
</tr>
<tr>
<td>Total Regeneration Costs</td>
<td>$0</td>
<td>$163,328</td>
<td>$163,328</td>
</tr>
<tr>
<td>Total Cost</td>
<td>$340,000</td>
<td>$2,182,209</td>
<td>$2,328,089</td>
</tr>
</tbody>
</table>

* Reflects costs of noncommercial contracts for removing trees to a landing for disposal.

All alternatives require significant appropriated funds expenditure for the mechanical hazard reduction, fuels treatment, pile and prescribed understory broadcast burning, and reforestation.

Forest Vegetation

Most of the acreage in the Piute Fire burned under hot, windy conditions. It created a mosaic of live and dead vegetation, affecting native vegetation types shown in the table below. Of approximately 30,310 forested acres on National Forest System lands, about 18,890 acres, or 60 percent, had high (more than 75 percent) tree mortality and are considered deforested. Many deforested areas were left with no living trees, in openings from less than one acre to several hundred acres in size. Areas not deforested sustained moderate (50 to 74 percent) or low (0 to 49 percent) tree mortality. Mortality was mapped at the time of fire containment using LANDSAT satellite imagery.
The 2001 and 2004 Sierra Nevada Forest Plan Amendments identify the Piute Mountains as having primarily Eastside Sierra forest types (See data from the R5 remote sensing lab at: http://www.fs.fed.us/r5/rl/projects/gis/data/vegcovs/ssierran/EvegTile37B_01_24k_v1.zip). Major tree species include Jeffrey pine, white fir, black oak, singleleaf pinyon pine, and western juniper. Less common, or restricted to localized areas, are grey pine, ponderosa pine, sugar pine, live oaks, and blue oak. The California Wildlife Habitat Relationships System vegetation types impacted by the Piute Fire are summarized in Table 9.

Table 9. Vegetation summary

<table>
<thead>
<tr>
<th>Vegetation Type</th>
<th>Acres</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Deforested</td>
</tr>
<tr>
<td>Jeffrey Pine</td>
<td>8,965</td>
</tr>
<tr>
<td>Pinyon-Juniper</td>
<td>5,770</td>
</tr>
<tr>
<td>Mixed Conifer</td>
<td>2,405</td>
</tr>
<tr>
<td>Oaks (Black, Blue, Canyon Live)</td>
<td>1,280</td>
</tr>
<tr>
<td>Jeffrey Pine Plantations</td>
<td>465</td>
</tr>
<tr>
<td>Chaparral/Sagebrush/Grass/Barren</td>
<td></td>
</tr>
<tr>
<td>Non-National Forest System Ownership</td>
<td></td>
</tr>
<tr>
<td>Total</td>
<td></td>
</tr>
</tbody>
</table>

**Jeffrey Pine Forest**

Jeffrey pine is the most common forest type within the burned area. Stands are dominated by Jeffrey pines, often with minor components of white fir or black oak. Brush species, including mountain whitethorn, manzanita species, and bitter cherry, are commonly found in the understory. Many of the accessible Jeffrey pine stands are roughly 100 years old, but are densely stocked and have trees too small for commercial salvage harvest. Most of the Piute Fire mortality in Jeffrey pines occurred on steeper slopes or in dense stands where the fire intensity was highest.

**Pinyon-Juniper Woodland**

These are open stands primarily of single-leaf pinyon pines, growing along with western juniper, mountain mahogany, rabbit brush, and sagebrush. This type dominates the dry, eastern portion of the Piute Fire area. Much of the Pinyon-Juniper burned during high wind conditions, which resulted in high mortality.

**Mixed-conifer Forest**

Mixed conifers are found at the higher elevations, roughly between Piute Peak and Inspiration Point. Stands consist of white fir and Jeffrey pine, with black oak present in some areas. Common shrubs are bitter cherry, mountain whitethorn, manzanita, and ribes species. In this forest type, the montane shrubs often form dense brushfields following high and moderate intensity wildfires. The white fir, especially while still young, are more susceptible to damage
and mortality from wildfire, when compared to the Jeffrey pine on the same site. Black oak is also easily harmed by fire, but new growth can sprout vigorously immediately after the fire.

**Oak Forest**

Pockets dominated by black oak are found within the Jeffrey pine and mixed conifer types. Canyon live oak and interior live oak stands are found on dry or rocky sites where the environment is less favorable to competing conifers. Minor populations of blue oak are found at lower elevations at the northern edge of the burn area. The oak types are heavily influenced by historic and modified fire regimes. Hot fires that kill competing conifers usually only kill the above-ground portions of the oaks. The burned trees sprout vigorously from the root collar of the oak stumps. Acorns provide a secondary source of new trees.

**Jeffrey Pine Plantations**

District records indicate there are about 820 acres of Jeffrey pine plantations in the burn area. These were created following regeneration harvesting over the past 40 years. Planting survival and growth in the plantations was typically good. Brush competition was mostly from bitter cherry and ribes species. Roughly half of these plantations have been deforested by the Piute Fire, with the others experiencing little to moderate damage.

**Chaparral**

Many low elevation areas are dominated by chaparral brush species like chamise, manzanita species, and scrub oak. This plant community is well adapted to regenerating itself by sprouting or seed germination following wildfires.

**Forest Insects and Diseases**

There is always concern following a large disturbance like the Piute Fire that surviving, but weakened, trees will be further damaged or killed by forest insects and diseases. Portions of the Piute burn were inspected by Forest Service Forest Health Protection (FHP) staff entomologists and pathologists prior to (Bulaon et al. 2005, Bulaon and MacKenzie 2007) and following the Piute wildfire (Bulaon et al. 2009).

Current red turpentine beetle attacks on the lower boles of fire-injured pines are at low levels. Some beetle attacks may continue to occur, but are not expected to significantly spread or contribute to additional tree mortality for this project. There has been no indication of significant activity by other bark beetles in the area. No recently infested trees were found and no pattern of recent crown fading (other than from fire injury) was observed in 2009 that would indicate significant losses are expected for this project.

There is some current activity from flatheaded borers and ambrosia beetles, primarily in fire-killed and fire-injured white firs. The activity is most common under fire-scorched areas of the bark. The woodborers are frequently associated with clear pitch streaming and whitish boring
dust on the bark and at the base of trees. From field observations, there is no evidence for this project that the number of bark beetles and woodborers are growing in population to infest and cause significant damage by killing more fire-impacted trees or spreading into adjacent unburned areas.

Two native tree diseases exist within the Piute burn that could impact stands treated under this proposed project. The first is dwarf mistletoe, a parasitic plant that depends on the host tree for water and nutrients. These plants are host specific, with different species of dwarf mistletoe infecting one species of tree or a group of closely related species. In the Piute Mountains, populations of dwarf mistletoe are widespread, usually at low, endemic levels. However, some stands are heavily infected, with evidence of the disease on every acre. These parasites slowly weaken or kill host trees, cause growth abnormalities, or predispose trees to insect infestation or decay (MacKenzie and Bulaon 2007). Dwarf mistletoe seeds disperse from the fruiting bodies and often fall onto the smaller understory trees, infecting the next generation of host plants. Because of this tendency, reforestation prescriptions for areas planted under this project will give direction to avoid planting susceptible seedlings directly under live host trees.

The second disease of concern is annosus (*Heterobasidion annosum*) root rot. This disease affects the roots and lower boles of infected trees. In pines, trees are usually killed directly by the disease, while in true firs the fungus causes wood rot, which leaves the trees susceptible to bark beetle attack and windthrow. The disease spreads when wind-blown spores land on freshly cut stumps or broken lower boles. The fungus grows within the stump and into the roots. If infected roots come into contact with the growing roots of uninfected trees, the fungus can invade the latter and spread to new host trees. Disease centers can spread slowly outward, and the fungus can survive in dead roots for as long as 50 years (Smith 1993).

**Fuels**

Currently, surface fuel loading is low in areas that burned at moderate to high intensity. Much of the ground is bare with no fuels to carry a fire. Dead standing trees have not yet begun to fall and accumulate. Many of the live trees have remaining foliage on the upper third of their canopies. Needle cast from these dying trees moderately covers shaded areas. Grasses and forbs are reestablishing in the open areas, but are too sparse to allow continuous fire spread. Brush is also beginning to re-sprout. Areas that burned with low intensity resulted in lighter fuels being partially consumed, and larger, heavier fuels remaining. Wildland fires within the Piute Fire perimeter should be of low intensity and small in size for the next 5 or more years.

A threshold limit is the point that fire behavior characteristics become undesirable. By not exceeding these limits, the predicted fire behavior is generally favorable for direct attack on all portions of a wildfire. This would result in a safer fire environment for firefighters or members of the public that may need to escape a future fire in or adjacent to the project area. The management of future wildfires would have a higher probability of success when the fire behavior does not exceed the threshold limits.
The FlamMap model (Finney 1998) was used to conduct a coarse level analysis of three fire behavior characteristics over the analysis area: flame length (feet), heat per unit area (BTU/sq ft), and rate of spread (chains/hour). As a fire behavior characteristic value increases, the more severe that characteristic becomes. See the table below for the threshold limits used in this document.

### Table 10. FlamMap fire behavior characteristics thresholds

<table>
<thead>
<tr>
<th>Fire Behavior Characteristics</th>
<th>Description</th>
<th>Threshold Limit</th>
</tr>
</thead>
<tbody>
<tr>
<td>Flame Length</td>
<td>The average distance from the base of the flame to the tip.</td>
<td>4 feet</td>
</tr>
<tr>
<td>Heat/Unit Area</td>
<td>Amount of heat released in the flaming front measured in BTUs per square foot.</td>
<td>1,000 BTU/ft</td>
</tr>
<tr>
<td>Rate of Spread</td>
<td>The speed the fire spread measured in chains per hour. 1 chain = 66 feet and 80 chains = 1 mile.</td>
<td>5 chains/hour</td>
</tr>
</tbody>
</table>

**FlamMap Analysis**

The following table displays the results of the FlamMap analysis for the Piute Fire Restoration Project for its existing condition. Table 11 shows that 96 percent of the Piute Fire is estimated to be at or below the threshold for heat/unit area; 86 percent is estimated to be at or below the threshold for flame length; and 84 percent is estimated to be at or below the threshold for rate of spread. These are the FlamMap results from the Piute Fire as a whole (37,254 acres).

Under the existing condition, areas that burned at moderate to high severity have low surface fuels and meet desired conditions. Areas that burned with low intensity retained high levels of surface fuels and exceed desired condition thresholds.

### Table 11. Existing condition of fire behavior characteristics at or below threshold limits for the entire Piute Fire (37,254 acres)

<table>
<thead>
<tr>
<th>Fire Behavior Characteristic</th>
<th>Existing Condition</th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Acres at or Below Threshold Limits</td>
<td>% of Acres at or Below Threshold Limits</td>
<td></td>
</tr>
<tr>
<td>Heat/Unit Area (&gt; 1,000 BTUs/ft/sec)</td>
<td>31,548</td>
<td>96</td>
<td></td>
</tr>
<tr>
<td>Flame Length (&gt; 4.0 foot)</td>
<td>31,909</td>
<td>86</td>
<td></td>
</tr>
<tr>
<td>Rate of Spread (&gt; 5.0 chains/hour)</td>
<td>31,219</td>
<td>84</td>
<td></td>
</tr>
</tbody>
</table>

Dead trees that are not removed would contribute to extremely high fuel loading in the next 10 to 20 years. As dead trees fall, surface fuels would increase significantly affecting future fire behavior and suppression capabilities. Fireline construction in areas with numerous large logs would be significantly slowed or have a high resistance to control. Over time, shrub growth interspersed with the large logs would exacerbate effects on fire behavior and suppression capabilities. High resistance to control can lead to larger fires since fire lines have to be relocated.
to areas with less vegetation and/or heavy fuels where tractor lines can be readily constructed (on flatter ridge tops for example).

**Minerals, Special Uses, and Lands**

*Special Uses/Lands*

Within the project area, special uses currently permitted include outfitter guides (bear hunters) and one road permit that leads to private property. Periodically recreation events are permitted, but there are no current or pending applications for such events.

There are three private landowners adjacent to the project area. One of these parcels has an access road, across NFS land, for which a special use permit exists. This permitted road is on the border of the project area. Some of the roads within the project area are also required for access to the other private parcels.

*Minerals*

The Piute Restoration area is open to mineral entry under the Mining Law of 1872, as amended. Most of the past mining operations have been abandoned for several decades. Currently there are two active mining claims within the project boundary. Neither of these fall within the areas proposed for treatments. The mine claimants may require use of some of the roads within the project area to access these claims.

Several abandoned mines exist within or in close proximity to the project area. These abandoned mine sites may have hazardous mine openings, structures, old equipment and trash left from past occupancy.

Four Comprehensive Environmental Response Compensation and Liability Act (CERCLA) sites exist within the project area. These are sites with hazardous materials from past mining operations. A CERCLA removal action has been completed at the Bright Star tailings, burying the tailings on site, and at the French Meadow Mine site, burying the mine tailings and reopening the stream channel. The French Camp site was recently discovered a short distance down the road from the French Meadow Mine site. The French Camp site is closed to public access until site investigations and cleanup are complete. At the Jennette Grant site, the Piute Fire burned off the vegetation that was holding the tailings on the slope. A post fire BAER project was initiated to temporarily stabilize the tailings on the slope.

The Moreland Mines Reclamation project is planned for implementation in 2010 and 2011. This project will close mines and rehabilitate the sites at nine abandoned mines in the Alaska Flat and Weldon Meadow area. Four of these sites are in the Piute Restoration Project treatment areas. These sites are Evening Star, Mary Etta, Weldon Meadow, and Weldon Meadow Dolomite. Mine reclamation activities include removing debris from burned structures and other trash, closing the hazardous mine openings, re-contouring the slopes to natural conditions, and closing the access roads (except for Mary Etta, which is a system road).
Recreation

*Description of Trail Network*

The recreation resource within the Piute Fire perimeter primarily consists of a network of single-track motorcycle trails, comprised of both Forest Service system trails and user-created trails. All of the camping is dispersed; there are no developed campgrounds in the project area. The area receives heavy use during hunting season, which is from mid-August to late-October.

Numerous trails in the Piute Fire area have been damaged. Maintenance and rehabilitation of National Forest System Trails is ongoing. Falling trees will create an increased workload over the long-term to maintain the trails to Forest Service standards. Regulatory, informational and directional signs have been damaged during the fire and are being replaced.

*Inventoried Roadless Area (IRA)*

The Woolstalf Roadless Area covers much of northern and eastern portions of the project area. The most recent guidance on the management of Forest Service Roadless Areas comes from the Secretary’s Memorandum 1042-154, ordered on May 28, 2009. The memorandum reserves the decision-making authority to the Secretary of Agriculture “over the construction and reconstruction of roads and the cutting, sale, or removal of timber in inventoried roadless areas.”

Motorized trail use in the roadless area is ongoing and will be analyzed through the Travel Management (TM) Rule. Travel Management Planning for the Piute Mountains was deferred pending analysis of effects of the fire. In both the proposed action and the modified action, the cutting, sale, and removal of timber would be done outside the boundaries of the Woolstalf Roadless Area. Only existing roads will be used. Therefore, the Woolstalf Roadless Area will not be analyzed in depth in the Environmental Consequences section of this document.

*Recreation Opportunity Spectrum*

The recreation opportunity spectrum (ROS) is the basic inventory that provides a zoning backdrop of what types of uses are desired on a landscape-level in Forest planning (USDA forest Service 1982). The following are recreation opportunity spectrum classes found within the project area:

**Landscape-level Desired Conditions in Project Area**

- Natural/Roaded
- Semi-primitive/Motorized
- Semi-primitive/Nonmotorized

**Designed Use of Trails**

The desired condition for National Forest System Trails (NFSTs) is found in FSH 2309.18. Following the trail management objectives (TMOs) for each trail in the project area, the
guidance is abundant regarding the design parameters in which each trail should be maintained. In the post-fire environment in the Piute Mountains, there are some special considerations that will be important to implement when reconstructing the trails to their designed use.

Special Considerations for Reconstructing Piute Fire Trails

- Use grade reversals, knicks, and rolling grade dips to drain water from the trails where feasible.
- Waterbars are less effective and harder to install correctly. Even when installed correctly waterbars have a high-probability of failure (USDA Forest Service 2007).
- Since many of the trails are single track, Trail Class 2 & 3 motorcycle trails, care should be taken to ensure that tread width and clearing limits are not exceeded.
- The combination of the Piute Fire, subsequent clearing efforts, and removal of hazard trees could have an unintended effect of making the area more accessible to all-terrain vehicles (ATVs). ATVs would negatively impact the National Forest System Trail’s designed use.
- Appropriate signage should replace signs damaged in the fire to inform the public about designated routes and regulations. Signing the routes and enforcement are the most effective ways to prevent the proliferation of more unauthorized trails in the area.

Watershed Resources

The existing conditions of the soils and watersheds in the Piute Fire area consist of hillslope rilling and channel scour. These were caused by the fire, which removed the forest floor cover, and subsequent intense rainfall with about a 10-year, 5-hour-frequency and duration event. Recovery of ground cover in the 11 months following the fire has been minor, and watersheds in the project area have been affected by increases in runoff and sediment delivery. Hillslope soil erosion losses have been extensive. Further erosion has occurred in beds and banks of first- and second-order streams in the area. Much of the eroded material is sequestered in the bed and valley bottoms of area streams.

Soils

Soils in the project area are mainly of granite origin and display signs of the classic decomposed granitics, which include low productivity with high erosion risk from sheetwash and dry ravel. These soils have low clay content and therefore resist compaction (Gomez et al. 2002). The other soil types are of metasedimentary origin. These soils have a finer texture and more fertility than the granitics.

The majority of the units contain high percentages of bare soil and low amounts of large woody debris. This is a result of the fire and the subsequent removal of ground cover. Although a low percentage of the area within units was burned at a high severity, the erosive nature of the granitic soils and the occurrence of a high-intensity rainfall event immediately following the fire
have caused massive erosion across the landscape in the high and moderate intensity burned areas.

The area with the highest observed burn severities and erosion are associated with units in South Fork Erskine Creek headwaters, along road 28S17. The fire appears to have come from west of the project area and heavily burned west-facing slopes and lightly burned the eastern slopes. The intense post-fire rainfall event was concentrated in this area.

**Soil Productivity**
Soils in high and moderate burn severity areas have little soil productivity. This is due to the consumption of the soil organic layer, needles, and fine tree branches where the majority of the nutrients were before the fire. These nutrients generally move into the soil. Soil erosion has resulted in a loss of nutrients.

**Soil Erosion**
The soil erosion rates for the high and moderate severity lands are approximately 63.09 tons/acre. The intensely burned areas in the Erskine Creek area exhibit rill and gully erosion. Rill spacing of 3 to 4 feet and depths up to 4 to 18 inches trending toward gully formation occur in localized areas. Erosion is independent of parent material or moderate versus high burn severity. The only areas that are not eroded are the unburned and low severity areas.

**Effective Soil Cover**
Currently, resistance to erosion is very low in the units due to little effective soil cover. This is evident by the high bare soil values found during soil surveys. In units without vegetative ground cover, rock fragments currently provide soil cover.

**Downed Woody Material**
Large down logs per acre in the surveyed treatment units is minimal following the Piute Fire. As a result, only three of the units are currently at a desirable level for large woody material of 5 to 10 tons/acre as recommended by Brown et al. (2003).

**Litter and Duff**
Fine organic matter is lacking in the fire area as plant litter, duff, and woody material less than three inches in diameter was consumed during the fire. There are significant areas in many units with a thin ash layer, on order of a few millimeters thickness. However, partially burned litter and duff does exists. Ash, when dry, does not serve as a sufficient buffer to rainfall, and therefore, was not counted as effective cover.

**Stream Conditions and Sediment**
All incidences of surface flow in the project area are at geologic contacts or down slope and near enough to contacts that they may be attributed to the same. On the west side of the project area
perennial or seasonal flow occurs at about the 8,000 foot elevation in the form of seeps, developed springs and minor flow in incised draws. This contour marks the approximate contact between granitics and the older, stratigraphically higher limestone inclusions in the metamorphic sedimentary on top and lower end of King Solomon’s Ridge. Similarly, incidence of surface flow in the eastern portion of the project area, in the Kelso Creek watershed, is in shallow swales within the granitics, below a contact with limestone edging the undifferentiated metamorphic rocks that are exposed on the ridge top on the eastern slopes. In these cases, flow emerges from loose sand alluvium in recently scoured channels. All the watershed streams are largely ephemeral (forest GIS data confirms this), though many contain isolated springs and meadows as described above, they do not necessarily connect to main stem channels and flow outside the project area.

Many 0 and 1st order channels, and virtually all 2nd and 3rd order channels examined in and around project treatment units, show scour and/or aggradation, which are most likely all effects of the storms of July 14-15, 2008. Scour was typical in the steeper lower order channels (0-1st), while the larger, high order channels usually showed an alternating pattern of scour and deposition, particularly in the western portion of the project area, where the rainfall intensity was highest. While heavy rilling obviously carried a large amount of sediment to the channels, water energy of hillslope runoff also scoured the larger channels, in the case of Clear Creek up to 5 and 6 feet. Channel scour and hillslope derived sediments frequently did not travel far, en masse, but rather deposited in fans upstream of constrictions in the channel or particularly broad valleys. Some of these movements may have been in the form of debris flows. The fan material carried large rocks and some woody debris. Suddenly unladen stream flow energy was increased and capable of further scour downstream, setting up a pattern of scour and deposition. In this manner, a significant amount of eroded material is sequestered yet in the channel of the project area watersheds.

Road Conditions

Major access roads in the project area were noted as in good shape, with no rilling on road surfaces evident, and cleared culvert relief or cross drains where they existed. Generally, roads are out-sloped, which provides wide-ranging, dispersed flow over the sides instead of at concentrated discrete points. Despite heavy rains of the previous summer and the burn condition, incidences of rilling on hillslopes at apparent road drainage points were few. Rills on the hillslopes were overwhelmingly generated from rainfall water collected on the hillslopes themselves. Culverts have been cleared from BAER efforts. Because of relatively low density of drainage features on the hillsides, the incident of culvert crossings is correspondingly low. Secondary routes are also in generally good repair, either through recent BAER efforts or apparent low traffic use.
Wildlife

**Threatened, Endangered, and Sensitive Species**

Terrestrial and aquatic species addressed in this analysis include the California spotted owl, the northern goshawk, and the yellow-blotched salamander. These are Forest Service sensitive species. Other threatened and endangered species that have the potential to occur within the Sequoia National Forest were eliminated from detailed analysis based on various criteria relating to the scope and intensity of the project, timing of project, habitat requirements, and/or species geographic range. These species and the reasons they were not analyzed in detail are addressed in the wildlife working papers for this project. As a result, a “no effect” determination has been made for threatened and endangered species.

**California Spotted Owl**

The Kern River Ranger District has identified three California spotted owl protected activity centers (PACs) and associated home range core areas (HRCAs) for three separate spotted owl pairs in the Piute Fire perimeter. Beck and Gould (in: Verner et al. 1992) identified the Piute Mountains as a part of an area of concern, Gap C, regarding spotted owl distribution. It was identified in part, because small semi-isolated groups of spotted owls occur in the few areas at elevations where habitat persists at the southern end of the Sierra Nevada. Small isolated populations can become more vulnerable to extinction by local stochastic or catastrophic events. The Piute Fire was such an event that removed large tracts of previously suitable habitat for spotted owls. Gap C represents the gap between suitable spotted owl habitat at the end of their range in the Sierra Nevada and isolated mountains with suitable spotted owl habitats in southern California approximately 30 miles or more to the south and west. This natural gap in habitat is the result of existing geographic and topographic influences on vegetation.

The California spotted owl selects habitat for nesting, roosting, or foraging that have structural components of old forests. Occupied stands tend to have a greater representation of large old trees (trees with cavities, broken tops, etc.); higher live tree basal area; a multi-layered condition; higher canopy cover; and an availability of large, live trees, snags and downed logs (California Department of Fish and Game 2005; Verner et al. 1992; USDI Fish and Wildlife Service 2006). The species appears to be intolerant of high temperatures (California Department of Fish and Game 2005), with most roost locations occurring in areas where dense multi-layered canopy exist. The selection of mature, multi-layered stands is also evident for breeding and nest selection (California Department of Fish and Game 2005). Occupied spotted owl sites in California have occurred most frequently in mixed conifer forests (80 percent). Limited occupancy however is also noted in red fir forests (10 percent), ponderosa pine/hardwood forests (7 percent), or other forest types such as east-side pine, and foothill riparian/hardwood (collectively 3 percent; Verner et al. 1992; USDI Fish and Wildlife Service 2006).
Recent studies (Bond 2002, Bond 2007) indicate that spotted owls may benefit from low intensity fire. Bond et al. (2002) found that short-term impacts (less than 1 year) of wildfire on spotted owl survival, reproductive success, and mate/site fidelity were minimal in areas burned by low to moderate severity fires in northern California, Arizona and New Mexico. Another study found that while the short-term impacts may be minimal, suitable habitat around spotted owl nest sites continued to decline up to 2 years post-fire as additional tree mortality occurred (Gaines et al. 1997). Following wildfire in the eastern Washington Cascades, spotted owls utilized areas of low intensity burns (Bevis et al. 1997). In addition, low intensity prescribed fire had little impact on the ability of Mexican spotted owls (Strix occidentalis lucida) to reproduce (Sheppard and Farnsworth 1997) and occupancy and productivity of the subspecies in burned landscapes was found to be slightly less than in unburned landscapes (Jenness et al. 2004).

Clark (2007) summarized some of the potential impact of stand-replacing fire in dry forests where fuels have accumulated due to active fire suppression similar to the situation that contributed to the Piute Fire and for which treatment in this EIS is prescribed to ameliorate the existing condition and reduce the risk of future effects. The following is excerpted from Clark (2007):

Some of the structural complexity in forest stands occupied by spotted owls in southwestern Oregon may have developed due to the absence of wildfire due to active fire suppression during the latter part of the 20th century (Agee 1993). As a result of active fire suppression, increased fuel loads may have created a large-scale risk of stand-replacing fires (Agee and Edmonds 1992) and potentially reduced the sustainability of spotted owl habitat in dry forest ecosystems (Agee 1993, Taylor and Skinner 1997, Spies et al. 2006). The greatest impact of wildfire on spotted owls will likely be the destruction or alteration of habitat. Numerous studies have documented that spotted owl survival and occupancy were positively associated with increased amounts of late-successional forest (Franklin et al. 2000, Olson et al. 2004, Blakesley et al. 2005, Dugger et al. 2005). Therefore, large-scale wildfires that destroy habitat may negatively impact spotted owl survival and occupancy. If wildfire removes a sufficient amount of suitable habitat, owl territories will likely be abandoned (Bart and Forsman 1992, Bart 1995), and these areas likely will not support owls until mature and older forests are restored.

Davis and Lint (2005) speculated that areas of high intensity fire may be used for foraging if there is no salvage. This is reinforced in studies by Bond (2006) where spotted owls were shown to preferentially use areas of light underburn and select against foraging use of high density, unburned forest (it is assumed that this is a preference for light underburn when present).

Clark (2007) found that spotted owl occupancy declined rapidly following stand-replacing fires in southern Oregon compared to similar unburned landscapes at the South Cascades. Occupancy at all three fires investigated declined from 2003 – 2006. Initial occupancy was positively influenced by the amount of roosting and foraging habitat with low severity burn within the core and negatively influenced by the amount of hard edge within the core. Extinction rates increased in a curvilinear manner as the amount of unsuitable habitat within the core increased and as the amount of edge increased. Colonization rates were positively influenced by the amount of nesting, roosting and foraging habitat that received a low severity burn within the
No significant differences in productivity of spotted owl pairs in burned landscapes and unburned landscapes were found (ibid.). Annual survival rates of spotted owls that resided within the fire or had recently emigrated out of the fire were lower than owls that resided outside the fire. Annual home ranges of spotted owls in this study were on average 248.46 ha. larger than home ranges observed in the same area prior to wildfire. However, home ranges of spotted owls that resided inside the fire were not significantly different than owls that resided outside the fire.

Clark (2007) found salvage logged areas and roosting/foraging habitats with low/unburned or high severity burn were used in a similar fashion as early-seral forests throughout the study area. Spotted owls selected 4 habitats over the reference (early seral) habitat including; roosting/foraging habitat with a moderate severity burn and nesting/roosting/foraging habitat with all levels of fire severity. Nesting/roosting/foraging habitats with moderate and high severity burn and roosting/foraging habitat with moderate severity burns were selected and used more frequently than available, but overall use of these habitats was relatively low. Salvaged stands were 1.58 times more likely to be used than the early seral habitat and were more likely to be used than stands with moderate or high severity but were used in lower proportion to their availability compared to areas of nesting/roosting/foraging habitat with high severity fire. Clark cautioned that, spotted owls did not appear to select salvage-logged areas, but appeared to use areas within salvaged stands that had live trees. Areas that received clear-cut salvage were rarely used. Bond (2007) also indicated that post fire salvage may have an adverse effect on spotted owl use of the fire area. However, no data was provided to support this hypothesis. Bond et al. (2009, in press) found California spotted owls selected low severity areas for roosting and selected high severity areas for foraging.

The Piute Fire burned with varying intensity in the spotted owl PACs and HRCAs within the fire perimeter. Two of the territories are completely within the burn perimeter, and the third is almost completely outside the perimeter. No salvage or fuel treatments would occur in any of the spotted owl PACs or HRCAs. Fire severity is derived from U.S. Forest Service Pacific Southwest Region Fire and Aviation Management website (http://www.fs.fed.us/r5/rsl/clearinghouse/gis-download.shtml#burnseverity). The ranking follows:

1 = **Unchanged**: This means the area one year after the fire was indistinguishable from pre-fire conditions. This does not always indicate the area did not burn.

2 = **Low**: Represents areas of surface fire with little change in cover and little mortality of the structurally dominant vegetation.

3 = **Moderate**: This severity class is between low and high and means there is a mixture of effects on the structurally dominant vegetation.

4 = **High**: Represents areas where the dominant vegetation has high to complete mortality.
The KE017 and KE018 had extensive area ranked in the moderate to high fire effects category. See Table 12 below for a summary. Spotted owl HRCA for KE016 had one acre of low severity burn, essentially not affecting the HRCA and PAC.

As displayed in Table 12, each of the spotted owl territories lost live overstory canopy and changed to an early-seral stage forest, in effect reducing the suitability of the PAC and HRCA. If and where the owls would shift their activity centers is unknown and unpredictable, although it is highly unlikely that they would occupy the most severely burned stands, those targeted for salvage and fuels reduction. A limited operating period would be imposed for treatments within one-quarter mile of these activity areas where no operations would occur from March 1 through August 15, unless surveys confirm no reproduction has taken place.

Table 12. Summary of fire severity in spotted owl PACs and HRCAs in the project area

<table>
<thead>
<tr>
<th>Spotted owl ID</th>
<th>Burn severity</th>
<th>Acres</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>1</td>
<td>3</td>
</tr>
<tr>
<td></td>
<td>2</td>
<td>109</td>
</tr>
<tr>
<td></td>
<td>3</td>
<td>174</td>
</tr>
<tr>
<td></td>
<td>4</td>
<td>77</td>
</tr>
<tr>
<td>KE017</td>
<td>PAC (363 acres)</td>
<td></td>
</tr>
<tr>
<td></td>
<td>1</td>
<td>19</td>
</tr>
<tr>
<td></td>
<td>2</td>
<td>99</td>
</tr>
<tr>
<td></td>
<td>3</td>
<td>150</td>
</tr>
<tr>
<td></td>
<td>4</td>
<td>205</td>
</tr>
<tr>
<td></td>
<td>HRCA (473 acres)</td>
<td></td>
</tr>
<tr>
<td>KE018</td>
<td>PAC (541 acres)</td>
<td></td>
</tr>
<tr>
<td></td>
<td>1</td>
<td>9</td>
</tr>
<tr>
<td></td>
<td>2</td>
<td>146</td>
</tr>
<tr>
<td></td>
<td>3</td>
<td>130</td>
</tr>
<tr>
<td></td>
<td>4</td>
<td>256</td>
</tr>
<tr>
<td></td>
<td>HRCA (457 acres)</td>
<td></td>
</tr>
<tr>
<td></td>
<td>1</td>
<td>0</td>
</tr>
<tr>
<td></td>
<td>2</td>
<td>45</td>
</tr>
<tr>
<td></td>
<td>3</td>
<td>131</td>
</tr>
<tr>
<td></td>
<td>4</td>
<td>281</td>
</tr>
</tbody>
</table>

Burn severity rankings: 1 = unchanged; 2 = low; 3 = moderate; 4 = high

Northern Goshawk

The Kern River Ranger District has identified one northern goshawk territory near the project area. The 2008 Piute Fire affected the very edge of this Protected Activity Center (PAC) and only 38 acres of the PAC had any tree mortality. One percent (5 acres) of the PAC had over 50 percent mortality.

Northern goshawks occur in a variety of coniferous forest communities in the western United States, primarily in ponderosa pine (*Pinus ponderosa*), Jeffrey pine (*P. jeffereyi*), mixed conifer, white fir (*Abies concolor*), and lodgepole pine (*P. contorta*). Large snags and downed logs are believed to be important components of northern goshawk foraging habitat because such features increase the abundance of major prey species (Reynolds et al 1992). When foraging, northern goshawks utilize a wider range of forest types and conditions, but most populations still exhibit a preference for high canopy closure and a high density of larger trees.
Nest stands are typically composed of large trees, have a high canopy closure, are on moderate slopes, and have a sparse understory (Squires and Reynolds 1997). The sole goshawk PAC near the project area would not be directly affected by this project.

Fisher

Best range estimates for this species show a consistent lack of fisher occurrence in southern Kern County, which includes both the Piute and Breckenridge Mountains (Grinnell et al. 1937, and Schempf and White 1977, Zielinski et al. 1995, Spencer et al. 2008). Schempf and White (ibid.) cited a personal communication of tracks observed in Bodfish Canyon (about 3,600 feet elevation) and there is an unverified, anecdotal report of a fisher sighting near Weldon Meadow in 1991 (district files and California Natural Diversity Database). Repeated track plate and camera surveys have failed to detect fisher south of the Kern River. There have been additional unverified reports of two fishers of possibly different sizes south of the Piute Fire in open pine/sage habitat that is generally considered marginal habitat. If fishers exist in the Piutes, they are present in such low numbers and are isolated from other populations such that they would not likely contribute to the viability of the main population. It is more likely that the observations, if valid, were dispersing individuals and do not likely represent a stable established population. Piute Fire Restoration Project units are unsuitable because fire resulted in stands with few or no live trees and no cover for very large areas. Potential for fisher occurrence or occupancy of the Piutes in general and the deforested project units in particular is very low. No suitable habitat for this species will be affected; there would be no effect on fisher. This species is not further addressed in the consequences section.

Yellow-blotched Salamander

There is potential for occurrence of two subspecies of this salamander in the project area. Records do not indicate which subspecies have been observed; therefore; it is assumed any records of this species are for the yellow-botched subspecies. Within the project boundary, there is one record nearby, that being in Clear Creek, north of Brown Meadow.

Yellow-blotched salamanders are found in open woodlands dominated by oak, pine, or fir; they also occur in canyons beneath litter and debris from canyon live oak. Meadows, springs, perennial streams, and intermittent streams within riparian conservation areas are potentially suitable habitat for this salamander species. Within the project area, habitat is limited to areas near springs and meadows because perennial and intermittent streams are lacking. Two springs and 57 acres of meadow offer the best potential habitat. Surveys for yellow-blotched salamanders found no occurrences.

Management Indicator Species

The management indicator species (MIS) whose habitat would be either directly or indirectly affected by the Piute Fire Restoration Project are carried forward in this analysis, which will
evaluate the direct, indirect, and cumulative effects of the proposed action and alternatives on the habitat of these MIS. The MIS selected for project-level analysis for the Piute Fire Restoration Project are:

- Mountain quail
- Hairy woodpecker
- Black-backed woodpecker

Habitats for MIS are defined using the California Wildlife Habitat Relationship (CWHR) System developed by the California Department of Fish and Game (CDFG 2008)\(^3\).

**Mountain Quail**

The mountain quail was selected as the MIS for early and mid seral coniferous forest (ponderosa pine, Sierran mixed conifer, white fir, red fir, and eastside pine) habitat in the Sierra Nevada. Early seral coniferous forest habitat is comprised primarily of seedlings (greater than 1 inch d.b.h.), saplings (1 to 5.9 inches d.b.h.), and pole-sized trees (6 to 10.9 inches d.b.h.). Mid seral coniferous forest habitat is comprised primarily of small-sized trees (11 to 23.9 inches d.b.h.). The mountain quail is found particularly on steep slopes, in open, brushy stands of conifer and deciduous forest and woodland, and chaparral; it may gather at water sources in the summer, and broods are seldom found more that 0.8 km (0.5 miles) from water (California Department of Fish and Game 2005).

In stands where there was moderate fire severity, forest stands are currently in early- and mid-seral stages. The most severely burned stands are now in an early-seral stage and offer little in the way of shrub cover, and thus are poor habitat.

**Hairy Woodpecker**

The hairy woodpecker was selected as the MIS for the ecosystem component of snags in green forests. Medium (diameter breast height between 15 to 30 inches) and large (diameter breast height greater than 30 inches) snags are most important. The hairy woodpecker uses stands of large, mature trees and snags of sparse to intermediate density; cover is also provided by tree cavities (California Department of Fish and Game 2005). Mature timber and dead snags or trees of moderate to large size are apparently more important than tree species (Siegel and DeSante 1999).

Snags exist mixed with live trees that survived the fire in project stands that had moderate fire severity and that are proposed for fuel reduction treatments (1,981 acres). Quantities of each size class of snags are not available, but based on fire severity existing snags per acre are above LRMP minimums. Pre-fire conditions modeled using CWHR include small, medium and large

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tree classes and would provide snags of the same size classes post fire. Using the CWHR classes, there are 1,981 acres that include medium and large snags.

**Black-backed Woodpecker**

The black-backed woodpecker was selected as the MIS for the ecosystem component of snags in burned forests. Recent data indicate that black-backed woodpeckers are dependent on snags created by stand-replacement fires (Hutto 1995; Kotliar et al. 2002; Smucker et al. 2005). The abundant snags associated with severely burned forests provide both prey (by providing food for the specialized beetle larvae that serve as prey) and nesting sites (Hutto and Gallo 2006).

Stand-replacing fire occurred on 11,370 acres of mature forest within the project area. Quantities of each size class are not available, but based on fire severity existing snags per acre are above LRMP minimums. CWHR pre-fire conditions include small, medium and large tree classes and would provide snags of the same size classes post fire.

Most timbered areas that burned in the Piute Fire suffered greater than 75 percent mortality due largely to absence of fires in the area over the past century, steep slopes, and high wind conditions. Within the Piute Fire area, approximately 11,370 acres of mature conifer forest experienced greater than 75 percent mortality, creating burned snag habitat. An additional 7,050 acres of oak, pinyon and foothill pine habitat was deforested creating additional burned snag habitat.

Estimated snag counts are not available for the project area. Tree size distribution was not available, but is instead based on stand CWHR size class from the pre-fire vegetation and sizes from other project stands near the roadside corridor. The assumption is that stand size class was retained even though the trees were killed by the fire.

Based on the above assumption, stand size class remained the same in those stands killed by the Piute Fire. We can assume stands that suffered more than 75 percent mortality have undergone a stand-replacing event. Stand sizes that are included in this portion of the MIS analysis are those with CWHR size class equal to 4 and 5.

Burned forest area that will be treated under the salvage proposal and is available for black-backed woodpeckers amounts to 347 acres within the restoration project units. This represents less than two percent of the fire perimeter and less than five percent of the medium and large tree habitat that had stand-replacing fire.

Black-backed woodpeckers are known to respond to fires from very long distances (Van Tyne 1926, West and Speirs 1958, Bock and Bock 1974, Yunick 1985, and Hoyt 2000). Other areas within the Sequoia National Forest also contribute to a high level of suitable burned conifer snag habitat. In particular, the Kern Plateau (within 50 miles air distance) has had a number of large fires that provide suitable habitat for this MIS within the past 8 years (Table 13). Wildfires on the Kern Plateau before 1900 were most likely relatively small, low intensity, and started by lightning in association with isolated summer thunderstorms. Historical records, after 1905, indicate that most fires in the analysis area continued to be small and infrequent.
Table 13. Recent fire history on the Kern Plateau

<table>
<thead>
<tr>
<th>Fire Year</th>
<th>Fire Name</th>
<th>GIS Acres</th>
<th>High-Mod Intensity Fire Effect Acres</th>
<th>Estimated High-Mod Intensity In Forest Acres</th>
<th>Salvage Acres</th>
<th>Percent (%) High-Mod Burned Forest Salvaged</th>
</tr>
</thead>
<tbody>
<tr>
<td>2000</td>
<td>Manter</td>
<td>79,222</td>
<td>56,744</td>
<td>6,500</td>
<td>1,000</td>
<td>15</td>
</tr>
<tr>
<td>2002</td>
<td>McNally</td>
<td>149,472</td>
<td>100,664</td>
<td>32,190</td>
<td>3,200</td>
<td>10</td>
</tr>
<tr>
<td>2003</td>
<td>Albanita</td>
<td>2,223</td>
<td>1,037</td>
<td>1,037</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>2003</td>
<td>Hooker</td>
<td>2,376</td>
<td>881</td>
<td>881</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>2004</td>
<td>Crag</td>
<td>870</td>
<td>100</td>
<td>100</td>
<td>0</td>
<td>0</td>
</tr>
</tbody>
</table>


<table>
<thead>
<tr>
<th>Fire Year</th>
<th>Fire Name</th>
<th>GIS Acres</th>
<th>High-Mod Intensity Fire Effect Acres</th>
<th>Estimated High-Mod Intensity In Forest Acres</th>
<th>Salvage Acres</th>
<th>Percent (%) High-Mod Burned Forest Salvaged</th>
</tr>
</thead>
<tbody>
<tr>
<td>2005</td>
<td>Crag</td>
<td>1,185</td>
<td>600</td>
<td>600</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>2005</td>
<td>W. Plateau Rx</td>
<td>215</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>2006</td>
<td>Broder/Beck</td>
<td>3,492</td>
<td>200</td>
<td>200</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>2006</td>
<td>Smith</td>
<td>225</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>2006</td>
<td>W. Plateau Rx</td>
<td>215</td>
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<td>0</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>2007</td>
<td>Vista</td>
<td>420</td>
<td>298</td>
<td>298</td>
<td>130</td>
<td>44</td>
</tr>
<tr>
<td>2007</td>
<td>W. Plateau Rx</td>
<td>215</td>
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<td>0</td>
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<td>0</td>
</tr>
<tr>
<td>2008</td>
<td>Clover</td>
<td>15,250</td>
<td>11,440</td>
<td>5,000</td>
<td>0</td>
<td>0</td>
</tr>
</tbody>
</table>

Subtotal: 21,217 | 12,538 | 6,098 | 130 |

Total Kern Plateau: 255,380 | 171,964 | 46,806 | 4,330 |

Additional fire in forested habitats adjacent to the Kern Plateau (Western Divide RD and Inyo NF):

<table>
<thead>
<tr>
<th>Fire Year</th>
<th>Fire Name</th>
<th>GIS Acres</th>
<th>High-Mod Intensity Fire Effect Acres</th>
<th>Estimated High-Mod Intensity In Forest Acres</th>
<th>Salvage Acres</th>
<th>Percent (%) High-Mod Burned Forest Salvaged</th>
</tr>
</thead>
<tbody>
<tr>
<td>2003</td>
<td>Cooney</td>
<td>1,928</td>
<td>1,143</td>
<td>1,143</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>2003</td>
<td>West Kern</td>
<td>7,971</td>
<td>1,452</td>
<td>1,452</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>2004</td>
<td>Deep</td>
<td>3,144</td>
<td>2,208</td>
<td>2,208</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>2006</td>
<td>Maggie</td>
<td>2,098</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>2006</td>
<td>Tamarack</td>
<td>4,656</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>2003</td>
<td>Olancha</td>
<td>272</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
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<tr>
<td>2003</td>
<td>Summit</td>
<td>4,761</td>
<td>3,392</td>
<td>3,392</td>
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</tr>
<tr>
<td>2008</td>
<td>Honey Bee</td>
<td>679</td>
<td>0</td>
<td>0</td>
<td>0</td>
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</tbody>
</table>

Additional fires in forested habitats on the Kern River Ranger District: (63 mile radius)

<table>
<thead>
<tr>
<th>Fire Year</th>
<th>Fire Name</th>
<th>GIS Acres</th>
<th>High-Mod Intensity Fire Effect Acres</th>
<th>Estimated High-Mod Intensity In Forest Acres</th>
<th>Salvage Acres</th>
<th>Percent (%) High-Mod Burned Forest Salvaged</th>
</tr>
</thead>
<tbody>
<tr>
<td>2000</td>
<td>King</td>
<td>5,225</td>
<td>1,791</td>
<td>500</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>2008</td>
<td>Piute</td>
<td>37,256</td>
<td>15,896</td>
<td>5,000</td>
<td>347</td>
<td>7</td>
</tr>
</tbody>
</table>

Total: 323,369 | 197,846 | 60,501 | 4,677 |

1. The GIS data layer CA_R5_FireHistory08_1 (obtained from [http://www.fs.fed.us/r5rsl/clearinghouse/gis-download](http://www.fs.fed.us/r5rsl/clearinghouse/gis-download)) was used to identify and estimate area and burn effects on forest vegetation of fires between 2000 and 2008 within a 50-mile radius of the Vista Project along with local data and personal knowledge.

2. Forested acres estimated from Burned Area Report, Google Earth or personal knowledge. Little or no high and moderate intensity fire effects were recorded for wildland fire use projects, however, several of these projects did result in creation of substantial suitable woodpecker habitat not included in the gross acres above, but not in the moderate to high severity fire in forested habitat column.

3. Estimated as a reasonably foreseeable action. Includes roadside hazard reduction in mature forest habitat and salvage and salvage in mature forest on 347 acres proposed in the Piute Restoration EIS. This figure does not include fuels reduction in small trees or pinyon juniper.

Recently, fires have become increasingly larger and more frequent. The Manter Fire of 2000 burned 79,000 acres on the southeastern extent of the Kern Plateau. The McNally Fire of 2002 burned 150,000 acres up the North Fork of the Kern River and the west and north portions of the Kern Plateau. The McNally and Manter fires affected over 70,000 acres of conifer forest with...
mixed lethal effects. Over 16,000 acres resulted in 75 percent mortality and substantial additional area has died due to extended effects of the fires. Additional burned forest habitat has been recruited yearly through prescribed burning and wildland fire use. Prescribed burning and wildland fire use generally result in lower mortality, but may provide substantial areas with high numbers of burned snags that would provide suitable habitat for this MIS.
Chapter 4 - Environmental Consequences

Air Quality

Direct, Indirect, and Cumulative Effects of Alternative A (No Action)

The no action alternative would result in a higher likelihood of future wildfire with fuel loading characteristics that could produce more emissions per acre. As discussed above, wildfires generally produce more emissions per acre and most often occur at times of the year when the adjacent air basins have high background pollution concentrations. There is a higher likelihood of adverse effects including cumulative effects to air quality under the no action alternative. Existing levels of fugitive dusts would continue on unsurfaced roads.

Because there would be no direct emission of greenhouse gases from proposed activities, there would be no direct effect on climate change from the no action alternative. Indirect effects from the no action alternative would likely include higher potential for future large wildfires and associated release of carbon to the atmosphere as well as slower reestablishment of forests, which can serve as a carbon sink (Zhang and others 2008).

Direct and Indirect Effects of All Action Alternatives

Smoke from prescribed burning associated with fuel reduction activities could potentially affect air quality and is a common concern because of its potential effect on human health and visibility. The smoke could potentially affect visitors to the Domeland Wilderness and residents in the surrounding communities.

When considering the use of prescribed burning to restore the natural role of fire in ecosystems, effects of wildfire and prescribed burning must be considered. Fires emit particulate matter (PM10 and PM2.5 [particulate matter less than 2.5 microns in diameter]) and carbon monoxide, as well as nitrogen oxides and volatile organic compounds, which are precursors to ozone. Other constituents of smoke (gases and chemicals) may also enter the lungs. Some components can be carcinogenic.

Wildfires result in greater emissions per acre when compared to prescribed burns, commonly exceeding ambient air quality standards. They also often occur under conditions of high temperature and low humidity, when high concentrations of ozone are most likely. Prescribed burning reduces existing fuels, thus decreasing the fire hazard and the risk of high intensity wildfire, and decreases the quantity of fuels available to be consumed in a wildfire. However, infrequent large-scale wildfire will still occur naturally in some vegetation types.

The quantity of smoke emissions from fires and the impact of those emissions on local and regional air quality vary dramatically with the size and type of fire that occurs. The number of acres burned is the single most important factor in determining the total emissions within an airshed. Large fires, whether they originate as wildland fires or prescribed fires, produce more
total emissions than small fires. Therefore, reducing the total acreage burned, regardless of the type of fire, is the most effective way to reduce the total emissions within an airshed.

The fire type also influences the quantity of emissions from fire. Prescribed fires typically produce lower per-acre emissions than wildland fires; heading fires (a fire that burns with the wind) typically produce lower per-acre emissions but have higher emission rates than backing fires; and surface fires typically produce lower per-acre emissions than crown fires. The differences in emissions among the different fire types may be attributed to differences in the meteorological conditions that typically occur, differences in fuel properties, and differences in the resultant fire behavior and fuel consumption. Because prescribed fire generally produces fewer per-acre emissions than wildland fire, it is possible to burn more acres by prescribed fire than would normally occur with wildland fire and still maintain the same total emissions within an airshed.

The primary benefit of a prescribed fire program is in modifying sizes and types of fires that occur within a particular geographic region. Through prescribed fire, it is possible to replace large high intensity wildland fires that are characterized by high fuel consumption and high total emissions with smaller, lower-intensity prescribed fires that are characterized by lower fuel consumption and lower total emissions.

Each action alternative includes some pile burning in the first five years. This will be an extremely important element in effectively spreading the emissions over time since the pile burning can be accomplished during winter months.

Prescribed fire is permitted by the San Joaquin Valley and Kern Air Pollution Control Districts. Allocations are granted by the District on days when meteorological conditions allow sufficient dispersion to reduce the potential for public exposure. Smoke from prescribed burning may have short-term effects on the Dome Land Wilderness and efforts will be made to minimize that impact. In general, the quantity of material expected to be burned and the expected dispersal patterns in the Piute Mountains make effects on the Dome Land’s class I airshed highly unlikely.

The regulatory environment for smoke has shown an overall emphasis on accommodating prescribed fire out of recognition of the severe fuels risk in the western United States. In California, the public nuisance rule provides an important protection measure for property, safety, and health. However, this rule can have a very unpredictable impact on prescribed burn programs.

In response to the California Code of Regulations, the District has enacted Rule 4102. This is the Nuisance Rule and was adopted May 21, 1992, and amended December 17, 1992. This rule essentially requires the District to investigate and take action to remedy any air discharge that is causing injury, detriment, nuisance, or annoyance to any considerable number of persons.

Good smoke management techniques, improved burn day forecasts, and public communication can mitigate some complaints. Public Nuisance issues are more commonly associated with changing or unforeseen conditions in the burn day forecast or lower elevation projects when the smoke is not fully dispersed during the daytime hours. Although difficult to
predict, it is probably safe to assume that the impact of public nuisance calls on prescribed fire projects is likely to increase given growing populations in the foothill areas on the west side of the planning area.

Fugitive dust from equipment operation and hauling on unsurfaced roads is likely. This effect would be minimized by dust abatement on National Forest System roads using water. The proposed project areas are more than 0.25 miles from occupied buildings, which would also allow for dissipation and/or settling of dust well away from sensitive areas. The county road that would be a haul route for logs transported to the mill is beyond the jurisdiction of the Forest Service and logging traffic would be treated the same as any other vehicular traffic on the county road with no dust abatement.

There would be greenhouse gas emissions associated with salvage treatments. These would include machinery and vehicle emissions from harvesting, yarding, and hauling (Karjalainen and Asikainen 1993). For approximately 350 acres of treatment, these emissions would be very small. Athanassiadis (2000), for example, estimated that carbon dioxide emissions from harvesting operations in Sweden accounted for just 1 percent of the total amount emitted by all sources nationwide. Moreover, the emissions of carbon from forest operations are also small (about 1.4 percent) relative to the amount of carbon sequestered in the harvested timber (Berg and Karjalainen 2003). Mastication work would involve greenhouse gas emissions from machinery; pile burning would also release carbon dioxide. While still relatively small when compared to all anthropogenic sources of greenhouse gas, Sonne (2006) found that pile burning was second only to mechanical harvesting in the direct emission of greenhouse gas during forestry operations (32 percent).

In addition to the direct emissions of greenhouse gas under this proposal, there may be indirect greenhouse gas emissions associated with milling the salvaged timber. That is, the conversion of fire-killed trees to forest products requires energy inputs, which may create emissions.

On the other hand, the project is designed to improve the resilience of the ecosystem (Bosworth and others 2008), to reduce the likelihood of large fires (Hurteau and others 2008), and to improve the ability of the project area to sequester carbon (Schroeder and Ladd 1991). Plus, the indirect effect of milling forest products may be to reduce the use of concrete or steel products, thus offsetting emissions from those sectors.

**Note on the Direct and Indirect Effects of Alternative C on Climate Change**

The potential direct emissions of greenhouse gases associated with this alternative would likely be less than those of the proposed action because none of the salvage logging associated with Alternative B would occur. On the other hand, the direct effect of emissions associated with proposed road closure and obliteration work may offset the effects of a no-logging alternative. Studies of emissions from forestry have found that the use of machinery associated with heavy
road work, such as bulldozers and excavators, accounts for a large percentage of forestry emissions (Karjalainen and Asikainen 1993). The potential indirect effects of greenhouse gas emissions associated with milling forest products would be absent under this alternative.

**Cumulative Effects of All Action Alternatives**

The regulatory framework (Title 17) that controls agricultural and wildland prescribed fire in California is designed to control cumulative effects through allocations based on meteorological conditions influencing smoke dispersion. The Sequoia National Forest and other cooperating wildland agencies work closely with the District and the California Air Resources Board to prioritize wildland prescribed fire within the emissions constraints allowed by the regulatory agencies. Under this regulatory structure, cumulative effects are not expected to occur.

Normally, a discussion of the cumulative effects associated with climate change would involve addition. That is, the potential effect from a proposed action is added to the potential effects from all other past, present, and reasonably foreseeable projects. The total sum is the cumulative effect. In the case of a qualitative discussion of potential direct and indirect effects to climate change such as the one used in this analysis, however, it is not possible to quantify the potential cumulative effect. Ultimately, the cumulative effects of greenhouse gas emissions from all sources likely include forest habitats altered by drought and fire (Hogg and Bernier 2005), decreased mountain snowpacks (Hamlet and Lettenmaier 1999), and more extreme weather events (Bell and others 2004).

On the other hand, it may be useful to look at the potential magnitude of the cumulative effect on the release of greenhouse gases associated with the Piute Fire Restoration Project. The State of California has estimated that emissions from forestry statewide have ranged between 4.4 and 7.7 million metric tons of carbon dioxide (MMTCO$_2$) per year over the 15-year period from 1990 to 2004 (CEC 2006). The gross CO$_2$ emission data for all sources over the same period ranged between 310 and 372 MMTCO$_2$ per year (CEC 2006). That means that, at worst, forest management activities statewide are contributing approximately 2.5% of carbon dioxide emissions each year. (At best, forestry accounts for just 1.2% of statewide carbon dioxide emissions.) Considering that California boasts 30 million acres of forest, the additive effect of greenhouse gas emissions from a 2,000-acre proposal is incalculably tiny.

It is also worth noting that the state of California estimates that its forests provide a yearly carbon dioxide sink equal to around 20 MMTCO$_2$. That is, the net contribution of forestry to carbon dioxide emissions is negative. Moreover, projects designed to reduce the potential for future catastrophic fires by reducing fuels can protect against massive carbon emissions associated with large stand-replacing wildfires at the regional scale (Hurteau and others 2008). Again, the contribution of the proposed fuel reduction actions on 2,000 acres is less than negligible whether counted as a source or a sink, but it is useful to keep the benefits and risks in perspective.
Archeology

*Effects Common to All Alternatives*

Archaeological resources have been lost in the past and will continue to be lost in the future. The cumulative effect of resource loss is that over time, fewer archaeological resources will be available for study and interpretation. For the proposed project, the potential loss of heritage resources is reduced or eliminated through application project design features and the standard mitigation measures presented within Sierra Programmatic Agreement (PA). Project effects would not impact those characteristics of a site that contribute to its National Register of Historic Place eligibility or to its cultural value. Recording and archiving information about each site for future reference contributes to reducing the effects of the proposed project. The project complies with Section 106 of the National Historic Preservation Act (NHPA).

Although measures would be taken to ensure that cultural sites are not disturbed during salvage and hazard tree removal operations, the risk of vandalism to sites would be increased since attention would be drawn to areas possessing cultural material, which will be identified and flagged under all the action alternatives. The risk of increased vandalism will be partially reduced by having heritage personnel (monitors) on site during project activities near cultural resource sites. Additionally, heritage personnel should also conduct an archaeological sensitivity training with all project personnel prior to the commencement of project activities.

*Alternative A – No Action*

**Direct Effects**

As the no action alternative, this alternative would present a low to moderate risk to cultural resources. There would be no new or increased ground-disturbing activities in the areas of known cultural resource sites, and therefore no direct effects would occur with this alternative.

**Indirect Effects**

This alternative may have indirect effects to the cultural resources through inaction. The existing threat of trees falling naturally, and potentially disturbing cultural resources, would continue unabated in the areas of cultural resources. The actions presented in other alternatives would serve to better control the placement of felled salvage and hazard trees to avoid cultural resources, and therefore reduce the potential for ground disturbance to cultural sites. The lack of action can adversely affect cultural resources through natural mortality where fire weakened trees may uproot within archaeological sites and subsequently create increased ground disturbances.

Additional risks associated with no action alternative include: 1) the increased potential of seasonal wood gathering along the existing roads, and potentially within or adjacent to cultural site areas, that may result in ground disturbance within site boundaries, and 2) the reduced
ground cover resulting from the lack of timber treatments may result in increased site visibility and subsequent site looting and vandalism.

Cumulative Effects
The no action alternative poses no or minor cumulative effects; these effects are similar to the indirect effects noted above where public access and activity may continue within or near the project area for multiple years.

**Alternative B – Proposed Action**

Direct and Indirect Effects
This alternative would have no effect on known cultural sites since all known sites would be flagged and avoided. Commercial timber harvest actions will disturb the ground surface, causing potential direct effects to unknown cultural resources. Tractor logging has the highest potential to disrupt archaeological sites through ground surface alteration. These direct effects are reduced through extensive survey of the proposed treatment units prior to a decision on the alternatives, using existing landings, skid trails, and roads. No new roads will be constructed during project implementation, and therefore impacts created from road construction are eliminated from additional analysis.

The action of producing effective ground cover from proposed timber and fuel treatments can benefit cultural resources through reducing soil erosion and site disruption from erosion. Ground cover also has the benefit of decreasing site visibility, and subsequently reduces the likelihood of site vandalism and looting.

Directionally removing hazard and salvage trees will likely reduce ground disturbance in cultural resource areas. Trees that naturally fall may encroach upon archaeological site boundaries and create ground disturbance within these site areas.

This alternative poses a low risk of impacts to cultural resources because of directional felling away from site areas, and by having archaeological monitors present during project activities to better ensure site locations are avoided during project implementation.

Cumulative Effects
The proposed project aims to move the project area toward desired conditions—conditions that may have previously existed within the Piute Mountains, and conditions that witnessed the formation of both pre-historic and historic-era site formation. The stated project objective may restore the Piute Mountains to a former condition and will 1) better serve to preserve cultural resources through restoration efforts and 2) will help to retain cultural resource site integrity and National Register eligibility through improving the associated integrity criteria of location, setting, and feeling.
Alternative C – Noncommercial Funding Alternative
The effects of this alternative are similar to those described above in Alternative B (Proposed Action Alternative) for cultural resource concerns.

Additional actions proposed in the modified action alternative include road-decommissioning activities. Decommissioning road segments will better serve to reduce access to cultural resource site locations and will eliminate routine road maintenance activities that pose a threat to existing cultural resources located within or adjacent to existing roads. The additional action creates an overall benefit for cultural resources.

Botany
Botanical field surveys within activity units with mechanical ground disturbance were accomplished in the late spring and summer of 2009. These surveys confirmed existing populations of unexpected larkspur (*Delphinium inopinum*), Piute buckwheat (*Eriogonum breedlovei* var. *breedlovei*), and Palmer’s mariposa lily (*Calochortus palmeri* var. *palmeri*). The surveys also discovered new populations of these species; two occurrences of unexpected larkspur, two new occurrences of Piute buckwheat, and seven new occurrences of Palmer’s mariposa lily. Under all action alternatives, all existing and newly discovered sensitive plant populations will be flagged and avoided by mechanical ground disturbance in salvage units. Existing and new populations in fuels treatment units will be protected by imposing a limited operating period for mechanical disturbance.

Alternative A – No Action

Direct and Indirect Effects
No positive or negative direct effects to sensitive plant species will occur under the no action alternative.

Cumulative Effects
There will be no direct or indirect effects to overlap with temporally or spatially. Therefore, there will be no cumulative effects from the no action alternative.

Alternative B – Proposed Action

Direct and Indirect Effects
Direct effects occur when sensitive plant species are physically impacted by activities associated with forest ecosystem management. Direct impacts can physically break, crush or uproot sensitive plants by driving over them, covering them, falling trees on them, or by burning them. Direct impacts to sensitive plants can physically damage the sensitive plant or the habitats where they grow. When too much of an individual plant is damaged, it can be killed or may experience altered growth and development or reduced or eliminated seed-set and reproduction. These
impacts to individual plants can reduce the population size and potentially the viability of the species. For annual plant species, the timing of impacts is critical. Management actions that take place after annuals have set seed have much less impact than management actions performed prior to seed-set. Direct effects being considered in this discussion include those associated with timber felling, skidding, yarding, skid trail and road construction, road maintenance, and tree planting. Both unexpected larkspur (*Delphinium inopinum*) and Piute buckwheat (*Eriogonum breedlovei* var. *breedlovei*) are found in dry rocky ridge-top openings. Known and new occurrences of sensitive plant species were found in the project area during surveys. These occurrences will be flagged for avoidance or under a limited operating period for mechanical equipment. While the potential exists for some undiscovered occurrences to be missed during surveys, effects are expected to be minimal due to the protection of known populations from disturbance. Any occurrences discovered during implementation monitoring of the project will be protected.

Forest management activities can indirectly impact sensitive plants by causing changes in vegetation composition and successional pathways of that vegetation, changing local hydrologic patterns in sensitive plant habitat, changing the fire regime, or by changing the soil characteristics. Management actions can also lead to changes in forage condition, and this can lead to changes in the foraging behavior of wildlife within the analysis area. New use patterns can result in different potential impacts to sensitive species. The project area has been temporarily closed to grazing due to the fire, resulting in a temporary decrease in impacts from grazing. Indirect effects can also occur from noxious weed invasion or from impacts to pollinators or mycorrhizae associated with sensitive plant species.

Some indirect effects, such as noxious weed invasion, pose a potential threat to all plant habitats, although different habitats may be invaded by different species of noxious weeds. In riparian areas or wet meadows, bull thistle (*Cirsium vulgare*) may invade and outcompete desirable native species. Upland areas may be invaded by a host of noxious weeds such as the yellow star thistle (*Centaurea solstitialis*). These noxious weeds can lead to habitat changes that are detrimental to sensitive plant species. Noxious weeds, once established, could indirectly impact sensitive plant species through allelopathy (the production and release of plant compounds that inhibit the growth of other plants), changing the fire regime, or direct competition for nutrients, light, or water. Subsequent weed control efforts could also impact sensitive plants. Although bull thistle and yellow star thistle occur on the Kern River Ranger District, the project area contains no known noxious weed populations. Therefore, impacts from non-native invasive species invasion are not expected to occur or are expected to be minimal in the case of new infestations.

Some sensitive plant species may benefit from mechanical or hand treatment. These species colonize open areas, multiply rapidly, and persist for a short while. They may be out-competed by other colonizers, or they may persist until woody species move in and shade them out. They are well adapted to take advantage of the high light intensities found in forest openings. These
species have become less common as a result of fire suppression. Mechanical or hand treatment may have a beneficial effect on these species since such treatment will maintain areas in a more open condition. Palmer’s mariposa lily (*Calochortus palmeri* var. *palmeri*) occurs in open forest habitats, and has benefited from the fire and could benefit from further opening of the forest by mechanical or hand treatment. However, beneficial indirect effects could easily be overcome by negative direct effects (trampling), excessive soil disturbance (leading to soil erosion or degradation of the seedbed), and noxious weed introduction and spread. Both unexpected larkspur (*Delphinium inopinum*) and Piute buckwheat (*Eriogonum breedlovei* var. *breedlovei*) are found in dry rocky ridgetop openings and would not likely be adversely or beneficially affected by mechanical or hand treatment.

**Cumulative Effects**

Past and current activities have altered sensitive plant populations and their habitats. The effects of past activities are built into this analysis in that they are largely responsible for the existing landscape. It is unclear if all of the sensitive species included in this analysis have always been rare or were once more common but currently rare due to past land use practices. Very little is known about population dynamics and metapopulations (a population of populations) of sensitive species such as how long individuals live, how long colonies persist, how often are new colonies formed, and how long seeds persist in the seed bank. A thorough understanding of species population dynamics and metapopulations would be necessary to accurately assess the cumulative impacts of past, present, and future projects on a species. This cumulative effects analysis is based on the best available science known regarding species distribution, ecology, and life history. Current management direction is designed to eliminate or reduce possible negative cumulative impacts by protecting sensitive plant species from direct and indirect impacts. The following discussion provides an explanation of why this type of management is effective in reducing cumulative impacts to sensitive plants.

MacDonald (2000) reports that a critical step in cumulative effects analysis is to compare the current condition of the resource (in this case sensitive plants) and the projected changes due to management activities (in this case forest ecosystem management) with the natural variability in the resources and processes of concern. This is difficult for sensitive plants since long-term data are often lacking, and many sensitive plant habitats have a long history of disturbance (i.e., an undisturbed reference is often lacking). For some species, particularly those that do not tolerate disturbance or are found under dense canopy conditions, minimizing on-site changes is an effective way of reducing cumulative impacts. "If the largest effect of a given action is local and immediate, then these are the spatial and temporal scales at which the effect would be easiest to detect. If one can minimize the adverse effects at this local scale, it follows that there would be a greatly reduced potential for larger-scale effects" (MacDonald 2000). For other species, particularly those that are disturbance tolerant or fire-followers, minimizing on-site changes could be detrimental. These species tolerate or benefit from on-site changes that result in opening
the stand and increasing light reception in the understory. Thus, the response of sensitive plant
species to the management activities is species dependent.

Past and present forest management activities have caused changes in plant community
structure and composition across the forest. Management activities that have cumulatively
impacted sensitive plant occurrences on the forest include: historic timber harvest, fire
suppression, prescribed fire, recreational use, and road construction. These cumulative impacts
have altered the present landscape to various degrees. However, cumulative, direct, and indirect
effects can be minimized by following Forest Service standards and guidelines and by
implementing mitigation measures to monitor or offset impacts to sensitive plants species. With
these protective measures in place, cumulative effects are less likely to be adverse.

The timeframe for determining cumulative effects depends on the length of time that
lingering effects of the past action will continue to negatively impact the species in question.
This will vary widely among species because some rare plants require and tolerate disturbances
that would harm others. Past actions that occurred in the area of each sensitive plant occurrence
are included in this evaluation if information is available. Where site-specific information is
lacking, the general discussion of cumulative effects addresses the effects of disturbances likely
to have occurred.

Since known sites are protected from direct impacts, the greatest cumulative impacts are
likely to occur from the increased chance of noxious weed invasion from ground-disturbing
activities. The following projects are ground disturbing: roads and trails repair and
reconditioning, hazard tree assessment/removal, ongoing cattle grazing, and the Moreland
Abandoned Mine Reclamation Project. Direct and indirect effects from these projects would be
similar to those described above in the direct and indirect effects above. There are no known
noxious weeds in the project area, greatly reducing any potential impacts from noxious weed
invasion. Additionally, several projects that intersect with the project area reduce the chance of
noxious weed invasion. Foremost among these is the BAER Noxious Weed Delayed Assessment,
which will consist of surveys for noxious weeds and follow up monitoring. Any noxious weeds
found would be treated immediately. This practice of early detection rapid response is central to
preventing the spread of noxious weeds. Area closure to OHV trails, grazing rest, the prohibition
of cross-country travel (Motorized Travel Management Plan) has greatly reduced the amount of
possible noxious weed vectors and reduce the possibility of indirect effects to TES plant species
from noxious weed invasion.

Summary of Effects

Approximately 2,675 acres of ground-disturbing activities have the potential for inadvertent
effect on unknown sensitive plant populations. All known sites for sensitive plants within
salvage units will be flagged and avoided. All known sites for sensitive plants within fuels units
will be protected with a limited operating period for mechanical equipment.
**Alternative C – Noncommercial Funding Alternative**

**Direct Effects and Indirect Effects**

Direct and indirect effects would be almost identical to those described in the proposed action analysis. The biggest difference between the two alternatives is the decommissioning of roads in the noncommercial alternative. The reduction of road mileage presents a short-term increase in the risk of noxious weed invasion due to ground disturbance. However, the activity results in a long-term reduction to the amount of vectoring routes for the establishment of noxious weed seeds. The net effect is a reduced spread of noxious weed invasion.

**Cumulative Effects**

The cumulative effects for the modified proposed action would be similar to those of the proposed action. The noxious weed assessment, road closure to OHV, and grazing rest all present short-term measures to reduce noxious weed invasion. These activities should lessen the risk of noxious weed invasion in the short term from road decommissioning. Prohibition of cross-country travel (Motorized Travel Management Plan) will add to the reduced road density to reduce the chance of noxious weed invasion in the long term.

**Summary of Effects**

Approximately 2,774.5 acres of ground disturbing activities (note: this assumes an average road prism of 100 feet width is disturbed over the entire eight miles of road to be decommissioned) have the potential for inadvertent effect on unknown sensitive plant populations. All known sites for sensitive plants within salvage units will be flagged and avoided. All known sites for sensitive plants within fuels units will be protected with a limited operating period for mechanical equipment.

**Determination for Threatened and Endangered Species**

The Piute Fire Restoration Project would have no positive or negative effect on threatened, endangered, or proposed plant species because none exist in the project area.

**Determination for R5 Sensitive Species**

The Piute Fire Restoration Project may affect undiscovered individuals but is not likely to result in a trend toward federal listing or loss of viability for Palmer’s mariposa lily (*Calochortus palmeri* var. *palmeri*), unexpected larkspur (*Delphinium inopinum*), Piute buckwheat (*Eriogonum breedlovei* var. *breedlovei*), San Bernardino aster (*Symphyotrichum defoliatum*), mountain moonwort (*Botrychium montanum*), water fan lichen (*Hydrotheria venosa*), three-ranked hump-moss (*Meesia triqueta*), and broad nerved hump-moss (*Meesia uliginosa*).

Other plant species listed on the Sequoia National Forest as Forest Service Sensitive do not have habitat within the project area, and therefore will not be impacted by the project.
Economics

**Alternative A – No Action**

Alternative A would cost approximately $340,000 in general fund tax dollars. This addresses NEPA analysis costs (which are “sunk” costs and which apply to all alternatives discussed in the analysis). No actions are presented, and no work would proceed which would cause further spending of public funds—NEPA analysis is not considered here.

**Alternative B – Proposed Action**

Alternative B proposes to salvage log approximately 2.7 to 3.2 MMBF on 347 acres, further treat another 1,981 acres for reduction of fuels, and reforest 347 acres of salvage logged units, and some (156 acres) of the fuels treatment only units. Volumes projected reflect field data collected on proposed salvage units only, and from trees exceeding 16 inches d.b.h. The total volume reflected in this survey was reduced for volume deterioration due to time (see below) and for 3 to 4 retention snags per acre.

The total cost to the Forest Service for Alternative B includes sale preparation and administration, fuel treatment, and reforestation, and totals $1,842,000 (Table 14). Receipts from the timber sale revenue at base rates would be $9,400, somewhat minimally reducing implementation costs. Revenue from salvage sales may be retained internally by the Forest Service to prepare and administer other salvage projects and do not have to be deposited to the U.S. Treasury. Federal tax income from the production of goods and employment directly from harvest and lumber processing would be about $112,000 further reducing the federal balance. Logging operations reduce the fuels treatment costs by $289,000 over Alternative C.

The hidden benefit beyond that to the public is the addition of $360,000 of log product, which can be processed to lumber with additional derivatives to the market economy. Yield tax (due upon severance of the log from the stump) which the Purchaser is obligated to pay the State of California is about $10,000. Retail tax to be earned on finished lumber to be paid to state and local governments, based on 5.5 percent on $1.39 per board foot value at “retail checkout” would approximate $250,000. State employment tax, considering only logging and mill workers, would approximate $50,000. The total taxation opportunity to the state is $312,000. The state assumes these taxation benefits, with no state investment. These are all benefits directly tied to the proposed logging in Alternative B, which are largely forgone if Alternative A or Alternative C is implemented. The total benefit of raw material supply to the mill and federal, state, and local tax opportunities total $672,000.

These benefits together total $1,083,000 and are derived from an additional federal investment of $207,000. The benefit/cost to society would be a return of $5.22 for every $1.00 invested by the public in the timber sale portion of the proposed alternative. Of this, the benefit/cost to the Federal Government would be $1.98 return for every $1.00 invested in the timber sale portion of the project, and the benefit/cost to state and local government would be
$1.50 return for every federal $1.00 invested. Product log value contribution to the local economy (mostly Southern California) would be $1.74 for every federal $1.00 invested.

Table 14. Benefit/cost comparisons between alternatives

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<th></th>
<th>A</th>
<th>B</th>
<th>C</th>
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<td>Local State Market Benefit/Cost</td>
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<td>$1.74</td>
<td>$0.00</td>
</tr>
</tbody>
</table>

* cost of preparing and administering a non commercial contract to remove excess trees

**Alternative C – Noncommercial Funding Alternative**

Alternative C includes treatment of only trees 15 inches d.b.h. or less within the 350 acres proposed for salvage under Alternative B, the retention of all logs from hazard trees greater than 20 inches in diameter, and felling, bucking, and lopping slash of trees less than 10 inches d.b.h.

After two years, trees less than 15 inches d.b.h. present only 18 to 27 percent of their pre-fire volume (Region 5 Supplement 2409.12-2005-2 of the Forest Service Handbook (FSH) 2409.12, Chapter 20 – Estimating Tree Volume and Weight, Exhibit 22.31e Tree Deterioration Guide.) Hauling log loads, which are only 25 percent “sound wood” costs approximately $195/MBF and is not economically feasible, when the other logging costs are considered, and the “log-pond”
value is $110/MBF. (Thus, the original proposal under Alternative C was “noncommercial” and it has been renamed to reflect that.)

The field data collected, indicates an average of 12 to 13 dead trees greater than 16 inches d.b.h. per acre. This can pose safety issues for crews implementing reforestation activities.

Fuels treatments for Alternative C are greater than Alternative B for two reasons: 1) fuels would not be treated as part of timber operations on 347 acres of salvage and charged off against logging operations, but they would still need to be treated by the Forest Service or Service Contractor under Alternative C; 2) tree felling operations on the (formerly) salvage units in order to mitigate the safety issues will have costs associated with felling and bucking trees.

Forest Service contract preparation and administration costs are less than for a timber sale (Alternative B) due to reduced standards required, including product identification, measurement, and valuation; boundary control; environmental protection administration; and timber theft prevention.

Alternative C does not present product infusion into the local and state economies and therefore presents no further taxation or funding derivatives, beyond those associated with income tax generation from snag reduction for safety and reforestation employment.

Forest Vegetation

**Alternative A – No Action**

**Direct Effects**

No restoration activities would take place at this time under the no action alternative. No trees would be cut for salvage or hazard reduction, and existing fuels would not be treated.

The deterioration of trees killed by fire is described by Kimmey (1955). The principle influences on the stands of burned trees are fungi, insects, and weather. For about the first two years after the fire there is little obvious change in the conditions of the fire-killed trees. By years 3 to 5, however, signs that the stands are changing are evident. Dead branches fall to the ground. Smaller pines and firs start to lose their bark and break off at various heights from the ground.

Early stages of forest succession take place immediately following the fire, favoring rapid revegetation of grasses, forbs, and sprouting woody plants.

**Indirect Effects**

The indirect effects of no action would be the continuation over time of forest succession on the burned area. Brush species like manzanita, ceanothus, bitter cherry, and sagebrush would flourish and come to dominate many sites as has happened on the Kern River District on the McNally, Manter, and Stormy fire areas. These brush species tend to capture a site and delay reforestation for 40 years or more by limiting water, nutrients, and sunlight available to tree seedlings (Helms and Tappeiner 1996, pp. 443-445).
Reforestation would be by natural recovery only. Species of oaks would regenerate from sprouts. Stands with residual cone-bearing trees would see some seedlings become established following good cone-crop years. Shade-tolerant species like white fir would be best able to compete with and eventually overtop the brush competition. Shade-intolerant pines like Jeffrey and pinyon would be at a disadvantage. Areas that suffered stand-replacing fire intensities have lost the viable seed stored in the soil litter as well as the mature trees needed to provide a seed source. These deforested areas range from small openings, to hillsides hundreds of acres in size. Because tree seeds are not usually dispersed over long distances, recovery of the coniferous forest would be a very slow process, with trees becoming established outward from adjacent live stands or scattered surviving pockets of green trees (Helms and Tappeiner 1996, pp. 443-445).

Cumulative Effects
Site preparation and planting of deforested stands that are not proposed for salvage harvesting will be analyzed under a separate NEPA document in 2010. How much additional planting will be proposed is uncertain at this time, but preliminary estimates are 2,500 to 3,000 acres. The sum of those acres together with the natural recovery acres would determine reforestation established in the Piute burn.

Failure to treat fuels would have a cumulative effect should one or more future wildfires occur in the project area. Fuel loadings would be higher and the chances for a larger, hotter, and more resource damaging fire would increase. In areas where we depend on natural recovery, the result would be fewer trees remaining as seed trees to help reforest the site. Unstocked or understocked stands would require more time to return to desired old forest conditions. Decadent stand features often beneficial to wildlife species could be delayed for an additional 250 years (SNFPA 2001, V.1, Ch.2, p.138).

Summary of Effects
Alternative A does not address the identified forest vegetation needs to reforest areas in a reliable and timely manner, or to reduce the safety hazard from falling fire-damaged trees.

Alternative B – Proposed Action
Direct Effects
Alternative B would remove dead and dying trees in salvage harvest units (about 350 acres) and small (less than 15 inches d.b.h.) dead trees in fuel treatment units. Three of the fuel treatment units that are not going to be salvaged (19, 23, and 31) on about 155 acres would also be planted. These three stands had over 75 percent fire mortality and were originally proposed for harvest and planting, but field exams in the summer of 2009 indicated the damaged trees are too small to be commercially logged. Other fuel treatment units generally did not have stand-replacing mortality levels. The salvage specifications would also be used to identify hazard trees expected to die within three years and pose a danger along forest roads.
Beschta et al (1995, p. 7) state “human intervention should not be permitted unless and until it is determined that natural recovery processes are not occurring.” His report raises concerns about planting or seeding of exotic species that are not part of the native ecosystem of the area, and points out that on-site seed trees can often supply a source of seedlings. On the Piute Fire Restoration Project, only seedlings grown from suitable seed sources for the Piute Mountains would be planted. Jeffrey pine and white fir would be planted with some sugar pine and black oak if needed. Where planting is proposed, seed sources for natural regeneration were killed by the wildfire. Waiting for several years to see if natural reforestation takes place may have more application in areas that have more growing-season rainfall than in the dry Piute Mountains. Here, waiting several years before planting would almost certainly result in very poor survival and growth without the repeated use of herbicides and mechanical treatments to suppress the competing grass, forbs, and shrubs. There is also no assurance that potential seed trees will survive long into the future.

Planting is proposed within one year of harvest on all salvage logged units. Planting offers the advantage of establishing tree seedlings before the competing forbs, grasses, and brush species are dense enough to dominate the sites and limit the water, nutrients, and light available for the seedlings. While not all planted seedlings survive, Kern River District records of past planting in the Piute Mountains indicate about 50 to 80 percent of seedlings should survive and grow. This is not the case with natural seed germinants. Natural seed germination will be much lower, as they lack the root depth and bark thickness to survive the hot, dry conditions found on the project area. Additionally, most areas proposed for salvage were severely burned and do not have enough live trees to provide an adequate seed source for natural reforestation. (Any small pockets where there are live trees or newly spouted seedlings or hardwood sprouts, would not be planted. Examples of this are expected in salvage unit 1S and fuel treatment units 19 and 23.)

Only seedlings from local seed zones adapted to local site conditions would be considered for planting. All planting areas are in either mixed conifer or Jeffrey pine vegetation types. For mixed conifers, prescriptions call for planting about 150 Jeffrey pines and 50 white firs per acre. Jeffrey pine types would receive 150 Jeffrey pine seedlings per acre. Planting 150 to 200 trees per acre instead of more trees at denser spacing is necessary to assure that there are enough local site adapted seedlings available to plant all areas anticipated for planting within the Piute Fire area. At expected stocking levels, established stands should be able to achieve and maintain 25 to 50 percent canopy covers, but not be dense enough to be dependent on thinning treatments to remain healthy. Planted stands would receive one hand release (weeding) treatment within three years of planting to help reduce competition from other vegetation (See Table 4 page 19, Project Design Features, SV-3). Competing weeds would be grubbed out within a 5-foot radius of the seedlings. Detailed reforestation prescriptions would be completed for each stand after a NEPA decision is issued.

Given that about 500 acres are proposed for planting, and an additional 2,500 to 3,000 acres that are not harvested may be proposed for planting under a separate reforestation NEPA
document, natural recovery is still the predominant reforestation method prescribed for
Alternatives B and C. Assuming 3,500 acres are eventually planted, there are still roughly 15,400
acres of deforested stands that will depend on natural recovery to restore trees to the sites.
Whether desired or not, there are typically workforce, supply, budget, and logistical constraints
that limit artificial reforestation efforts like planting, and result in natural recovery as the most
prevalent means of reforestation. Large areas of the Piute burn are within the Woolstaf Roadless
Area and not accessible for planting. Other areas are too inaccessible, rocky, or shallow-soiled to
be practical to reforest artificially. These areas include most of the Jeffrey pine and pinyon-
juniper typed stands. These forest openings should reforest over time, perhaps centuries, without
intervention from silvicultural activities.

Indirect Effects
Salvage harvests and fuel treatments would reduce aerial and surface fuels and aid in any future
prescribed fire and wildland fire use in the area. Reducing fuels and fire intensities would
potentially protect reforested areas from stand-replacing fires during the early years of forest
reestablishment. Fuel treatments with feller-buncher or mastication equipment will disturb the
ground surface litter layer. In fuel treatment units with residual live trees, this will provide a
better seed bed for natural seedlings to become established.

As planting has proven to be the most reliable and fastest means of reforestation on nearby
recent wildfires (McNally, Stormy), planting 500 acres on the project would move those sites
more quickly from a shrub dominated community to one well stocked with trees. Even with
planting, it will take at least 100 years for these stands to contain large trees (greater than 24
inches d.b.h.), and about 250 years to develop trees with decadence characteristics favored by
many wildlife species (SNFPA 2001).

Cumulative Effects
Additional reforestation by planting, with and without site prep to remove small standing dead
fuels, is anticipated on an additional 2,500 to 3,000 acres by 2011 or 2012. The fuel treatment
may be by feller-buncher or masticating machinery. Reforestation by planting would total 3,000
to 3,500 acres and reforestation by natural recovery about 15,400 to 15,900 acres. All planted
areas would receive one hand release. Additional release needs are not anticipated, but would be
assessed as part of the survival examinations. In summary, more acres would be reforested in a
shorter time, and at a higher cost, than in Alternative A.

Summary of Effects
Alternative B helps to meet the identified forest vegetation needs to reforest areas in a reliable
and timely manner, and to reduce the safety hazard from falling fire-damaged trees. It would
help lead to long-term desired habitat conditions associated with large and decadent trees.
**Alternative C – Noncommercial Funding Alternative**

Alternative C limits treatments to dead trees only (no green needles), with a 15 inches d.b.h. upper limit in the (former) salvage units. Smith and Cluck (2009) guidelines for dying trees would not be used. No green trees with the exceptions of roadside hazard trees defined below would be harvested. All felled hazard trees over 20 inches in diameter would be left on the ground for wildlife habitat. Treatments in the fuels units would remove or masticate only dead trees, as in Alternative B, but would be limited to trees no greater than 10 inches d.b.h.

Because only smaller stumps would be created (less than 18 inches diameter), Sporax application to control the spread of annosus root rot would not be used under Alternative C (with the exception of hazard trees that may be over 18 inches d.b.h.; Bulaon et al. 2009). The small stumps should be too hot on the surface and interior, and too dry to support annosus growth. The exception would be any stump larger than 18 inches diameter from removal of roadside hazard trees, which would be treated with Sporax.

Alternative C uses hazard tree marking guidelines from the Sequoia National Forest Hazard Tree Procedures for Forest Plan Compliance (2004) to designate roadside hazard trees to remove. These were the guidelines prescribed in the Environmental Assessment of the Piute Fire Roadside Hazard Tree Removal Project (2009).

**Direct Effects**

This alternative has been designated as a noncommercial alternative. Trees in the 10-15 inches d.b.h. range would be felled under service contracts to reduce hazards to forest workers in the plantations and provide a higher level of fuels reduction within established plantations. Fewer and smaller dead trees would be removed in the fuel treatment units compared to Alternative B. This would result in higher fuel loadings than in Alternative B, but lower fuel loadings than in Alternative A, with corresponding risks of future losses to wildfires.

Planting would use the same specifications as Alternative B. The same 500 acres would be planted. More fire-injured roadside trees that are dying but not yet dead would remain on site than in Alternative B, creating higher potential for injury or damage in the near future or requiring further treatment or additional environmental analysis.

**Indirect Effects**

With no trees salvaged and fewer removed in fuel treatments, more standing fuels would remain on the treated sites to contribute to future surface and standing fuel loadings. This would make protection of future stands by prescribed fire and wildland fire use more difficult and costly.

In the near future, more hazard trees would remain along system roads, posing more of a danger to forest visitors. However, Alternative C also proposes decommissioning about 8 miles of lower-use forest roads, indirectly reducing the hazard from falling trees to the public along those roads.
Planted areas would be restored as they would under Alternative B. Those sites would move more quickly from a shrub dominated community to one stocked with trees.

Cumulative Effects
The cumulative effects of Alternative B also apply to Alternative C. More areas would be reforested over a shorter time than if no action were taken.

One additional effect of Alternative C would be the impacts of the proposed road decommissioning. These roads may access areas that are eventually proposed for planting and weeding under the future Piute Fire Reforestation Project. Any areas without vehicle access are more expensive and time consuming to plant and release.

Summary of Effects
Alternative C helps to meet the identified forest vegetation needs to reforest areas in a reliable and timely manner, and to reduce the safety hazard from falling fire-damaged trees. However, more dead and dying trees are left on salvage and fuel treatment sites than under Alternative B, which would create a higher risk of fuel management/wildfire problems after stands are revegetated by planting and natural recovery. This alternative would help lead to long-term desired habitat conditions associated with large and decadent trees.

Because Alternative A relies entirely on natural recovery to reforest deforested and understocked areas, there is a reduction in long-term productivity, compared to Alternatives B and C, which rely in part on more reliable and timely planting of site-adapted trees.

Both Alternatives B and C would restore site productivity in a shorter timeframe by using planting to restock deforested stands on about 500 accessible, suitable acres.

Fuels

Effects Common to all Alternatives
The Piute Fire perimeter was used to analyze the cumulative effects. The area is of sufficient size to project potential impacts to fuels and fire behavior of all alternatives. Forested areas outside the treatment areas that burned at moderate to high intensity would have similar direct, indirect, and cumulative effects as those of the no action alternative. Throughout the Piute Fire area, fuel loadings within the Sierra mixed-conifer high-mortality areas would likely range between 80 to over 100 tons/acre, and Jeffrey and Eastside pine stands would likely range between 39 to 80 tons/acre over the next 20 to 30 years. In areas outside the forested areas, herbaceous fuel would increase. By year 20 after the fire, brush and herbaceous fuels would be intermixed and fallen dead pinyon juniper trees would contribute to fuel loadings. Fuel loadings within the pinyon juniper areas would likely be between 6 and 14 tons/acre. Within 30 years, many of these areas would exceed fire behavior characteristic thresholds.
Alternative A – No Action

This alternative essentially would allow the trees to fall at their own rate; however, diligent effort would be made to provide public access and maintain safe conditions. No salvage or fuels treatment would occur. The only fuel removed would be through personal use firewood gathering permits.

Direct and Indirect Effects

Under the no action alternative, the current potential fire behavior is predominately low. However, this will change as herbaceous fuels are expected to increase. Twenty years following the fire, dead trees would have fallen, with chaparral and herbaceous fuels intermixed. Within 30 years, the remainder of the dead trees would have fallen creating a heavy slash fuel model (fuel model 12) in the conifer forest high-mortality areas. Fuel loadings within the treatment units would range between 40 to over 100 tons/acre.

FlamMap Analysis

The following tables (next page) display the results of the FlamMap analysis for the Piute Fire Restoration Project for the no action alternative. Table 15 shows the results of the Piute Fire as a whole (37,254 acres). Table 16 displays only the proposed units.

As the tables demonstrate, at 10 years after the Piute Fire, most of the fire area would have desirable fire behavior characteristics. By 20 years after the Piute Fire, establishment of young chaparral shrubs would begin. Generally, fires in young brush are not very intense because surface fuel loads are light with little dead debris, and the foliage contains little volatile material (Anderson 1982). However, large volumes of fire-killed trees on the ground would be in addition to the chaparral. Therefore, there would be a considerable decline in the amount of area within the desired range in heat per unit area. By 30 years, the project area would reach its peak potential fire behavior. The chaparral would reach an age that it is no longer suppressing fire spread. While these areas would look like chaparral fields, they would have high fuel loadings from the fallen fire-killed trees.

Cumulative Effects

Alternative A would reduce neither future fuel loading nor potential fire behavior within the Piute Fire perimeter. This alternative could contribute to more intense future potential fire behavior on a landscape scale. Existing plantations that survived the Piute Fire would be put at risk from wildfire as the fuel loading increases in and around them. FlamMap projects that by 30 years after the fire there would be enough fallen fire-killed trees that the flame length and heat per unit area would increase dramatically to mostly exceed the desired range in areas that receive no treatment. High volumes of down large dead debris may preclude the use of prescribed fire or fire for resource benefit without killing a significant portion of trees growing on the site and have
a greater risk of escaped fires. The no action alternative would not meet or move the project area towards the LRMP standards and guidelines.

Table 15. Effects of the no action alternative (Alternative A) on fire behavior characteristics at or below threshold limits for the entire Piute Fire (37,254 acres)

<table>
<thead>
<tr>
<th>Fire Behavior Characteristic</th>
<th>After 10 Years</th>
<th>After 20 Years</th>
<th>After 30 Years</th>
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<tr>
<td></td>
<td>Acres at or Below Threshold Limits</td>
<td>% of Acres at or Below Threshold Limits</td>
<td>Acres at or Below Threshold Limits</td>
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<tr>
<td>Heat/Unit Area (&lt; 1,000 BTUs/ft/sec)</td>
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<td>Flame Length (&lt;4.0 foot)</td>
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<td>Rate of Spread (&lt; 5 chains/hour)</td>
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Table 16. Effects of the no action alternative (Alternative A) on fire behavior characteristics at or below threshold limits for the Proposed Units (2,317 acres)

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<th>Fire Behavior Characteristic</th>
<th>After 10 Years</th>
<th>After 20 Years</th>
<th>After 30 Years</th>
</tr>
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<tbody>
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<td>Acres at or Below Threshold Limits</td>
<td>% of Acres at or Below Threshold Limits</td>
<td>Acres at or Below Threshold Limits</td>
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<td>------------------------------</td>
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<tr>
<td>Heat/Unit Area (&lt;1000 BTUs/ft/sec)</td>
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<td>500</td>
</tr>
<tr>
<td>Flame Length (&lt;4.0 foot)</td>
<td>2,245</td>
<td>97</td>
<td>1,772</td>
</tr>
<tr>
<td>Rate of Spread (&lt;5 chains/hour)</td>
<td>2,051</td>
<td>89</td>
<td>1,610</td>
</tr>
</tbody>
</table>

**Alternative B – Proposed Action**

Direct and Indirect Effects

Dead trees would be felled, piled and/or masticated. Excess fuels over 10 to 15 tons/acre would be jackpot and pile burned. An average of one pile per acre would be left for wildlife habitat. Approximately, 3 to 5 tons/acre of large woody debris and less than 5 tons/acre of woody debris less than 3 inches would be left to meet management standards and guidelines. Delayed mortality and large cull trees left after salvage operations would contribute less than 5 tons/acre more. In 30 years, fuel loadings from large woody debris would be less than 20 tons/acre.

FlamMap Analysis

The following tables display the results of the FlamMap analysis for the Piute Fire Restoration Project for the proposed action alternative. Table 17 displays only the proposed units.
Table 17. Effects of the proposed action (Alternative B) on fire behavior characteristics at or below threshold limits for the proposed units (2,317 acres)

<table>
<thead>
<tr>
<th>Fire Behavior Characteristic</th>
<th>After 10 Years</th>
<th>After 20 Years</th>
<th>After 30 Years</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Acres at or Below Threshold Limits</td>
<td>% of Acres at or Below Threshold Limits</td>
<td>Acres at or Below Threshold Limits</td>
</tr>
<tr>
<td>Heat/Unit Area (&lt; 1,000 BTUs/ft/sec)</td>
<td>2,317</td>
<td>100</td>
<td>2,318</td>
</tr>
<tr>
<td>Flame Length (&lt; 4.0 foot)</td>
<td>1,572</td>
<td>68</td>
<td>2,287</td>
</tr>
<tr>
<td>Rate of Spread (&lt; 5 chains/hour)</td>
<td>120</td>
<td>5</td>
<td>2,206</td>
</tr>
</tbody>
</table>

As the table above demonstrates, at 10 years following the Piute Fire, due to an increase in herbaceous fuels, rate of spread would exceed thresholds in almost all areas of treatment. By 20 years after the Piute Fire, herbaceous vegetation would be shaded out by growing plantations in salvage units. Young chaparral and trees planted in the fuels units would increase the resistance to fire intensities. At 30 years, FlamMap estimates that the flame length desired range would decline. Plantations would be old enough to burn like a brush field and brush fields would consume areas that are not planted. Therefore, a chaparral fuel model (fuel model 5) was assigned to these areas resulting in higher flame lengths and increased rates of spread. The amount of heat energy affecting heat per unit area would remain in the desired range due to the fire-killed trees being salvaged and/or piled and burned.

Cumulative Effects

Alternative B would reduce future heavy fuel loading and potential fire behavior in the treatment units within the Piute Fire perimeter. This would help to reduce future potential fire behavior on a landscape scale when combined with other projects such as the Piute Roadside Hazard Tree Removal Project and future post-fire wildlife and planting projects. These projects would reduce roadside fuel loading along primary fire control points (roads) and/or help fragment the heavy fuel loadings expected to occur as the fire-killed trees fall in the Piute Fire area. Suppression efforts would have higher rates of success and increase firefighter safety by providing fire control points along roadways. This alternative would increase the probability of survival for the plantations from a future wildfire by reducing fuel loadings in and adjacent to planting units and the plantations that survived the Piute Fire. This alternative brings treatment units closest to meeting standards and guidelines.
**Alternative C – Noncommercial Funding Alternative**

**Direct and Indirect Effects**

Fuel loadings within the treatment units would be slightly less than those in the no action alternative. Dead trees less than 10 inches d.b.h. (or less than 15 inches in the 350 acres proposed for salvage under Alternative B) would be felled and piled. Excess fuels over 10 to 15 tons/acre would be jackpot and pile burned. An average of one pile per acre would be left for wildlife habitat. As stated in the proposed action, approximately 3 to 5 tons/acre of large woody debris and less than 5 tons/acre of woody debris less than 3 inches diameter would be left. Twenty years after the fire, the larger dead trees would have fallen within the plantations and brush fields. Within 30 years, the remainder of the larger dead trees would have fallen resulting in a heavy slash fuel model (fuel model 12) as described in the no action alternative.

**FlamMap Analysis**

The following tables display the results of the FlamMap analysis for the Piute Fire Restoration Project for the modified action alternative. Table 18 displays only the proposed units.

As the table demonstrates, at 10 years after the Piute Fire, most of the fire area would have desirable fire behavior characteristics. By 20 years after the Piute Fire, growing plantations and young brush in the treatment units would increase the resistance to fire intensities. However, the addition to the large volumes of larger fire-killed trees on the ground would reduce the amount of area within the desired range for heat per unit area. By 30 years, the project area would reach its peak potential fire behavior. Acres falling within the desired ranges for heat per unit area, flame length and rate of spread would considerably decline. Plantations would be old enough to burn like a brush field and brush fields would consume areas that are not planted. These areas would also have high fuel loadings from the fallen fire-killed trees.

**Table 18. Effects of modified action alternative (Alternative C) on fire behavior characteristics at or below threshold limits for the proposed units (2,317 acres)**

<table>
<thead>
<tr>
<th>Fire Behavior Characteristic</th>
<th>After 10 Years</th>
<th>After 20 Years</th>
<th>After 30 Years</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Acres at or Below Threshold Limits</td>
<td>% of Acres at or Below Threshold Limits</td>
<td>Acres at or Below Threshold Limits</td>
</tr>
<tr>
<td>Heat/Unit Area (&lt; 1,000 BTUs/ft/sec)</td>
<td>2,318</td>
<td>100</td>
<td>751</td>
</tr>
<tr>
<td>Flame Length (&lt; 4.0 foot)</td>
<td>2,132</td>
<td>92</td>
<td>1,806</td>
</tr>
<tr>
<td>Rate of Spread (&lt; 5 chains/hour)</td>
<td>1,738</td>
<td>75</td>
<td>1,660</td>
</tr>
</tbody>
</table>
Cumulative Effects
Alternative C would have similar cumulative effects as the no action alternative. Alternative C would reduce some future fuel loading within the treatment areas. Plantations would be put at risk from wildfire as the fuel loading increases in and around them. Accumulations of large dead woody fuel, especially larger diameter decayed pieces contribute to the development of large fires, high fire severity, fire persistence, and resistance to control. Torching, crowning, and spotting, which contribute to large fire growth, are greater where large woody fuels have accumulated under a forest canopy (Brown et al. 2003). FlamMap projects that by 30 years after the fire there would be enough fallen fire-killed trees that the heat per unit area and flame length would increase dramatically to mostly exceed the desired range in areas that receive no fuel treatments. Future wildfires near roads proposed for decommissioning may be larger in size due to the increased amount of time it would take suppression resources to arrive on scene. This alternative brings treatment units closer to meeting standards and guidelines than the no action alternative.

Minerals, Special Uses, and Lands

*Alternative A – No Action*

Direct, Indirect, and Cumulative Effects
The no action alternative describes the current condition with no restoration activities to be implemented. This alternative would have no direct effects on minerals, special uses, or lands.

An indirect effect to local landowners would be increased fuel loading that could increase the risk of future damaging fires, with potential threat to private property. If the roads were not repaired, an indirect effect could be loss of access to private inholdings and mining claims. This could require the land or claim owner to reconstruct access routes, when authorized by a special use permit or plan of operations. This could incur significant costs upon individuals.

Summary of Effects
Although the no action alternative would have no direct effects on minerals, special uses, or lands, indirect effects could be costly to private landowners and mining claim owners.

*Alternative B – Proposed Action*

The proposed action includes the activities outlined below:

1. Snag habitat for wildlife and future down logs would be retained while merchantable dead and dying conifers would be harvested in stands with greater than 50 percent mortality.
2. Hazard trees would be removed in conjunction with this project including trees predicted to die within three years.
3. Ensure adequate ground cover and treat fuels.
4. Ground-based logging methods (e.g., tractor, skidder, feller/buncher, tractor end lining) would be used to remove merchantable trees and to treat fuels.
5. Native tree seedlings would be planted in treatment units.
6. Existing roads would be repaired and receive maintenance where conditions warrant to reduce erosion and facilitate treatments and product removal.

Direct Effects
For those mining and reclamation activities in the project area, the design feature specified on page 19 (ML-1) would ensure proposed activities would not have any direct effects.

The Moreland Mines Reclamation Abandoned Mining Lands (AML) project will be considered under a separate NEPA document. The Moreland AML project will conduct earth-moving activities to recontour slopes and close or rehabilitate access roads. Four of the activities in the proposed action have the potential for direct effects on the project. Activities 2 through 6 above should be coordinated with the Moreland AML project, scheduling project activities to ensure the final forest goal is achieved, without duplication of efforts.

The French Meadow Mine CERCLA site contains a capped repository of contaminated mine tailings. Activities 4 and 5 have the potential to disturb the soil cap. This effect can be mitigated by avoiding the capped area (see table 4, p. 19, Project Design Features, ML-1).

The French Camp CERCLA site has uncontained contaminated mine tailings. Should any of the above activities take place within the site, hazardous materials could be released into the environment and human exposures would be likely. Therefore, no activities should take place within the French Camp Site (ML-1).

Indirect Effects
No indirect effects were identified for minerals, lands or special uses.

Cumulative Effects
All potential direct effects can be mitigated by project design and there would be no indirect effects. Therefore, Alternative B would not have any cumulative effects for minerals, lands or special uses.

Alternative C – Noncommercial Funding Alternative
The effects of the activities outlined in Alternative C are similar to Alternative B, with the exception of commercial salvage and activity #6: Existing roads would be repaired and receive maintenance where conditions warrant to reduce erosion and facilitate treatments and product removal. Road segments that are not required for this project, not required for future forest management activities, not required for access to private property, and that have been severely
damaged as a result of the 2008 flooding would be proposed for decommissioning and restoration.

Direct Effects
This would be the same as Alternative B for AML projects. Activity #6 could have a direct effect on mining prospectors and potential claimants if a currently used access route were to be closed by this project. However, this can be mitigated through administrative procedures. Mining claim owners that require access to their claims may file a plan of operations.

Indirect Effects
Other than Activity #6, none of the project activities in this alternative would have any indirect effects on minerals, lands, or special uses.

In Activity #6, a potential indirect effect from closing roads would be decreased access to public lands for mineral exploration, with the subsequent effect of a reduction of discovery of new mineral resource commodities. When there is no public access for minerals-related activities, the miner or prospector must go through the process of submitting a plan of operations to use the roads not available for the public, or to construct new roads. Approval of a plan of operations requires an environmental analysis, performed by the Forest Service, and a reclamation bond from the miner. This is time consuming and costly for the miner, as well as the Forest Service, and often discourages the proposed mining activity.

Cumulative Effects
The only cumulative effect would be the potential decreased access for minerals exploration, and the extra time and cost involved with processing and approving a plan of operations for access to future mining claims. The future miner would have to file a plan of operations to reopen a closed route (just the same as he would to construct a new route). This would incur an added expense for the miner if his mining operation would not otherwise require the plan of operations.

Summary of Effects
The effects of Alternative C to special uses, lands and minerals would be minimal to none, with only a small potential for decreased minerals exploration, and the possibility of a mining prospector or potential claimant incurring additional costs to use roads that are no longer open to the public.

Recreation

Alternative A – No Action

Direct, Indirect and Cumulative Effects
No management action would occur under Alternative A. There would be no direct or indirect effects to analyze from project activities. Without direct and indirect effects, there would be no
cumulative effects. Recreation and trail conditions would remain as described in the Affected Environment section of this report, though there might be some lost opportunity to mitigate or curtail cross-country travel.

Summary of Effects
The effects of the no action alternative would be the same as described in the Affected Environment section of this report. The no action alternative would present no additional effects or issues regarding the recreation resource.

Effects Common to Alternatives B and C
Both the proposed action and the modified action alternative would have similar effects on the recreation resource with the exception of decommissioning of roads. Both actions propose ground-based logging methods, temporary closures for public safety, and fuels reduction operations. The areas that these activities would occur in are the same in both alternatives, with differences that would not be substantial to the recreation resource. The decommissioning of roads, changes in vehicle class, and conversion to trails being proposed in the noncommercial alternative are additional effects that will be analyzed in the section “Additional Effects from Alternative C – Noncommercial Funding Alternative.”

Direct Effects
The direct effects of the action alternatives would be negligible to the recreation and trails resources. Though the Piute Fire resulted in a variety of long-term and short-term effects, the action alternatives would not result in significant effects. Effects that could occur would be minimized with the project design features.

Direct effects to recreational users would be short term, and design features would ensure that long-term effects would be negligible.

One short-term, direct effect would be the closure of roads and trails during salvage and fuels reduction operations. Closures would impact all users in the short-term, ranging from hunters to OHV enthusiasts. These two types of recreational visitors comprise the bulk of the visitors in the Piute Mountains. Table 19 and Table 20 list the trails within the proposed action’s activity centers. Road closures would also prevent visitor access, and increased traffic and congestion on the roads due to logging operations would occur during operations. However, these effects would be insignificant because a design feature of the proposed action would be to halt operations during periods of high visitation, which would include weekends during hunting season.
Another short-term, direct effect would be the degradation of National Forest System trails (NFSTs). However, the trails within the project area would be protected during operations, and if damages occur, the trails would be reconstructed to their designed use according to Forest Service standards.

To summarize the direct effects on trails, there are approximately 40.55 miles of National Forest System trails within the Piute Fire perimeter. Of those, 1.74 miles (4.3 percent) of Piute system trails are within salvage areas, and 7.25 miles (17.9 percent) are within fuels reduction areas. Direct effects would occur on approximately 9 miles (22.2 percent) of National Forest System trails in the Piute Fire area. These direct effects would be short-term, lasting less than a year.

Indirect Effects
The potential indirect effects from the proposed action include increased accessibility to off-trail, motorized activity. If additional trails were created there could be increased erosion resulting from these trails. These effects could occur because of the removal of timber, creation of skid trails, and thinning of brush that would occur in both the salvage and the fuels reduction areas. Design features are included to minimize the potential for the proliferation of new, user-created routes.

Cumulative Effects
The Piute Fire BAER effort is ongoing. The trails within the Piute Fire area are currently being rehabilitated. This will benefit recreational visitors in the long-term by providing sustainable, safe trails. However, due to post-fire conditions all of the Piute trails are closed to motorized use from July 23, 2009 to May 1, 2010 following Forest Order 09-04. This action was taken as part of the BAER recommendations to prevent resource damage. This order has a short-term, negative effect on recreation in the Piute Mountains because it prevents opportunity for users to
enjoy the area’s trails with OHVs, which is a primary use of the area. However, the long-term effect of this order will be positive for OHV enthusiasts. This will allow Forest Service crews to rehabilitate the trails to Forest Service standards and build safer trails that will be more resilient to erosion. Allowing time to rebuild the area’s trails, replace damaged signs, and post information will benefit area users in the long-term.

The Piute Roadside Hazard Tree Removal Project is also being implemented in the project area. This project will remove hazard trees along 31.6 miles of system roads. The result of this project will be a positive effect for recreation. Access will not be hindered by fallen trees, and the roads will be safer in the long term. There would be short-term negative effects similar to this proposed action within the Piute Roadside Hazard Tree Removal Project. However, none of these effects would be significant as project design features and mitigations would minimize the effects to recreation.

Travel management planning is also ongoing in Sequoia National Forest. Though the Piute Mountains were originally a part of this planning effort, the Sequoia National Forest will now analyze the Piute Mountains in a subsequent environmental document due to the changed conditions.

Summary of Effects

**Project Conformity to the Recreation Opportunity Spectrum (ROS)**

Issue indicator = Project conforms to the ROS; or project does not conform to ROS and a Plan Amendment would be necessary.

- Both action alternatives conform to the ROS. No Forest Plan Amendment would be necessary.

**Project Effects on Trails**

Issue indicator = Miles of National Forest System Trails will that will be affected by the project activities.

- Approximately 9 miles of National Forest System trails would be affected. The effects on the trails would be short term, lasting less than a year because a project design feature is the protection and/or restoration of these trails upon completion of the project.

**Project Effects on Inventoried Roadless Area**

- No salvage logging or fuel reduction operations would take place in the Woolstalf IRA, which complies with Forest Service policy regarding inventoried roadless areas.

**Additional Effects from Alternative C – Noncommercial Funding Alternative**

In addition to the aforementioned effects, there would be additional effects resulting from Alternative C. The noncommercial alternative would change the status of some system roads in the Piute Fire area, resulting in some changes in recreation opportunities. Some roads would be
decommissioned and a few would be converted from a road to a motorized trail. The effects of these actions will be analyzed in this section.

**Direct Effects**

The direct effect on recreation from changing the status of system roads would be primarily a couple of minor, long-term, negative effects, with a beneficial effect in one instance. As listed in Table 21, there would also be numerous status changes that would have a neutral effect.

Most of the Forest roads used by visitors would be maintained, including those that provide access to hunting camps. There would be a few roads that are used by forest visitors that would be decommissioned under Alternative C. National Forest System roads, 28S17A and 28S43, are currently used as OHV routes, though under Alternative C these would be decommissioned and have a negative effect on recreation in the project area. Road 28S24C, used by hunters and OHV enthusiasts, would also be decommissioned. The net, direct effect of the decommissioning of roads in the Piute Fire area would be a long-term loss of some motorized opportunities.

**Indirect Effects**

Alternative C could indirectly affect the project area and other areas by increasing congestion and causing displacement of visitors. Displacement of visitors can increase impacts in previously undisturbed areas. However, this is not a forestwide proposal, and Alternative C would affect only a small number of Sequoia National Forest roads. Alternative C would decommission 7.97 miles, which would have some effect in increasing congestion in the Piute Mountains during hunting season. However, most of the roads currently open would remain open, including all arterial roads, so the indirect effect of congestion would be minimal. Likewise, most of the roads more frequently visited in the Piute Mountains would remain open, so there would be little displacement created by these closures.

**Cumulative Effects**

The cumulative effects of Alternative C are similar to those listed under Alternative B, above. The additional effect of decommissioning 7.97 miles of road may have cumulative impacts associated with travel management planning. Currently, however, travel management planning for the Piute Mountains has been deferred pending evaluation of the fire and flooding effects on the travel route system. Travel route management will be analyzed through a separate NEPA document that will evaluate recreation opportunities with other resource issues. Because this separate project is in the data gathering process and no actions have been proposed, a cumulative effects analysis would be purely speculative at this time.
### Table 21. Proposed status change in roads and direct effects to recreation

<table>
<thead>
<tr>
<th>Road Number</th>
<th>Proposed Change</th>
<th>Positive (+), negative (-), or neutral (=) effect on recreation</th>
<th>Direct Effect on Recreation</th>
</tr>
</thead>
<tbody>
<tr>
<td>27S02E</td>
<td>Decommission</td>
<td>=</td>
<td>Very small effect on recreation. 27S02E does cross System trail 33E65, but there are better access points for OHV use of the trail.</td>
</tr>
<tr>
<td>27S02F</td>
<td>Convert to trail ½ mile, Decommission ½ mile</td>
<td>+</td>
<td>Small beneficial effect for OHV use. The conversion of the first ½ mile of 27S02F would slightly increase the mileage of system trails in the Piute mountains. The decommissioning of the second ½ mile would have little effect on the recreational opportunities, because it is not heavily used by the public and it duplicates access via the Liebel peak Trail to Liebel Peak.</td>
</tr>
<tr>
<td>28S17A</td>
<td>Decommission</td>
<td>-</td>
<td>Small negative effect. Decommissioning 28S17A would represent a small loss in riding opportunity for OHV users as it is currently a ML2 – High clearance road open to OHVs. OHV riders could still access U00043 &amp; U001234 via other Forest roads.</td>
</tr>
<tr>
<td>28S18A</td>
<td>Decommission</td>
<td>=</td>
<td>No negative effect on recreation. 28S18A is a short, dead end spur that does not connect to any trails.</td>
</tr>
<tr>
<td>28S23</td>
<td>Maintain 0.75 miles, Decommission 0.89 miles</td>
<td>-</td>
<td>Road would be maintained to 33E68, so OHV use would not be significantly impacted. 28S23 is used by hunters, so there would be a negative effect with regards to reduced motorized access on the last 0.89 mile of 28S23.</td>
</tr>
<tr>
<td>28S24</td>
<td>Maintain to Dry Meadow Trailhead: 5.78 miles, Decommission past trailhead: 0.34 miles</td>
<td>-</td>
<td>Decommissioning the road at 5.78 miles would end the road at 34E31. No significant loss of opportunity would occur as connectivity with system trails would remain intact.</td>
</tr>
<tr>
<td>28S24B</td>
<td>Install gate or barrier</td>
<td>=</td>
<td>Already listed in INFRA as ML1, so 28S24B is currently not intended for public use.</td>
</tr>
<tr>
<td>28S24C</td>
<td>Decommission</td>
<td>-</td>
<td>Decommissioning 28S24C would decrease hunting access for motorized users.</td>
</tr>
<tr>
<td>28S24D</td>
<td>Decommission</td>
<td>=</td>
<td>There would be no negative effect to the recreation resource. 34E42 would still exist for motorcycle riding. 28S24D dead ends in Woolstalf Meadow after only 0.3 miles so no significant hunting access would be lost.</td>
</tr>
<tr>
<td>28S29</td>
<td>Decommission</td>
<td>=</td>
<td>Does not provide any substantial OHV opportunities or hunting access.</td>
</tr>
<tr>
<td>28S30</td>
<td>Decommission</td>
<td>=</td>
<td>Does not provide any substantial OHV opportunities or hunting access.</td>
</tr>
<tr>
<td>28S33</td>
<td>Decommission</td>
<td>=</td>
<td>Does not provide any substantial OHV opportunities or hunting access.</td>
</tr>
<tr>
<td>28S43</td>
<td>Decommission</td>
<td>-</td>
<td>Decommissioning this road would be a negative effect for OHV use. The first portion of FR 28S43 is used to access Trail 33E65 at the southern end.</td>
</tr>
</tbody>
</table>
Summary of Effects

**Project Conformity to the Recreation Opportunity Spectrum (ROS)**
Issue indicator = Project conforms to the ROS; or project does not conform to ROS and a Plan Amendment would be necessary
- Both action alternatives conform to the ROS. No Forest Plan Amendment would be necessary.
- Though there would be a loss of some motorized opportunity, ROS provides only landscape-scale prescriptions, and these prescriptions would still be met.

**Project Effects on trails**
Issue indicator = Miles of National Forest System trails that will be affected by the project activities.
- Approximately nine miles of National Forest System trails would be directly affected. The effects on the trails would be short-term, lasting less than a year because a project design feature is the protection and/or restoration of these trails upon completion of the project.
- More trail mileage would be affected in the long-term through cumulative actions resulting from road decommissioning, as discussed in the Cumulative Effects discussion in this section.

**Project Effects on Inventoried Roadless Area**
- No salvage logging or fuel reduction operations would take place in the Woolstalf IRA, which complies with Forest Service policy regarding inventoried roadless areas.

**Watershed**

**Alternative A – No Action**

**Direct Effects—Soil Resource**
Under the no action alternative, no management activities would take place and therefore no new soil disturbance would occur. Existing conditions are described in Chapter 3. Without management, there would be no new disturbance and a gradual recovery of the existing disturbed areas would occur with increases in large logs and ground cover over time.

**Indirect Effects—Soil Resource**
Nutrient cycling would be enhanced as nitrogen-fixing shrub species establish themselves. Soil fertility would be enhanced as organic matter accumulates on the soil surface and in the soil once early successional plant species establish and die.
Cumulative Effects—Soil Resource

Cumulative effects to soils are based upon the number and types of management activities occurring within an individual stand (or unit) over time and are measured by effects on soil productivity. With no new disturbances, existing disturbances from past activities, wildfire, and storm events would slowly recover. As plants reestablish and soils stabilize, the areas disturbed from high burn severities and excessive erosion would recover much quicker.

Erosion

Without any new management activities, erosion processes would not be altered from their current state. Current excessive rilling would heal over the next 3 to 5 years as plants reestablish and provide litter for stabilizing ground cover.

Soil Biology

Soil biological functions would recover over the next 3 to 5 years as plants establish and provide litter to aid in nutrient cycling. An early establishment of nitrogen fixing shrubs would help the recovery.

Direct and Indirect Effects—Hydrologic Resource

No management activities take place under this alternative. Ground cover and disturbance by rilling would recover over an approximate 3- to 5-year period after the fire from litter cast, downed wood and basal revegetation to a state near baseline erosion potential (Berg and Azuma 2007). Much of the material eroded from the hills would remain sequestered in channels of the project area and be available for movement in the event of infrequent rainfall intensity and exacerbated runoff from hillslopes during that period (Moody and Martin, 2009), but the potential should diminish to near baseline frequency approximately 5 years after the fire (Courter and Stewart 2008). Much of the sediment deposited in channels would be held by revegetated banks and rooting in channel bottoms.

Cumulative Effects—Hydrologic Resource

The BAER post-fire rehabilitation work was mostly focused on roads and trails. Recommendations for further work included area closure for OHVs and rest from grazing rotation. Funding for road and trail work was granted in November 2008. The Piute Fire Hazard Tree Removal Project (decision in 2009), removes trees along 31 plus miles of Forest roads in the project area. The planting of conifer seedlings over approximately 500 acres, is slated to start in 2011.

These activities were taken into account for the Cumulative Watershed Effects (CWE) analysis. The CWE model uses Equivalent Road Area (ERA) in acres to assess impacts of management activities and other events. A threshold of concern (TOC) is established for each watershed based on features of the watershed, the sensitivity of that watershed to disturbance and the nature of the existing and predicted disturbances within the watershed. Results of the CWE
runs are shown in Table 22. The most significant parameter is ground cover. Because of the mitigation effects on ground cover by treatments, the results for Alternative A show higher ERA values for each year after the fire than for the action alternatives after implementation of the treatments. This will be explained in more detail in the cumulative effects discussion for Alternatives B and C.

Table 22. Cumulative watershed effects analysis showing equivalent roaded acres (ERAs). Highlighted values denote watersheds (WS) over threshold of concern (TOC).

<table>
<thead>
<tr>
<th>Watershed No.</th>
<th>Watershed name</th>
<th>Watershed area (acres)</th>
<th>ERA TOC</th>
<th>ERAs Year 2010 Alternatives</th>
<th>ERAs Year 2012 Alternatives</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>A</td>
<td>B</td>
</tr>
<tr>
<td>13DG</td>
<td>Woolstaf C.</td>
<td>1,140</td>
<td>57.61</td>
<td>44.30</td>
<td>41.22</td>
</tr>
<tr>
<td>13DH</td>
<td>Unnamed</td>
<td>290</td>
<td>14.50</td>
<td>15.18</td>
<td>15.18</td>
</tr>
<tr>
<td>13FA</td>
<td>Unnamed</td>
<td>1,160</td>
<td>58.00</td>
<td>36.34</td>
<td>35.24</td>
</tr>
<tr>
<td>13FB</td>
<td>Bright Star Cyn.</td>
<td>1,127</td>
<td>56.35</td>
<td>40.87</td>
<td>36.25</td>
</tr>
<tr>
<td>13FC</td>
<td>Unnamed</td>
<td>1,363</td>
<td>54.52</td>
<td>69.88</td>
<td>32.62</td>
</tr>
<tr>
<td>13FD</td>
<td>Unnamed</td>
<td>452</td>
<td>18.08</td>
<td>51.13</td>
<td>23.70</td>
</tr>
<tr>
<td>13FE</td>
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Most importantly, initial results of the CWE analysis show very high effects, well over threshold ERA values for 14 of 22 watersheds assessed. An ERA value that is 80 percent of threshold or higher, indicates an increased risk of adverse effects (USDA Forest Service 2009).

The ERA values are primarily from the effect of the fire itself. Average ground cover for the fire area was assumed at various levels—20, 40 and 50 percent depending on burn severity that were comparable to aggregates of survey values and model runs for erosion determinations.
Values from soil survey of treatment units for total ground cover ranged from 10 to 74 percent with an average of about 35 percent (Table 4 in Watershed and Soils Report). Values for effective ground cover assumed in WEPP model runs were 25, 40, and 55 percent (Table 8 in Watershed and Soils Report) for low, moderate, and high burn severity, respectively.

The Sequoia National Forest model includes a spatial element within it to assess impact proximity to channels or other hydrologically sensitive areas. CWE results should be judged as approximate, and the scale quite coarse. Results of the analysis are viewed as degree of sediment production largely from recovery of hillslope ground cover and surface roughness. Therefore, while a hillslope may recover hydrologic function naturally or through mitigation, the channel condition at the foot of the slope may yet be irrecoverably or indefinitely changed. For example, if the intense rainstorm of July immediately after the fire had not happened, with its consequence to channel condition, the ERA recovery of watersheds would be the same. While ameliorated runoff and sediment will impact channels differently than unrecovered slopes, some differing impacts will occur also according to current channel condition.

Alternative B – Proposed Action

Direct Effects—Soil Resource

Direct effects to the soils result from disturbance includes redistribution of organic matter and changes in biological and physical properties. The soil properties that are affected are soil volume, soil porosity, soil water availability, soil chemistry and soil biology (Powers 1989). The categories that follow explain in more detail how each of the management activities would directly affect the soil resource.

Ground-based Salvage Harvesting (347 acres)

The primary effects from ground-based harvesting would be direct soil disturbance from conventional log skidders and mechanical harvesters. These types of operations have the effect of development and placement of skid trails. Ground-based harvesting would result in increased soil disturbance and reduced porosity but with proper layout of the skid trail pattern and post-harvest mitigations, detrimental disturbance can be kept within allowable limits (15 percent of each unit).

Some compaction would occur in areas outside of main skid trails where machinery makes one or two passes but this increased compaction would not exceed threshold values as documented by Powers (2002). Compaction would be monitored as part of the best management practices evaluation process after management. If detrimental compaction exceeds 15 percent of the unit, compacted areas would be scarified after management in order to bring the level of detrimental disturbance below the 15 percent threshold (Andrus and Froehlich 1983).
Ground-based Fuel Treatments (1,981 acres)

Ground-based fuel treatments would have similar direct effects as mechanical salvage harvesting. The effects of large machinery, in this case excavators and masticators, are the same as skidding equipment and harvesters. Proper skid trail pattern layout would be essential to avoiding excessive soil disturbance. In units that have harvest and fuel treatments, care should be taken to ensure that the same skid trails are used for each treatment.

Piling and Burning Fuels

Whenever fuels are piled to burn, they are composed of material generally less than 10 inches in diameter and not compacted down to be in contact with the soil. Therefore, most of the radiant heat would not be focused on the soil but dispersed into the air. Field observations from other projects that had burned piles indicated that the duff layer beneath the pile is consumed and the soil surface blackened. This indicates that the burn intensity was in the range of low to moderate. Damage to the soil occurs when the soil color changes to reddish orange (red brick color) which normally occurs under logs and in stump holes during wildfire or broadcast burn intensities of moderate and high. There would be minimal to no significant changes in soil characteristics within the burned pile areas.

Mastication

Mastication covers the forest floor with coarse wood chips and adds protective groundcover. The primary purpose of mastication is to reduce fuel loading and decrease chances of future reburning. A secondary benefit is increased ground cover, which reduces erosion potential and would help to stabilize actively eroding soils in the treated units.

Mastication additionally disturb soils from the excavator turning and the masticating drum churning soil. The excavator has to make tight turns to maneuver between trees. These physical impacts are offset by the organic matter left on the soil surface that would protect churned soil from eroding and enhance recovery. Information on the long-term effects of mastication on soil productivity is still sparse (Resh et al. 2007). For the current analysis, effects are considered similar to those with established skid trail systems in harvested stands.

Hand Planting Tree Seedlings (503 acres)

Planting of native tree seedlings by hand would not have any serious negative direct effects to the soil resource.

Landings

Landings are central processing zones that are essential for logging operations. Landings are approximately 1/4 - 1/3 of an acre each, but are generally larger when whole-tree yarding is used. Existing landings would be reused where possible. All landings not associated with permanent roads would be scarified after use. Landings can produce erosion and sediment if not properly designed and maintained.
Effective Soil Cover
There would be a general increase in effective soil cover with the proposed action. The existing conditions are such that there is very little effective soil cover. It would take 3 to 5 years for effective soil cover to recover naturally without the proposed action. The proposed action would leave a total of 5 to 10 tons/acre of soil cover in the form of woody debris.

Down Woody Debris
Down woody debris would increase under the proposed action. One design feature of the proposed action is to leave 5 to 10 tons/acre of down woody debris on the ground. The increased ground cover would be a combination of materials less than and greater than 3 inches in diameter.

Also, large logs would be enhanced by felling and retaining five logs greater than 20 inches diameter, at least 10 feet long per acre where available. This increase in down woody debris would immediately help to stabilize the soils and increase soil productivity.

Litter and Duff
Litter and duff includes fine needles, partially decomposed needles and other plant material. All of the litter and duff was consumed in the high severity burn areas and the majority was consumed in the moderate burn severity areas. More importantly, in the high burn severity areas future sources (needles and fine branches) were consumed. Some dead needles remain on trees within the moderate severity burned areas and will contribute to future ground cover.

Slash and down woody debris will be retained to move conditions toward the goal of 50 percent of the total cover in the form of fine organic material (litter and duff).

Road Maintenance
Road maintenance to existing roads that are currently drivable would be done in order to access units with logging trucks and machinery. This includes blading and shaping of the road surface, installation of rolling dips, ditch cleaning and clearing of encroaching vegetation along the roadway. This work disturbs soil within the road prism. Application of road maintenance BMPs would insure water quality and mitigate erosion potential.

Indirect Effects—Soil Resource
Indirect effects on the soil ecosystem are secondary reactions to direct effects. The most common secondary reactions are increased surface erosion (from ground disturbance, soil cover removal), reduction in fertility (compaction, removal of fine organic materials), and reduced vegetative growth (compaction, loss of fine organic materials).

Ground-Based Salvage Harvesting (347 acres)
Ground-based harvesting would cause a loss of nutrients in the skid trails due to soil displacement and skid trail erosion. Loss of soil through erosion reduces growth of trees and
other vegetation on skid trails after the harvest. Installation of water bars on skid trails is very effective in controlling runoff and preventing off-site sedimentation. Application of slash to skid trails after use would accelerate site recovery by decreasing erosion. The high amount of proposed soil cover would act as a sediment filter and prevent skid trail derived sediment from reaching drainage channels.

**Ground-Based Fuel Treatments (1,981 acres)**

Ground-based fuel treatments would have similar indirect effects as mechanical salvage harvesting. The effects of large machinery, in this case excavators and masticators, are similar to skidding equipment and harvesters. Proper skid trail pattern layout would be essential to avoiding excessive soil disturbance. In units that have harvest and fuel treatments, care should be taken to ensure that the same skid trails are used for each treatment.

**Piling and Burning Fuels**

There is expected to be minimal indirect effects to the soil in pile and burn units. This is because the areas are devoid of vegetation already and nutrients have been burned in the original burning and then flushed through the system. There is not expected to be any available nutrients from the burn piles because they are primarily dead trees and limbs that had all of the fine needles and limbs consumed in the wildfire, which is where a majority of the nutrients in trees resides.

**Mastication**

Although the proposed fuels for mastication have existing low nitrogen content, there is the likelihood of nutrient imbalances due to the fact that additional carbon is being incorporated into the soil surface, locking up any future nitrogen that is added. It can be argued that the lack of initial nitrogen inputs (which would occur when masticating green fuels) makes the potential for long-term nutrient imbalances much more likely with this proposed activity.

This nutrient imbalance can be desirable where fuels are a concern. In a state of the knowledge review, Resh et al. (2007) found mastication and chipping suppressed vegetation regrowth, though had mixed review on nutrient imbalance. It may take several years to conclusively detect a measurable difference in soil carbon in the mineral portion of the soil. Mastication is a relatively recent fuel treatment and studies have thus far been inconclusive (Resh et al. 2007).

Potential nutrient imbalance is moderated somewhat by recommending average chip depth of 4 inches (Busse et al. 2005). Observed units with recent chipping generally had variable depths from 0 to 10 inches. Masticating vegetation leads to coarse chopped wood and foliage on the ground. This coarser chopped material has additional moderating effects on nutrient imbalances. The coarser pieces leave greater air space than compact chips leading to greater vigor of soil microbes.
**Hand Planting Tree Seedlings (503 acres)**

There is the potential for indirect effects to soil productivity as a result of hand planting tree seedlings. After a catastrophic disturbance such as wildfire, early successional shrub species such as *Ceanothus corulatus*, *Ceanothus pinetorum*, and *Cercocarpus betuloides* colonize sites, fix nitrogen, and leave the soil nutrient rich before dying off and being out-competed by tree seedlings. If tree seedlings out-compete these shrubs too soon, then there would be a net loss in soil productivity as beneficial nitrogen-fixing species are not allowed to flourish.

**Landings**

Landings are some of the most disturbed sites from logging activities. They have significantly lower site productivity due to compaction and loss of nutrients. Trees with stunted growth would slowly establish on these sites after more early successional vegetation such as shrubs and grasses. Rehabilitation of non-road prism landings as described in the mitigation measures would minimize short and long-term erosion. Erosion prevention and control measures would be implemented on all landings under BMP 1.16.

**Effective Soil Cover**

The proposed action would leave a total of 5 to 10 tons/acre of soil cover in the form of woody debris. The primary indirect effect of this would be to stabilize the soils that are actively eroding and reduce overall soil erosion.

**Down Woody Debris**

Post-treatment increases in down woody debris would have net positive indirect effects to soil productivity. Increased down woody debris would decrease erosion potential, which would take several years to accomplish without the proposed action. There would be an increase in long-term soil productivity as down woody debris decays and adds organic material with high nutrient and water-holding capacity. This would be different from the masticated units as the down woody debris would be larger and have less potential for short-term negative increases in carbon to nitrogen ratios.

**Litter and Duff**

Direct loss of litter and duff in the low and moderate burned areas would create secondary negative indirect effects to soil productivity and increase erosion potential. These losses can come in the form of equipment turning and main skid trail activity. Slash would be placed on skid trails to compensate for this potential loss implementing BMP 1.17, thus providing erosion and sediment loss prevention measures. Organic mulch may need to be imported if local sources are inadequate.
**Road Maintenance**

Road maintenance would reduce road related erosion by fixing road drainage problems such as rills and gullies, and redirecting runoff to dips.

**Soil Productivity**

Overall, indirect effects on soil productivity would be mixed. Increased ground cover would help stabilize soils and hence retain them on site for future productivity. However, the current conditions are such that most of the nutrients important to plant growth (nitrogen and phosphorus) have been lost through either volatilization (fire) or erosion after the fire.

Addition of nutrient-poor but carbon-rich ground cover through mastication could lock up much of the current nutrients so they are unavailable for plant uptake. This carbon would help soil productivity in the long term as it breaks down and becomes organic material in the soil. Masticated material would also help retain moisture on site and lower soil temperatures, helping maintain productivity during extremely dry months but slowing productivity during the cooler months (Resh et al. 2007).

Therefore, the net indirect effects on productivity would be a short-term loss of productivity (5 to 8 years) with long-term projected increases in net productivity from the proposed action.

**Soil Erosion**

Soil erosion would be decreased by the proposed action. Refer to Table 8 and Figure 1 in the watershed working papers for Water Erosion Prediction Project (WEPP) modeled erosion rates across burn severities. It is expected for post-activity ground cover to be near 50 to 55 percent. Therefore, it can be assumed that under the scenario that the activities were to immediately take place, the high and moderate burn severity areas would have the same erosion rates as the low burn severity areas with 55 percent cover.

Therefore, the high and moderate burn severity areas would have reduced erosion to 2.82 tons/acre and quickly return to background (1.33 tons/acre) within two years.

**Cumulative Effects—Soil Resource**

Cumulative effects on the soil ecosystem are based on the number and types of management activities occurring within a unit over time and are measured by effects on soil productivity. Overall, the proposed action has a high probability of improving soil conditions. Project design features and BMPs would minimize detrimental effects to soil productivity. The main soil concerns are the effects of ground-based harvest activities (especially skid trails) on the soil resource. Increased soil erosion and reductions in soil productivity (compaction and soil displacement) would occur primarily in main skid trails and landings. Maintaining the soil organic layer intact where it exists would minimize negative effects on nutrient cycling.

Effects of salvage and fuel treatment activities would be minor in the context of the effects from the wildfire and subsequent soil loss during post-fire storms. Generally, immediate increases in ground cover from treatment activities would help stabilize current erosion rates and
hence have net positive long-term effects to soil productivity compared to the no action alternative.

**Direct and Indirect Effects—Hydrologic Resource**

Harvest and mastication compacts and displaces soil to a degree, which is mostly dependant on soil texture. The preponderant granitic soils because of large grainy texture resist compaction, yet are also easily displaced, when lacking sufficient cover. The finer texture soils derived from metamorphic and limestone in the project area have greater shear resistance to displacement, but are more prone to compaction. Loss of ground cover is the greatest harm to hydrologic function of a hillslope (its ability to infiltrate and transmit precipitation water in through the soil column rather than as surface flow). A functional hillslope is able to retain moisture for plant growth, yet is sufficiently drained to prevent landslips.

Because of the fire, ground cover in moderate to high burn severity areas is below soil standard guidelines and probably insufficient for desirable function. Green-Ampt modeling of storms equivalent to that succeeding the fire, using data from infiltrometer tests in the project area, suggest that more than enough excess water would be produced to rill the surface of all soil types bared by the fire. Ten months after the fire, these conditions remain, as ground cover on average is well below recommended levels. Established rilling may exacerbate runoff in the occurrence of another rainfall of comparable intensity by facilitating surface flow off the hillslope.

Treatment would increase soil cover as a design feature for this project. Alternative actions are to lop and scatter slash to within 18 inches of the ground or mechanically treat by chipping or masticating slash in logged areas, which follows BMP 5.5. Non-merchantable dead trees in logged areas would be mechanically treated by chipping or masticating, or hand treated leaving the residual fuels on site for ground cover to adequate levels. Erosion control features would be built as necessary to prevent rilling on skidding trails (BMPs 1.13 and 1.17).

Variations in micro-topography, particularly as caused by living plants and debris on a slope usually dissipate water power before scour can occur. BMPs and design features that prevent or disrupt potential flow paths from disturbed areas are critically important to prevent localized erosion. Examples include BMP 2.7 that regulates road drainage; water bar construction on skid trails after use, riparian reserve buffers that leave undisturbed litter/duff and down woody debris (BMP 1.8, and 1.19), and seasonal operations to prevent rutting in wet conditions. Stream buffers in project stream management zones, particularly as they include breaks in slope transitioning from valley side hills to valley floodplain, can dissipate energy of surface flow to discontinue rilling, and cause transported fines to deposit (drop out).

Soil disturbance in activity areas, particularly the loss of the organic layer, may lead to surface erosion by sheet wash or rilling. Buffer strips on streams act variously as sinks and filters for sediment, pesticides, certain pathogens and nutrient constituents such as nitrogen and phosphorus that adhere to mineral particles. There is general consent, reported in conclusions on
research, on the value of buffer strips of riparian vegetation along stream courses (Castelle et al. 1994; Schnepf and Newton 2000). The most commonly prescribed minimum buffer widths for use in water quality and habitat maintenance are 20 to 30 meters (Welsch 1991, Sierra Nevada Ecosystem Project 1997). On low gradient slopes (less than 15 percent), buffer strips of 15 meters have been found effective, and 60 meters sufficient under most circumstances (Lee et al., 2004). For streambank protection and other physical parameters, 15 to 30 meters is effective (Castelle et al. 1994).

Project stream management zones are untreated ground with no equipment entry allowed. As outlined above, per the Sequoia Forest Plan, stream management zone width would be 100 feet (30 meters) for all springs, and 50 to 100 feet (15 to 30 meters) for the class III and IV stream channels that exist in the project area. No treated slopes would be greater than 35 percent gradient.

SPORAX, a borax product similar to common hand soap, would be sprinkled on stumps greater than 18 inches of cut trees under all action alternatives. The application of SPORAX on freshly cut stumps would reduce the occurrence of root rot in the stump and roots. The SPORAX is applied with a small shaker or by hand and would not be applied in stream areas. All SPORAX label directions would be followed during the storage and application of this fungicide. The use of this fungicide would not affect any of the beneficial uses of streams in the project area.

**Roads**

Sediment production specifically correlated to harvest is mostly tied to road construction, with several fold increases 1 to 5 years after harvesting, over baseline or pre-activity condition (Krammes and Burns 1973; Beschta 1978; Keppeler and Ziemer 1990). Primary sources are running surfaces, cutbanks, and fillslope failures, the latter usually coming a few years after road construction. There would be no new or temporary road construction with this alternative.

Roads affect hillslope hydrology by intercepting ground water in deeper cuts. Water emerging in cuts is then transported as surface flow in road ditches at rates that are orders of magnitude above ground water transmission. At stream crossings, road ditch water is transferred to stream channels. In this fashion, stormwater is collected and moved by roads at volumes and rates that could significantly increase peaks and advance the timing of peak flows. The effect is limited to small drainages of first- and second-order streams, and to small peak flows in the fall when soil moisture is low and the water retention qualities of a slope can be especially short-circuited by a road system (Beschta 1978; Ziemer 1998; Jones 2000).

Factors in the project area that may attenuate these effects are outsloping and low density of hillslope drainage. Fewer road ditches as roads in the project area are outsloped rather than insloped. Most flow is potentially dispersed widely over the sides, although recent maintenance berms along the outside edge can spoil these advantages. Because of very low density of natural drainage features, there are few opportunities for any captured flow to drain into channels.
Roads can add substantial amounts of fine sediment to a natural system where drainage surface flow directly connects to streams with aquatic resources, either at crossings or rutted relief drains (Bilby et al. 1989). Fine sediments make up at least 80 percent and usually much more of the total sediment delivered from road use (Bilby et al. 1989; Forsyth et al. 2006). Similarly, it has been demonstrated that traffic volume is the primary agent of sediment production. It is expected that sediment production would increase on roads used for hauling logs in the project area. Fines created during dry season, and usually the peak season of use, are washed away with the first storm events of each wet season (Luce and Black 1999). The project area channels are ephemeral or intermittent running, with the exception of small springs, and portions of French Gulch (Watershed # 13FE). Downstream connection to perennial channels with significant fishery or other aquatic resource is largely seasonal. The sediment producing effects of high traffic use on project area roads is expected to be mitigated by scale.

**Cumulative Effects—Hydrologic Resource**

Improvements in hillslope hydrologic function are reflected in ERA results for this action alternative (Table 22). Eleven of the 14 watersheds that were over threshold due to the fire would remain over threshold in the first year after harvest and at high risk for adverse effects in the event of high-intensity precipitation. Three watersheds would be reduced substantially below their thresholds due to increased down woody debris and ground cover compared to the no action alternative. These watersheds have a substantial amount of treatment acreage as a proportion of total watershed area. Two years out from year of harvest (2012) all the assessed watersheds would be below threshold and only one watershed, an unnamed tributary of Erskine Creek (Watershed # 14KG) would be at an elevated level, because treatment levels are light and burn severity effects were high. Two factors attribute to substantial reductions: increased soil cover and roughness of surface texture. The roughness is from chips, lop and scatter, and down wood residue from treatment, and local displacement of top soil from the tread of the equipment. Microtopography factors, such as slope roughness caused by small rocks and tire tread marks, were found to provide resistance to erosion in observations of treated slopes on the Stormy Complex by Forest Staff (Kaplan-Henry, personal communication, 2009).

The effects of mitigation by increased soil cover and slope roughness, to the degree that a watershed has treated acreage, should decrease risk of erosion, surface runoff from hillsides, and concomitant sediment delivery to a watershed’s channels over that of the current condition. An increased risk of sediment produced from storage in project area channels would remain for a few years. As a rainstorm progresses, a saturated zone that could contribute directly to runoff grows in the near channelbank area. The July 2008 rainstorm aggraded many project area channels with coarse sand and gravel, cohesive-less sediment that would be susceptible to mass failure in high intensity rainstorm events, possibly independent of hillslope inputs.

Proposed impairment parameters for Lake Isabella (State of California 2009) of dissolved oxygen content and pH level may or may not have similar sources. The state of California states
that the sources of the pollutants are unknown. Potential risk from the project area is elevated levels of fine sediment. This risk may be considered even higher if only because the channels have an enormous amount of material already stored. Sediment carry nutrient elements of nitrogen and phosphorous, which particularly in a lake may exacerbate or create a eutrophic condition of low dissolved oxygen content. Conditions of pH are more problematic as to source. Ash carried downstream from forest fires are one possible source of high pH, at least temporarily, and in fact many wildfires have occurred in the Lake Isabella watershed in the last decade (USDA Forest Service, unpublished, 2009). Nonetheless, water quality surveys conducted by the Forest Service on streams tributary to the lake show between 2001 and 2008 pH ranged between 6 and 8, which is within acceptable limits for pH and the beneficial uses of the lake. These same fires caused large fish kills, which could lower dissolved oxygen content. Mines are existent in the project area and mine water effluent is often acidic, but water quality of any possible effluent is not known for the purpose of this report.

Summary of Effects—Hydrologic Resource

Harvesting on forest slopes results in a degree of compacted and disturbed ground, and soil cover loss, which is the prime cause of erosion. Forest soils without disturbance except cover loss can badly erode as obviously occurred with the July 2008 rainstorms after the fire. Infiltration capacity and hydraulic conductivity of soil is not greatly affected by fire, as shown with infiltrometer tests, but rainstorms of sufficient intensity and duration can occur to deeply rill hillsides in absence of cover. Left alone, until the hillsides recover through litter cast and revegetation there is an elevated risk of further accelerated (over natural rate) erosion. In this instance however, the generation of cover by lop and scatter of slash and chips from mastication would improve the hydrologic function of the hillside. This conclusion is reflected in Forest CWE modeling that shows treated hillsides recovering much faster than untreated. Channel conditions of unstable degraded segments as well as aggraded with loose sediment may be at risk to further mass movement regardless of treatment. Sediment production from stored sediment in channels may pose risk downstream, where impairments to Lake Isabella from dissolved oxygen have been proposed by the state.

Cumulative watershed effects are occurring within the watersheds affected by the Piute fire in the form of high rates of sedimentation in the affected drainages, increased runoff, and bank erosion. Implementation of the remainder of the Clear Creek Forest Health and Fuels Reduction Project in unburned or lightly burned areas would increase watershed impacts in the affected watersheds. It is recommended that the affected watersheds be allowed to recover for 3 to 10 years to stabilize and partially recover before additional ground-disturbing work is proposed.
**Alternative C – Noncommercial Funding Alternative**

**Direct Effects—Soil Resource**

Direct effects to the soils result from disturbance and include redistribution of organic matter and changes in biological and physical properties. The soil properties that are affected are soil volume, soil porosity, soil water availability, soil chemistry and soil biology (Powers 1989). The categories that follow explain in more detail how each of the management activities would directly affect the soil resource.

**Ground-Based Salvage Harvesting (347 acres)**

This action would not occur under the noncommercial alternative. These acres would, however, be treated for fuels. As a result, there would be skid trail operating patterns similar to those discussed under Alternative B.

**Ground-Based Fuel Treatments (1,981 acres)**

The direct effects of ground-based fuel treatments would be the same as Alternative B. There would be less fuel mechanically treated but it would require the same skid trail operating patterns.

**Mastication**

The direct effects of mastication would be the same as in Alternative B. This would utilize similar skid trail patterns.

**Hand Planting Tree Seedlings (503 acres)**

Planting of native tree seedlings by hand would not have any serious negative direct effects to the soil resource.

**Landings**

Although there would be no timber processed under this alternative, existing landings may be used for staging equipment or piling material. The effects of these activities would similar to Alternative B except there would be no new disturbance.

**Effective Soil Cover**

The direct effects to effective soil cover would be the same as Alternative B.

**Down Woody Debris**

The effects to down woody debris would be the same as Alternative B. However, Alternative C proposes much more down woody debris than Alternative B.

**Litter and Duff**

The effects to litter and duff would be the same as Alternative B.
**Road Maintenance**
These effects would be the same as Alternative B.

**Road Decommissioning (7.97 miles)**
Proposed road decommissioning would take place across 7.97 miles of unnecessary roads. The result of road decommissioning would be primarily to increase the watershed health of the systems from a hydrologic standpoint. However, roads would be decommissioned to stabilize soils and decrease any erosion potential.

**Indirect Effects—Soil Resource**
Indirect effects on the soil ecosystem are secondary reactions to direct effects. The most common secondary reactions are increased surface erosion (from ground disturbance, soil cover removal), reduction in fertility (compaction, removal of fine organic materials), and reduced vegetative growth (compaction, loss of fine organic materials).

**Ground-Based Salvage Harvesting (347 acres)**
There would be no ground-based salvage operations under this alternative. Indirect effects of fuel treatments would be the same as Alternative B.

**Ground-Based Fuel Treatments (1,981 acres)**
Ground-based fuel treatments would have the same indirect effects from skid trail activities as Alternative B.

**Mastication**
The indirect effects of mastication would be the same for this alternative as they are for Alternative B.

**Hand Planting Tree Seedlings (503 acres)**
Hand planting tree seedlings would have the same indirect effects as Alternative B.

**Landings**
There would be no timber processing under this alternative, therefore there would not be any indirect effects.

**Effective Soil Cover**
Effective soil cover would be affected indirectly the same as in Alternative B.

**Down Woody Debris**
Indirect effects on down woody debris would be similar as Alternative B except that there would be much more down woody debris, especially in the long term. This would likely create a system with a much higher carbon-to-nitrogen ratio and less productivity. Also, as postulated by Brown et al. (2003), when coarse woody debris (greater than 3 inches diameter) reaches 30 tons/acre,
there is a higher chance of reburn, especially in the 10- to 30-year window. Without removing more of the larger diameter trees, down woody debris would easily accumulate to over 30 tons/acre.

**Litter and Duff**

The indirect effects to litter and duff would be the same as Alternative B.

**Road Upgrades and Maintenance**

Road upgrades and maintenance would have the same indirect effects as Alternative B.

**Road Decommissioning**

Road decommissioning would help stabilize soils and hence increase long-term soil productivity at the sites scheduled for decommissioning.

**Soil Productivity**

The indirect effects on soil productivity would be similar to Alternative B. However, with much more down wood and a high carbon content on the forest floor, the long-term benefits would take much longer to be realized, likely over 30 years.

**Soil Erosion**

Soil erosion indirect effects would be the same as Alternative B. There would be an initial ground cover increase that moves the high and moderate burn erosion rates into the low burn categories. As stated before, there would be a long-term increase in ground cover over Alternative B. However, this would not affect erosion rates.

**Cumulative Effects—Soil Resource**

Cumulative effects to the soil resource would be the same in this alternative as in Alternative B. There is no proposed difference in mechanical treatment systems, which are the main indices for determining detrimental soil conditions. Road decommissioning would not be considered for detrimental soil conditions because road systems are assumed to be permanently removed from forest productivity.

**Summary of Effects—Soil Resource**

Overall, Alternative C has a high probability of meeting the soil standards and guidelines as detailed in the regulatory framework section. Project design features and BMPs would minimize detrimental effects to soil productivity. The main soil concerns are the effects of ground based harvest activities (especially skid trails) on the soil resource. Increased soil erosion and reductions in soil productivity (compaction and soil displacement) would occur primarily in main skid trails. The direction to maintain the soil organic layer intact where it exists would minimize negative effects on nutrient cycling.
Effects of fuel treatment activities would be minor in the context of the effects from the wildfire and subsequent soil loss during post-fire storms. Generally, immediate increases in ground cover from treatment activities would help reduce current erosion rates and hence have net positive long-term effects to soil productivity compared to the no action alternative.

Direct and Indirect Effects—Hydrologic Resource

In this alternative, the treatment area would remain the same as Alternative B. Some tree diameter limits and different guidelines for hazard tree identification would be imposed than under Alternative B. The precise extent of these effects, in terms of volume of timber removed and consequent disturbance is unknown, but are similar to Alternative B. The substantive difference between the two alternatives is in the road actions described below.

Roads

Alternative C would result in a number of roads being decommissioned that are not required by the project or for future Forest projects. The project watershed road density would be altered from 1.29 to 1.08 miles/square mile, by decommissioning a total of 7.97 miles. Decommissioning specifics have not been worked out as to whether the road surface is ripped or otherwise decompacted and other methods are used to return the road prism to approximately its natural condition in terms of slope and infiltration capacity. Decommissioning may also consist of simply blocking the road from use. A closed road would eventually revegetate and the absence of traffic would result in decreased sediment production. Given that the initial value of 1.29 miles per square mile is relatively low, the impact of roads generally across the project area may be considered as correspondingly low. The low road density and road decommissioning is reflected in CWE modeling results for Alternative C, which is not altered much from Alternative B. Moderately sloped terrain and the favorable road drainage features discussed in the Existing Condition section moderate road effects further.

All together, eight assessed watersheds would have road actions resulting in substantial decreases in road density. Current road density for these particular watersheds averages 1.83 miles per square mile. Decommissioning roads would result in an average road density of 1.42 miles per square mile for the affected watersheds. This reduction in road density for these watersheds does not greatly offset impacts of fire damage as illustrated in Table 22 for CWE results for Alternative C.

Cumulative Effects—Hydrologic Resource

The cumulative effects of this alternative are virtually identical with Alternative B. The treatment acreage, type, and placement remain the same as B. As described above, some amount of road mileage is changed by decommissioning, which results in minor decreases in ERAs used in five watersheds (Table 22) over that in Alternative B, and 10 watersheds over threshold. Two years out from harvest (2012), no watershed ERA values would remain over threshold. These changes
over Alternative B due to road actions, while can be quantified in ERA method, are probably too small to be detectable in flow yield from the hillslope drainages.

**Summary of Effects—Hydrologic Resource**

The treatment effects of Alternative C are similar to Alternative B. The effects of road decommissioning may be gradual depending on methods employed. Because road density is relatively low, and fire effects are high, cumulative effects from road decommissioning is slight in the short term.

**Wildlife**

*Forest Service Sensitive Species*

**Alternative A – No Action**

*Terrestrial Species*

Under the no action alternative, no planned activities would occur within or near spotted owl and northern goshawk territories. Trees that have fallen across roadways would be cut or removed by Forest Service personnel as necessary when accessing work areas, or by the general public when recreating or firewood cutting. The primary difference in disturbance effects between this alternative and the action alternatives is the no action alternative does not specifically manage disturbance during the breeding season.

Opportunity for accelerating development of mature forest habitat to replace habitat lost to the fire through tree planting and cultural treatments would be foregone. Future forest cover if established through natural means would be at higher risk for future stand-replacing events and high-severity fire effects as fuels accumulate from falling dead trees and high levels of brush in openings with little or no overhead cover.

*Aquatic-dependent Species*

Under the no action alternative, salamander habitat would be impacted by trees falling from natural action or by public woodcutting. Trees falling naturally would increase the amount of down wood over a time span longer than under either of the action alternatives. The no action alternative would not mechanically disturb soil or adjacent vegetation; that is, this alternative would neither actively disturb habitat or injure or kill any salamanders.
Alternative B – Proposed Action

Terrestrial Species

Habitat

The proposed action would not directly impact any spotted owl PAC or HRCA. The project would not directly impact any northern goshawk PAC, of which the nearest is over one-half mile away from the closest unit.

The proposed action would salvage 347 acres of forest that had stand-replacing fire and would treat fuels on another 1,981 acres. Salvage units are largely in the most severely burned stands, which are less suitable for nesting and roosting than the stands that had low to moderate severity fire.

For both the California spotted owl and the northern goshawk, trees removed are dead and dying and do not contribute to live canopy cover, or would for very long in the case of dying trees. Dead tree removal would not contribute to a decrease in live trees and live stand density either. In the fuel reduction units, dead trees are targeted for removal as well as some live understory trees.

A minimum of three snags per acre of the largest size available would be retained. Also, up to 10 tons per acre of down woody material would be retained (greater than 20 inches in diameter by 20 feet long, where available). Areas where stand-replacing fire occurred may take 100 years to reestablish trees at least 24 inches d.b.h., and up to 250 years to develop patches of old trees with decadence beneficial to species like the goshawk and spotted owl. Snags and down woody material that are retained now may benefit foraging goshawks and owls in the long-term, should they remain standing or as substantial coarse woody debris until at least 100 years in to the future.

The units nearest the goshawk PAC are on the opposite side of a prominent ridge. Fuel reduction treatments would occur there, thus reducing long-term fire risk in mature conifer stands that function as potential foraging habitat outside the PAC.

The areas proposed for salvage are a small component of the available burned area and are not in areas previously found to have high to moderate use by owls (PACs and HRCAs) and have little retention of green areas. As such, these areas are not likely to attract spotted owls as new foraging areas, and availability of burned habitat for foraging is not likely to be limiting. None of the areas of low severity burn will be treated.

Disturbance

No activities would occur in or within one-quarter mile of any spotted owl PAC from March 1 through August 15. This would limit disturbance in and near critical activity areas during the breeding season.

Noise disturbance is limited due to the above-mentioned limited operating period near PACs. Spotted owls may forage outside the delineated PAC and HRCA in response to changes in the
vegetation due to fire. That is to say, because the fire may have reduced habitat suitability within the PACs and HRCAs, owls may expand their foraging distance from the nest. However, the most-severely burned stands are not typical foraging habitat; therefore, potential owl use of these stands is speculative.

Aquatic-dependent Species

Habitat
Potential salamander habitat could be affected by snag removal and fuel reduction treatments. However, because no salamanders have been detected in recent surveys within the project area, impacts to individuals are unlikely. Furthermore, operating restrictions within suitable habitat would further reduce impacts to habitat. Down woody material retention would leave adequate cover for salamanders for the long term, in both salvage and fuel reduction units.

Disturbance
Machinery and tree felling may disturb individuals and habitat. If salamanders were present, it is plausible that individuals could be injured or killed because they are unable to avoid the activities. However, no salamanders haven been detected during project surveys, thus these impacts are unlikely.

Alternative C – Noncommercial Funding Alternative

Terrestrial Species
Alternative C would not include salvage harvest. Alternative C would apply fuels treatment to trees less than or equal to 15 inches d.b.h. Hazard trees over 20 inches d.b.h. would be felled and left on site.

Habitat
Spotted owl and northern goshawk habitat impacts under the noncommercial alternative are similar to the proposed action. While the larger snags would be retained, habitat quality in the project stands would be no different. There would still be a lack of live crown canopy and large-diameter, live trees. As stands regenerate, there potentially would be more large standing snags and down woody material available in foraging habitat. In the long term, greater than 100 years, it is unlikely those snags would still be standing to contribute to suitable nesting and roosting habitat. It is plausible that some of the largest material may still exist at that time as down woody material, although it would likely have extensive decay.

Disturbance
Under this alternative, there would be less disturbance from project activities because fewer trees would be treated, thus requiring a shorter operating period. The limited operating periods would still be in place, however, so disturbance impacts would still be reduced.
Aquatic-dependent Species

Habitat
Potential yellow-blotched salamander habitat would be impacted to a lesser degree than in the proposed action. Because snags greater than 15 inches d.b.h. would be retained, less mechanical disturbance to habitat would occur. In the longer term, there would be more large-sized down woody material available in potential salamander habitat. Because no salamanders have been detected in project surveys, this degree in impact may be moot.

Disturbance
Under the noncommercial alternative, there would be a lesser degree of disturbance in potential salamander habitat because no material would be removed, thus requiring a shorter operating period. Because salamanders are not highly mobile, if present, some could be injured or killed; however that is unlikely given their absence in the project units.

Cumulative Impacts for All Action Alternatives
The cumulative effects area will vary by species. For the spotted owl and the northern goshawk, this analysis area includes the Piute Mountains area of the Kern River Ranger District. For the yellow-blotched salamander (ensatina), the cumulative effects area is confined to riparian habitat corridors.

In considering the cumulative effects, the most recent vegetation and habitat analysis layer (2002) from the Forest geographic information system (GIS) was used, with modifications to reflect effects of the Piute Fire, to analyze loss of habitat for spotted owls, goshawks and ensatina as well as snag creation. The Piute Fire Restoration Project affects moderately suitable owl or goshawk habitat. It does not remove enough trees to change canopy cover class or size class in suitable unburned or lightly burned habitats and areas of high-intensity fire or severe effects on vegetation were rendered unsuitable by the fire. Owls will use burned habitats for a period of time after a fire, including use of severely burned habitats for foraging. The proposed project would retain suitable roost trees and snags similar to the conditions that Clark (2007) found were used by spotted owls in salvaged areas. The salvaged areas are a small proportion of the burned mature forests and are not in close proximity to areas that were previously known to be heavily used by owls. Therefore, even though the project could have effects on habitat that may be used by spotted owls and/or goshawks for low quality foraging, it would not change suitability or availability of habitat on a landscape basis.

Although the fire caused a very significant reduction in habitat availability and suitability, both action alternatives of the proposed Piute Fire Restoration Project would not contribute to or exacerbate this decline. For ensatina, the Piute Fire removed down logs and cover for this species. Both action alternatives would result in an increase in down woody material in the short term where cover is most critical, and currently lacking over large areas. This would have a
small beneficial impact that could partially offset the cumulative adverse impact of the fire on this species.

The Clear Creek Forest Health Improvement and Fuels Reduction Project was planned in an area overlapping portions of the Piute Fire Restoration Project. The portion of the Clear Creek Project that is overlapped by the fire is incorporated into and analyzed as part of the Piute Fire Restoration Project. Due to the severity of habitat changes in suitable spotted owl habitat as a result of the fire, there is a greater need to maintain the existing green habitat until new use patterns by spotted owls can be established. The fire risk and overstocking issues that generated the Clear Creek proposal are still issues in the unburned area and put the remaining habitat at risk. However, due to concerns regarding availability of suitable, live, mature forest for spotted owl and goshawk habitat, it is recommended that further green harvest within the unburned area be deferred indefinitely to allow spotted owls to establish new patterns of use and nesting areas.

The Valley View Fuels Reduction Project has been proposed and would consist of thinning small (less than 6 inches d.b.h.) trees and chaparral. Such actions would not affect suitable habitat for goshawks or spotted owls. There are no riparian areas, seeps or meadows within the Valley View Fuels Reduction project; therefore, it would not affect habitat for the yellow-blotched ensatina.

The Piute Roadside Hazard Tree Removal Project will remove fire-killed and fire-damaged hazard trees along 32 miles of Sequoia National Forest roads. The project area is a 200-foot buffer on each side of selected system roads. This project occurs in the same area as much of the Piute Fire Restoration Project. The project would not have adverse effects on spotted owls and northern goshawks or their habitat because the project units are largely unsuitable habitat as a result of the fire and disturbance impacts would be mitigated by limited operating periods. Surveys for salamanders and site-specific management for identified habitat for the Piute Roadside Hazard Tree Removal Project would reduce the potential adverse impacts to this species. Similar measures for the Piute Fire Restoration Project would protect yellow-blotched salamander habitat. Thus, cumulative impacts to this species’ habitat are unlikely to occur and would be minimized by mitigation measures.

The Piute Fire Restoration Project covers an area less than 10 percent of the Piute Fire. Removal of dead and dying trees in severely burned stands would not adversely impact spotted owl and goshawk habitat. In its current condition, the severely-and moderately burned stands do not have high-quality habitat characteristics. Furthermore, the project avoids activities within protected activity centers and home range core areas and restricts activities within one-quarter mile to outside critical season through limited operating periods. When viewed cumulatively with these other projects occurring in the Piute Mountains, the Piute Fire Restoration Project is not expected to contribute to adverse impacts to California spotted owls and northern goshawks.

Surveys for yellow-blotched salamander have not detected their presence within the project area. Activities in potential salamander habitat would benefit habitat suitability in the near term by increasing the available down woody material. Under the no action alternative, down woody
material would become available over a longer time period as dead trees fall on their own. In sum, this project would not have cumulative impacts on potential salamander habitat in the Piute Mountains.

**Determination**

*Alternative A*

The no action alternative would have **no effect** on the California spotted owl, northern goshawk, and yellow-blotched salamander. This alternative would limit long-term opportunities to reduce fragmentation and reestablish suitable habitat for spotted owl and goshawk and ensatina. Short-term opportunities for establishing woody debris for ground cover for ensatina would be foregone.

*Alternative B*

The proposed action may affect individuals, but is not likely to result in a trend toward federal listing or loss of viability of the California spotted owl, northern goshawk, or yellow-blotched salamander.

**Rationale for Determination**

- Limited operating periods near spotted owl and northern goshawk territories would restrict disturbance impacts to a time period outside the breeding season.
- Surveys for spotted owls and northern goshawks prior to implementation would identify presence and/or reproductive status of spotted owls and northern goshawks.
- Suitable salamander habitat has been surveyed prior to implementation and determined no presence of salamanders. Furthermore, occupied habitat, if detected, would be managed on a site-by-site basis to reduce impacts to salamanders or their habitat. In addition, down wood guidelines and riparian area conservation measures would be implemented, which would retain what remains of suitable habitat features after the fire and within project units. While no salamanders have been detected, the proposed action would provide a beneficial impact by increasing the available down woody material sooner than would occur under natural conditions.

*Alternative C*

The noncommercial alternative may affect individuals, but is not likely to result in a trend toward federal listing or loss of viability of the California spotted owl, northern goshawk, or yellow-blotched salamander.

**Rationale for Determination**

- Limited operating periods near spotted owl and northern goshawk territories would restrict disturbance impacts to a time period outside the breeding season.
- Surveys for spotted owls and northern goshawks prior to implementation would identify presence and/or reproductive status of spotted owls and northern goshawks.
Suitable salamander habitat has been surveyed prior to implementation and determined no presence of salamanders. Furthermore, occupied habitat, if detected, would be managed on a site-by-site basis to reduce impacts to salamanders or their habitat. In addition, down wood guidelines and riparian area conservation measures would be implemented, which would retain what remains of suitable habitat features after the fire and within project units. While no salamanders have been detected, the noncommercial alternative would provide a beneficial impact by increasing the available down woody material sooner than would occur under natural conditions. This noncommercial alternative would disturb less ground and leave more woody material available for potential salamander habitat.

**Forest Service Management Indicator Species**

**Alternative A – No Action**

**Direct and Indirect Effects to Mountain Quail Habitat**
The no action alternative would not directly or indirectly impact early- and mid-seral conifer habitat. Natural regeneration of conifer and shrub cover would occur. In the most-severely burned stands, conifer regeneration is likely to occur over a slightly longer timeframe than if planting is implemented.

**Cumulative Effects to Mountain Quail Habitat**
Because the no action alternative would have no direct or indirect effects, there would be no cumulative effects as a result of its implementation.

**Direct and Indirect Effects to Hairy Woodpecker Habitat**
The no action alternative would remove no medium and large snags in green forest and thus would not affect hairy woodpecker habitat. Over the long term, fire-killed snags would fall and be removed from habitat, but would be replaced by new snags as living trees die.

**Cumulative Effects to Hairy Woodpecker Habitat**
Because there would not be any direct and indirect effects to habitat, there would be no cumulative effects from the no action alternative.

**Direct and Indirect Effects to Black-backed Woodpecker Habitat**
The no action alternative would not remove medium and large snags in burned forest habitat and thus would not affect black-backed woodpecker habitat.
**Cumulative Effects to Black-backed Woodpecker Habitat**

Because the no action alternative would not have direct or indirect effects on medium and large snags, and thus black-backed woodpecker habitat, there would be no cumulative effects as a result of this alternative.

**Alternatives B and C – Action Alternatives**

**Direct and Indirect Effects to Mountain Quail Habitat**

The action alternatives are similar within the early- and mid-seral conifer, post-fire habitat. The early-seral stands that would be salvaged currently provide poor habitat because of the lack of shrub cover. Therefore, the effects to habitat in these stands are negligible. The action alternatives would not change the early- or mid-seral habitat status.

In the fuel treatment stands, those with live trees and shrubs to varying extent, the effects are measurable. In these stands (1,981 acres) fuel treatment activities would reduce the shrub component. The stands would still provide early- and mid-seral cover, but to a lesser extent. In the portions of stands with dead shrubs (high-severity fire), there would be no effect to habitat. Live shrub canopy cover reduction in the fuel reduction treatment areas (1,981 acres) would result in lower predicted fire intensity.

Implementation of the action alternatives would result in:

a. no change in existing (post-fire) conditions (acres) of early- and mid-seral coniferous forest;

b. no changes in acres in CWHR tree size class;

c. no changes in tree canopy closure; and

d. a reduction in understory shrub canopy closure.

While there may be a reduction in shrub canopy closure in the short term to achieve fuel reduction, the treatment areas would still provide habitat for quail. In the long term, shrubs are expected to resprout and continue to provide habitat.

**Cumulative Effects to Mountain Quail Habitat**

Cumulative effects of the action alternatives are assessed across the Piute Fire perimeter. The Piute Fire Restoration Project would affect six percent of the Piute Fire perimeter. Therefore, the majority of the fire perimeter would still provide habitat for mountain quail. Sixty percent (nearly 19,000 acres) of the fire perimeter had high mortality and are considered early-seral habitat.

The Piute Roadside Hazard Tree Removal Project will cut hazard trees along certain roadways within the fire perimeter. However, this project will not affect habitat factors for mountain quail. Thus, the Piute Fire Restoration Project will not add cumulatively to effects of this project.
The Valley View Fuels Reduction Project would manually thin brush and small trees adjacent to the Valley View community. Project-generated slash would be piled and burned, and there would be some light underburning. Overall, there would be no change to the four habitat factors from these projects. Therefore, the Piute Fire Restoration would not have cumulative effects associated with this project.

**Effects Summary for Mountain Quail Habitat**

The direct, indirect, and cumulative effects of the action alternatives (Alternatives B and C) would result in:

- no change in acres of early- and mid-seral coniferous forest habitat;
- no change in acres of CWHR tree size classes;
- no change in tree canopy closure; and
- a reduction in understory shrub canopy closure.

This reduction would occur within fuel treatment units, totaling about 1,981 acres. Some shrub canopy closure would remain, however. Because the project would occur in the most severely burned stands, existing shrub cover is low and fuel reduction treatments would not appreciably decrease this amount. In the long term, shrub canopy closure is expected to increase as shrubs are already resprouting.

**Direct and Indirect Effects to Hairy Woodpecker Habitat**

The action alternatives would affect the same area. Alternatives B and C would cut and remove medium and large snags while leaving three of the largest snags per acre to meet LRMP standards and guidelines. Hazard tree removal may also reduce medium and large snags along roadways, but the quantity of each size class, or combined, is not available. It is expected that the quantity of hazard trees to be cut would not appreciably add to the quantity in the fuel treatment units. Implementation of the action alternatives result in:

- a decrease in the available snags per acre of the medium size class; and
- a decrease in the available snags per acre of the large size class.

Because there is no available data for the medium and large size classes, it is not possible to separate the results. It must be assumed there would be a decrease in each size class. However, a minimum of three snags per acre of the largest size class would be retained.

**Cumulative Effects to Hairy Woodpecker Habitat**

Past actions, fire, and forest growth have contributed to create the baseline conditions in the Piute Fire Restoration Project area and the Piute Fire perimeter cumulative effects area. The Piute Fire made the most notable recent change to create these conditions. The Piute Roadside Hazard project and Valley View Fuels project in the Piute Mountains would occur within the cumulative effects area for the Piute Fire Restoration Project.
The Piute Roadside Hazard project would remove medium and small snags within the project road area. The quantity of snags of each size class to be removed is not expected to largely affect the snag availability across the fire perimeter.

The Valley View fuels reduction project is not expected to remove medium and large snags and therefore would not affect these hairy woodpecker habitat components.

Within the Piute Fire perimeter, the quantity of medium and large snags in green forest is not expected to be appreciably reduced. The Piute Fire burned about 33,000 acres of National Forest System lands, of which less than 2,000 acres (less than 6 percent) would be impacted by fuels reduction. For CWHR forest types that include medium and large snags, there are 13,768 acres that burned under low and moderate severity. From this perspective, this project would affect 14 percent of the area of available habitat (area, not quantity of snags). Project areas eliminated from this proposal as a result of steepness in slope and distance from existing access and roadless areas would remain unaffected and, as such, would retain existing quantities of medium and large snags.

**Effects Summary for Hairy Woodpecker Habitat**

The direct, indirect, and cumulative of the Piute Fire Restoration Project action alternatives will result in:

- a reduction in the available snags per acre in the medium size class; and
- a reduction in the available snags per acre in the large size class.

As stated above, it is not possible to separate the size classes (and it is assumed there would be a reduction in each size class) and the largest three snags per acre would be retained as per LRMP standards and guidelines. While the area affected represents about 14 percent potential snags in green forest acreage, the quantity of snags in green forest has appreciable increased in the low and moderate burn severity areas.

**Direct and Indirect Effects to Black-backed Woodpecker Habitat**

The action alternatives would occur over the same area. Alternative B would cut and remove merchantable medium and large snags while leaving three of the largest snags per acre to meet LRMP standards and guidelines. It is expected that most medium and large snags within the 347 acres of salvage would be removed. Implementation of the action alternatives result in:

- a reduction in medium snags per acre within burned forest; and
- a reduction in large snags per acre.

Alternative C would treat only dead trees less than 15 inches d.b.h. Thus, this alternative would not affect the habitat components for snags in burned forest.

**Cumulative Effects to Black-backed Woodpecker Habitat**

The Kern Plateau is used as the cumulative effects analysis area for examining effects to habitat. As stated above, less than 7 percent of the available medium and large tree stands affected by
stand-replacing fire would be harvested. Project areas eliminated from this proposal as a result of steepness in slope and distance from existing access would remain unaffected and, as such, would retain existing quantities of medium and large snags. Thus, there would be patches of medium and large snags distributed adjacent to the project units within the burned forest habitat type.

One other project, the Piute Roadside Hazard Tree Removal Project, will occur within the cumulative effects analysis area, and would remove all medium and large snags per acre within 200 feet of the project roads (approximately 470 acres).

**Effects Summary for Black-backed Woodpecker Habitat**

The direct, indirect, and cumulative effects of the Piute Fire Restoration Project action alternatives and foreseeable future action would result in a reduction of medium and large snags in burned forest on 817 acres of the available 11,370 acres of highly suitable burned conifer forest habitat. The combined effect would remove or degrade less than eight percent of the medium to large tree burned conifer forest habitat in the immediate area. When considered at a larger scale, there has been approximately 260,000 acres of fire within 63 miles or less, which resulted in creation of additional suitable burned snags in conifer forest habitat. A small proportion of the McNally fire was salvaged, but cumulatively there is a high proportion of suitable burned forest habitat and this habitat type does not appear to be a limiting factor in this area.

Moreover, a recent report (Siegel and others 2008) cites a new record of the black-backed woodpecker on the Sequoia National Forest and a range extension of approximately 130 miles south. That location is approximately 30 miles north of the Piute project. To date, surveys in the Piute Fire vicinity have found no black-backed woodpeckers. Thus, there would be no change in the population trend for this species as a result of the project. Finally, because black-backed woodpecker breeding range lies outside the project area, changes in snag availability in this project would not affect this species. The project would not alter the existing trend of snags across the Piute Mountains and Sierra Nevada, nor would it change the distribution of black-backed woodpeckers across the Sierra Nevada bioregion.

**Other Required Disclosures**

**Compliance with Forest Plan and Other Relevant Laws, Regulations, Policies and Plans**

The project is compliant with the forest plan goal of maintaining sensitive species to keep them from needing to be federally listed. Additionally, the SNFPA standard and guideline to survey project areas was met.

The 2004 SNFPA ROD (p. 6) addresses ecosystem restoration following catastrophic events like wildfires. It gives direction for restoration activities including salvage of dead and dying
trees, and fuel treatments to move towards old forest conditions. Alternative A does not follow this direction. It does not meet the Forest Plan goal of increasing timber supply from National Forest lands by intensively managing those lands where timber production is cost-effective (USDA Forest Service 1988, p. 4-3).

On treated acres, Alternative B follows restoration direction in the 2004 SNFPA ROD (pp. 6, 41-42, 52) to manage fuel profiles, restore forest habitat, and recover some of the value of dead and dying trees. Direction to exempt at least 10 percent of the total fire area from salvage harvest is followed (SNFPA ROD p. 52).

Alternative B also meets requirements of the National Forest Management Act at 16 USC 1604 (g)(3)(E), 16 USC 1604 (g)(3)(F), 16 USC 1604(k), and 16 USC 1604(m).

On treated acres, Alternative C also follows restoration direction in the 2004 SNFPA ROD (pp. 6, 41-42, 52) to manage fuel profiles and restore forest habitat. Direction to exempt at least 10 percent of the total fire area from salvage harvest is followed (SNFPA ROD p. 52).

Alternative C would also comply with provisions of 1976 National Forest Management Act, as explained under Alternative B.

The three alternatives are consistent with the laws, regulations, policies and plans governing special uses, lands and minerals.

The proposed action complies with laws, regulations, policies, and plans related to the recreation resource in the project area. Though the Woolstaf Inventoried Roadless Area (IRA) covers much of the northern portion of the Piute Fire area, the salvage and fuels reduction operations will not take place within the IRA. Therefore, the action alternatives will not impact the IRA in any negative way.

The National Forest Management Act (NFMA) requires that a broad spectrum of outdoor recreation opportunities be provided and OHV use be planned to promote public safety, protect resources, and minimize conflict with other uses of National Forest lands. Forests implemented this by creating Land and Resource Management Plans. Specifically, within these LRMPs the recreation opportunity spectrum (ROS) was created as a landscape-level inventory to provide a broad spectrum of recreation opportunities to visitors.

The Sequoia National Forest LRMP contains three ROS zones in the Piute Fire area – Natural/Roaded, Semi-primitive/Motorized, and Semi-primitive/Non-motorized. All of the salvage operations would occur in the Natural/Roaded ROS zone. Relating to traffic volume and human modification of the landscape, this is a compatible use of the Natural/Roaded ROS zone (USDA 1982). Likewise, the fuels reduction activities are compatible with the Roaded/Natural and Semi-primitive/Motorized zones in which they will occur.

The National Forest Management Act required National Forests to plan a broad spectrum of outdoor recreation opportunities, which resulted in the Recreation Opportunity Spectrum (ROS). The project complies with the ROS from the Sequoia National Forest LRMP. The additional effects from Alternative C would be a loss in motorized-recreation opportunities. However, there
would still be motorized-recreation opportunities in the Piute Fire area, which is what the Recreation Opportunity Spectrum prescribes for the roaded area within Alternative C.

The Relationship between Short-term Uses of Man’s Environment and the Maintenance and Enhancement of Long-term Productivity

The uses of man’s environment proposed under the Piute Fire Restoration Project will generally be short term. For example, energy consumption during implementation and impacts to resources such as soils or wildlife are expected to recede to near baseline within a decade. The project is designed, however, to maintain and enhance forest vegetation productivity over the long term. In addition, the forest products generated by the Piute Fire Restoration Project will provide long-term benefits to the American public. For example, wood products used in residential construction are likely to provide benefits for 75 to 85 years or more (Winistorfer and others 2005).

Irreversible or Irretrievable Commitments of Resources

An irreversible commitment of resources is defined as a course of action that so changes the environment that it can never be returned to a normal or natural state. Likewise, an irretrievable commitment of resources is a course of action in which the committed resources can never be recovered. A good example of an irreversible or irretrievable commitment of resources is the construction of an open pit mine. The topography is permanently changed and cannot be reversed. The ore is permanently removed and cannot be retrieved. In contrast to these definitions, however, the treatments proposed in the Piute Fire Restoration Project are neither irreversible nor irretrievable. The natural resource to be salvaged—woody vegetation—is renewable. Moreover, the soils report also shows that the effects of this kind of disturbance are usually short term and that soils generally recover naturally within five years.

Possible Conflicts between the Proposed Action and Objectives of Federal, Regional, State, and Local Land Use Plans, Policies and Controls for the Area Concerned

The “area concerned” is governed by the Sequoia National Forest Land and Resource Management Plan and amendments. The proposed action is consistent with the LRMP and the mediated settlement agreement (MSA) to the Sequoia National Forest LRMP. There are no other conflicting federal, regional, state, or local land use plans.

Energy Requirements and Conservation Potential of Various Alternatives and Mitigation Measures

The proposed action involves ground based harvesting systems. Ground based systems rely generally on rubber-tired skidders for yarding. Production rates for skidders vary between 1.8 and 3.2 thousand board feet (MBF) per hour (Wang and others 2005). Fuel consumption rates for skidders average about five to six gallons per hour (Brinker and others 2002). Thus, ground
based yarding requires about two to three gallons of fuel for each MBF harvested. The proposed action involves 2,700 MBF. Total fuel consumption required for ground based yarding would likely be between 5,400 and 8,100 gallons.

**Natural or Depletable Resource Requirements and Conservation Potential of Various Alternatives and Mitigation Measures**

Implementation of the Piute Fire Restoration Project will provide renewable natural resources to the American public. Aside from the fuel required to run machinery, the project itself is not one that requires the consumption of either natural or depletable resources.

**Urban Quality, Historic and Cultural Resources, and the Design of the Built Environment, Including the Reuse and Conservation Potential of Various Alternatives and Mitigation Measures**

The Piute Fire Restoration Project will have no effect on urban quality or the built environment. All historic and cultural resources have been surveyed and will be protected by avoidance. The Piute Fire Restoration Project will have no effect on historic or cultural resources.

**Means to Mitigate Environmental Impacts**

The CEQ lists five “means” to mitigate potential impacts (40 CFR 1508.20). Two of them describe the approach used by the Kern River Ranger District in all of its project planning. First, impacts are avoided altogether by not taking certain actions [40 CFR 1508.20(a)]. For example, under Soil and Water Conservation Practices riparian area buffers are used to simply avoid impacts in close proximity to critical watershed areas. Second, impacts are reduced or eliminated by preservation and maintenance operations during the action [40 CFR 1508.20(d)]. For example, to maintain habitat for snag dependent species, all actions planned in forested vegetation types include retention of 300 snags per 100 acres. For the Piute Fire Restoration Project EIS, most of these approaches are listed in the Proposed Action and Alternatives section under the Project Design Features.
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Federal Agencies

Advisory Council on Historic Preservation
Federal Aviation Administration, Western-Pacific Region, Regional Administrator
National Marine Fisheries Service, Habitat Conservationists Division, SW Region
U.S. Army Engineer Division, South Pacific CESPD-CMP
USDA APHIS PPD/EAD
USDA National Agricultural Library Head, Acquisitions & Serials Branch
USDA Natural Resources Conservation Service
USDI Office of Environmental Policy and Compliance
U.S. Department of Energy, Office of NEPA Policy and Compliance
U.S. Environmental Protection Agency, Reg. 9, EIS Review Coordinator
U.S. Environmental Protection Agency, Office of Federal Activities, EIS Filing Section
U.S. Fish and Wildlife Service, Arnold Roessler
### List of Acronyms

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References


State of California. 2009. Clean Water Act Section 305(b) and 303(d) Integrated Report for Central Valley Region. Appendix A, Proposed Changes to 303(d) List. Central Valley Water Quality Control Board.


Appendix A - Additional Literature

In addition to the references cited directly in specialist reports and in the EIS itself, the ID Team collected, reviewed, and considered numerous papers, reports, and peer-reviewed articles. These documents constitute the best science available to the agency at this time. They were used to inform project design as well as effects analysis, and are addressed specifically where appropriate.

Climate


Forest Fuels


Legal Opinions

The Lands Council v. McNair, 537 F.3d 981 (9th Cir. 2008). This case explicitly overruled Ecology Center v. Austin, 430 F.3d 1057 (9th Cir. 2005) and held that “to act as a panel of scientists that instructs the Forest Service how to validate its hypotheses . . . , chooses among scientific studies . . . , and orders the agency to explain every possible scientific uncertainty . . . is not a proper role for a federal appellate court.”
Earth Island Institute v. Carlton, 2:09-cv-02020-FCD-EFB (E.D. Cal. Aug. 20, 2009). This case explicitly follows Lands Council v. McNair and holds that the “court must defer to the agency’s analysis of scientific data, as such review requires a high level of technical expertise.” This holding applies specifically to “competing” scientific views on post-fire mortality, the status of Black-backed Woodpecker habitat, effects of forest management on the California spotted owl, and the effect of post-fire treatments on watershed resources.

Public Comments


Beschta, R.L., C. Frissell, R. Gresswell, R. Hauer, J. Karr, W. Minshall, D. Perry, J. Rhodes. 1995. Wildfire and salvage logging recommendations for ecologically sound post-fire salvage logging and other post-fire treatments on Federal lands in the West. Oregon State University, Corvallis, OR. 14 pp. This document has been considered and addressed by the Sequoia National Forest in conjunction with post-fire treatments for many years. For the Piute Fire, consideration of the Beschta Report is included as a working paper in the project record.


Reforestation


Transportation/Forest Roads


**Tree Mortality**


Appendix B – Best Management Practices

Forest management and associated road building in the steep rugged terrain of forested mountains has long been recognized as sources of non-point water quality pollution. Non-point pollution is not, by definition, controllable through conventional treatment plant means. Non-point pollution is controlled by containing the pollutant at its source, thereby precluding delivery to surface water. Sections 208 and 319 of the Federal Clean Water Act, as amended, acknowledge land treatment measures as being an effective means of controlling non-point sources of water pollution and emphasize their development.

Working cooperatively with the California State Water Quality Control Board, the Forest Service developed and documented non-point pollution control measures applicable to National Forest System lands. These measures were termed "Best Management Practices" (BMPs). BMP control measures are designed to accommodate site specific conditions. They are tailor-made to account for the complexity and physical and biological variability of the natural environment. The implementation of BMP is the performance standard against which the success of the Forest Service’s non-point pollution water quality management efforts is judged.

The Clean Water Act provided the initial test of effectiveness of the Forest Service non-point pollution control measures where it required the evaluation of the practices by the regulatory agencies (State Board and EPA) and the certification and approval of the practices as the "BEST" measures for control. Another test of BMP effectiveness is the capability to custom fit them to a site-specific condition where non-point pollution potential exists. The Forest Service BMPs are flexible in that they are tailor-made to account for diverse combinations of physical and biological environmental circumstances. A final test of the effectiveness of the Forest Service BMP is their demonstrated ability to protect the beneficial uses of the surface waters in the State.

Best Management Practices, as described in this document have been effective in protecting beneficial uses within the affected watersheds. These practices have been applied in other projects within the Sequoia National Forest. Where proper implementation has occurred, there have not been any substantive adverse impacts to cold water fisheries habitat conditions or primary contact recreation (etc.) use of the surface waters. The practices specified herein are expected to be equally effective in maintaining the identified beneficial uses.

The following management requirements are designed to address the watershed management concerns. Most are BMPs from the Forest Service publication "Water Quality Management for National Forest System Lands in California" (USDA Forest Service, 2000). All applicable water quality BMPs shall be implemented. The implementation phase of the BMPs occur after a project is completed, but before the winter season. BMP monitoring of the project is done one year later after the project has experiences one rainy season. A list of BMPs used within the Piute Restoration project is as follows along with a brief summary of what each entails:
Timber

1.1 Timber Sale Planning Process

The objective of this practice is to incorporate water quality and hydrologic consideration into the timber sale planning process. This EIS constitutes the incorporation of water quality and hydrologic consideration into the timber sale planning process.

1.2 Timber Harvest Unit Design

The objective of this practice is to ensure that timber harvest unit design will secure favorable conditions of water quality and quantity while maintaining desirable stream channel characteristics and watershed conditions. The design of the units for the Piute project includes the size and distribution of natural structures as a means of preventing erosion and sedimentation.

A concern in the project area is the burn severity on soils. Other water quality considerations include tractor skidding on appropriate slopes not greater than 35 percent, and defining designated skid trails and crossings for drainages.

1.3 Surface Erosion Hazard Determination for Timber Harvest Unit Design

The objective of this BMP is to identify high erosion hazard areas in order to adjust treatment measures to prevent downstream water quality degradation. Maintenance of logging slash on treated units where appropriate would serve to reduce erosion hazard ratings and reduce the potential for erosion.

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<td></td>
</tr>
<tr>
<td>30</td>
<td>35</td>
<td>89</td>
</tr>
<tr>
<td>31</td>
<td>66</td>
<td></td>
</tr>
<tr>
<td>32</td>
<td>89</td>
<td>207</td>
</tr>
<tr>
<td>33</td>
<td>122</td>
<td>75</td>
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<tr>
<td>34</td>
<td>38</td>
<td></td>
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<tr>
<td>35</td>
<td>8</td>
<td></td>
</tr>
<tr>
<td>36</td>
<td>8</td>
<td></td>
</tr>
<tr>
<td>37</td>
<td>21</td>
<td></td>
</tr>
<tr>
<td>Grand Total</td>
<td>724</td>
<td>1,498</td>
</tr>
</tbody>
</table>

Additional information in the soil science resource report for the area will provide any other water and soil quality considerations.

1.4 Use of Area Maps and/or Project Maps for Designating Water Quality Protection Needs

The objective of this practice is to ensure recognition and protection of areas related to water quality protection delineation on project maps. All stream courses in the project area have been mapped and are displayed on the sale area map. These stream-courses are to be protected under C.6.5 of the timber sale contract. Additionally any other stream courses or wet areas not identified on the sale area map and identified during operation are to be protected under C6.5 of the timber sale contract.

1.5 Limiting Operating Period of Timber Sale Activities

The objective of this practice is to ensure that purchasers conduct their operations, including, erosion control work, road work, maintenance, and so forth, in a timely manner, within the time specified in the Timber Sale Contract.

1.6 Protection of Unstable Lands

The objective of this measure is to provide special treatment of unstable areas to avoid triggering mass slope failure with resultant erosion and sedimentation. A high potential for instability may exist as a result of the high burn severity. Field surveys conducted during planning for this
project did not identify specific units with the potential for mass slope failure. If areas of concern are identified during project implementation, special treatment of those areas—to include distribution of soil cover through lop and scatter of forest fuels and limited operating periods associated with wet conditions—will be required.

1.8, 1.19 Streamside Management Zone Designation, Streamcourse and Aquatic Protection

The objectives of these measures are to designate a zone along riparian areas, streams, and wetlands that will minimize potential for adverse effects from adjacent management activities. Management activity in these zones is designated to improve riparian values. Additionally, objectives of SMZs are to conduct management actions within these areas in a manner that maintains or improves riparian and aquatic values. Provides for unobstructed passage of stormflows, controls sediment and other pollutants from entering streamcourses, and restores the natural course of any stream as soon as practicable, where diversion of the stream has resulted from timber management activities. It is expected that development of RCAs (Riparian Conservation Areas) are included under these two BMPs. The purpose of RCAs is to protect riparian and aquatic ecosystems and the dependent natural resources associated with them during site-specific project planning and implementation.

Forest strategy provides direction to maintain or improve conditions for riparian dependent resources. RCAs include aquatic and terrestrial ecosystems and lands adjacent to perennial, intermittent, and ephemeral streams, as well as around meadows…Riparian dependent resources are those natural resources that owe their existence to the presence of surface or groundwater…Forest strategy also maintains or restores soil properties and productivity to ensure ecosystem health, soil hydrologic function and biological buffering capacity.

SMZ should not be considered replacement of RCAs but a nested zone contained in the RCA developed for the filtering capability of the streamside zone. All stream-courses would be protected and assigned SMZs. The stream-courses mapped on the Sale Area Map provide information for development of watercourse protection maps.

- Skidding patterns would be designed in a manner to skid logs away from the drainages and cross drainages at designated locations.
- Any material that would cause obstruction of storm flows would be removed.
- All channels have SMZs, which are equipment exclusion zones. Materials may be end-lined out of this zone.
- Ephemerals would have a minimum SMZs of 25 feet based on field investigations. The chart on the next page provides a summary of SMZ by stream class.
- Treatment in prescribed burn units would avoid direct lighting for prescribed fire within riparian vegetation and or within five feet of the edge of stream channel; prescribed fires may back into riparian vegetation areas.

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4 Sierra Nevada Forest Plan Amendment ROD, 2004, page 42
5 Sierra Nevada Forest Plan Amendment ROD, 2004, page 42-43
Within riparian conservation areas (RCAs) reduce as much as possible ground disturbing impacts (i.e., soil compaction, vegetation disturbance, etc.).

BMPEP form T01 would be utilized to evaluate implementation on those units with SMZs and other aquatic protection.

<table>
<thead>
<tr>
<th>Stream Class</th>
<th>Meadows</th>
<th>Seeps</th>
<th>Springs</th>
<th>Bogs</th>
</tr>
</thead>
<tbody>
<tr>
<td>SMZ Width by % Slope</td>
<td>&lt;30%</td>
<td>&gt;30%</td>
<td>&gt;40%</td>
<td>&gt;50%</td>
</tr>
<tr>
<td>Stream Order</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>I</td>
<td>100</td>
<td>Na</td>
<td>Na</td>
<td>Na</td>
</tr>
<tr>
<td>II</td>
<td>100</td>
<td>100</td>
<td>150</td>
<td>200</td>
</tr>
<tr>
<td>III</td>
<td>50</td>
<td>100</td>
<td>150</td>
<td>200</td>
</tr>
<tr>
<td>IV</td>
<td>&lt;50</td>
<td>&lt;50</td>
<td>&lt;50</td>
<td>&lt;50</td>
</tr>
<tr>
<td>IV</td>
<td>&lt;50</td>
<td>&lt;50</td>
<td>&lt;50</td>
<td>&lt;50</td>
</tr>
</tbody>
</table>

Riparian conservation objectives provide direction for the RCAs and prescribe widths of 300 feet either side for perennial streams, 150 feet for seasonally flowing streams, and 150 feet for special aquatic features. Within this area all standards and guidelines for RCAs need to be met. This area is a zone of closely managed activities and not a zone of equipment exclusion like SMZs.

1.9 Determining Tractor Loggable Ground

The objective of this practice is to minimize erosion and sedimentation resulting from ground disturbance of tractor logging systems. Determination of tractor loggable ground considers the physical site such as steepness of slopes and soil properties.

Soils for each unit has been evaluated during soil transect. The soils information can be found in the soils reports. All tractor logging will be conducted on slopes that do not exceed 35 percent. Both office evaluations of slope using DEMs and field investigations of sites to verify slope percentages have been performed. All harvest units identified for tractor logging meet slope requirements.

1.10 Tractor Skidding Design

The objective of this practice is to design skidding patterns to best fit the terrain, the volume, velocity, concentration and direction of runoff water can be controlled in a manner that will minimize erosion and sedimentation.

Skidding would not occur in SMZs. Skidding would occur on stable slopes not greater than 35 percent. Skidding would not occur down draws. Evidence of ruts associated or resulting from skidding pattern/path caused by the dragging of logs or otherwise would be water-bared and if ground cover disturbance was reduced to amounts less than preexisting levels, these areas would be slashed through lop and scatter to 18 inches. Rutting is characterized by the sunken tracks or
grooves usually made when the ground is wet or soft. Ruts for the purposes of this analysis, are at least 2 inches in depth. All identified units have 1-end suspension prescribed to reduce the potential for erosion.

BMPEP form T02 would be utilized to evaluate implementation on those units where skidding would occur.

1.12, 1.16 Log Landing Location, Log Landing Erosion Control

The objective of this practice is to locate new landings or reuse old landings in such a way as to avoid watershed impacts and associated water quality degradation and reduce the impacts of erosion and subsequent sedimentation associated with log landings by mitigating measures. All landings for this project would be associated with skid trails. Existing landings will be utilized. All landings would have proper drainage and erosion control measures applied. BMPEP form T04 would be utilized to evaluate implementation on those units with landings.

1.13, 1.17 Erosion Prevention and Control Measures During Timber Sale Operations, Erosion Control on Skid Trails, and Erosion Control during Fuels Treatments

The objective of these practices is to ensure that the purchaser’s operation will be conducted reasonably to minimize soil erosion. Any evidence of ruts associated or resulting from skidding pattern/path caused by the dragging of logs or otherwise would be water-bared and if ground cover disturbance was reduce to amounts less than preexisting levels would be slashed through lop and scatter to 18 inches. Ruts for the purposes of this analysis, are at least 2 inches in depth. Skidding would occur on ridge tops and not within draws. Standard road maintenance practices would be implemented. Any fire-lines created during fuels management activities would be water barred to reduce concentration of water.

BMPEP form T02 and T05 would be utilized to evaluate implementation on those units where skidding operations and where erosion prevention and control measures are expected to occur. BMPEP form F25 would be utilized to evaluate implementation of fuels management operations.

Erosion control measures will be implemented on all skid trails, tractor roads, and temporary roads. Erosion control measures must include, but are not limited to, cross ditches (water bars), organic mulch, and ripping. Cross drains must be spaced according to the table at right, maintained in a functioning condition, and placed in locations where drainage would naturally occur (i.e., swales).

<table>
<thead>
<tr>
<th>% Slope</th>
<th>Spacing (Erosion Hazard Rating)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Low</td>
</tr>
<tr>
<td>0-6</td>
<td>400</td>
</tr>
<tr>
<td>7-9</td>
<td>300</td>
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<tr>
<td>10-14</td>
<td>200</td>
</tr>
<tr>
<td>15-20</td>
<td>150</td>
</tr>
<tr>
<td>&gt;20</td>
<td>90</td>
</tr>
</tbody>
</table>
1.20 Erosion Control Structure Maintenance

The objective of this practice is to ensure that constructed erosion control structures are stabilized and working. Treatments adjacent to units where erosion control structures will be placed have to utilize skid trails, landings and temporary roads. Fuels treatment, specifically construction of fire lines has the potential to concentrate water and cause erosion and water quality concerns. All fire lines would be water barred in a fashion commensurate with skid trails and slashed if ground cover is below 50 percent of existing levels. It is important that all erosion control measures be in place and operational at the end of the project completion.

Riparian conservation objectives required by the Sierra Nevada Forest Plan Amendment, provides level of coarse woody debris (CWD) remaining on the ground post project. CWD levels are very low following the recent Piute Fire. Project treatment could increase CWD levels to a minimum of 10 tons/acre. Appropriate diameter would be least 10 inches in diameter if available. The CWD could be dropped flush with ground and on the contour. CWD should not be dropped or left parallel to the stream channel.

BMPEP form T05 would be utilized to evaluate implementation on those units with SMZs and other aquatic protection.

Roads

2.3 Timing of Construction Activities

This practice is to minimize erosion by conducting operations during minimal runoff periods. Operations should be scheduled and conducted to minimize erosion and sedimentation when ground conditions are such that excessive rutting and soil compaction would not occur. Roads would be maintained when conditions are dry. Erosion conditions will be kept as current as practicable on active road maintenance projects.

2.7 Control of Road Drainage

The objective of this practice is to minimize the erosive effects of water concentrated by road drainage features; to disperse runoff form disturbances within the road clearing limits; to lessen the sediment yield from disturbances within the roaded areas; to minimize erosion of the road prism by runoff from road surfaces and uphill areas. Standard road maintenance practices would be implemented to meet the above objectives.

2.11 Control of Sidecast Material during Construction and Maintenance

The objective of this practice is to minimize sediment production originating from sidecast material during roadway maintenance. Maintenance on those roads utilized by the project would not create sidecast materials onto the side of the road. All materials would either be consolidated onto the roadbed or moved to a stable location.

BMPEP form E11 would be utilized to evaluate implementation on constructed, reconstructed or maintained during the project.
2.12 Servicing and Refueling of Equipment
The objective of this practice is to prevent pollutants such as fuels, lubricants, bitumens and other harmful materials from being discharged into or near rivers, streams and impoundments, or into natural or man-made channels. Service and refueling locations would be located in landings. The forest would have a spill plan if the volume of fuel on site exceeds 660 gallons in a single container or a total storage at the site exceeds 1,320 gallons. It is not expected that any sites would exceed 660 gallons. Servicing and refueling would take place along landings or roads and follow forest spill plan direction.

BMPEP form E12 would be utilized to evaluate implementation on those areas that meet the requirements for servicing and refueling of equipment.

2.13 Control of Construction and Maintenance Activities Adjacent to SMZs
The objective of this practice relative to this project is to protect water quality by controlling maintenance actions within and adjacent to any streamside management zone so that the following SMZ functions are not impaired:

- Acting an and effective filter for sediment generated by erosion from bare surfaces, dust drift, and oil traces;
- Maintain riparian habitat and channel stabilizing effects;
- Keep floodplain surface in a resistant, undisturbed condition to slow water velocities and limit erosion by flood flows.

2.21 Water Source Development consistent with Water Quality Protection
The objective of this practice is to supply water for roads and fire protection while maintaining existing water quality. Locations identified for water drafting include Browns Meadow tank and a tank at the spring north of French Meadow.

BMPEP form E16 would be utilized to evaluate implementation on those areas identified for water source development.

2.22 Maintenance of Roads
The objective of this practice is to maintain roads in a manner that provides for water quality protection by minimizing rutting, failures, incorporation of slash into road fills, side-casting, and blockage of drainage facilities all of which can cause erosion and sedimentation and deteriorating water shed conditions. Engineering report provides details as to which road would be identified for use on the project in addition to pre-construction haul maintenance and reconstruction details.

2.23 Road Surface Treatment to Prevent Loss of Materials
The objective of this practice is to minimize the erosion of road surface materials and consequently reduce the likelihood of sediment production from those areas. Dust abatement
would occur on all roads associated with the project. Dust abatement in the Piute area will be completed by spraying water on the roads.

2.24 Traffic Control During Wet Periods
The objective of this BMP is to reduce road surface disturbance and rutting or roads and to minimize sediment washing from disturbed road surfaces. A wet weather agreement will be in place for any operations to occur outside the normal operating season. Operations would not occur, whether in the normal operating season or not, unless conditions are dry enough to prevent damage to road resources and water quality.

Vegetation Manipulation/Management

5.5 Disposal of Organic Debris
The objective of this practice is to prevent gully and surface erosion with associated reduction in sediment production and turbidity during and after treatment. Lop and scatter of slash to 18 inches would provide the much needed ground cover and organic material lacking as a result of the fire.

Fire

6.2, 6.3 Consideration of Water Quality in Formulating Fire Prescriptions and Protection of Water Quality from Prescribed Burning Effects
The objective of these practices is to provide for water quality protection while achieving the management objectives using prescribed fire and maintain soil productivity, minimize erosion, ash, sediment, nutrients and debris from entering water bodies.

   Burn piles would be placed a minimum of 20 feet from SMZs and cross stream perpendicular to drainage flow; all handlines would be water barred; and ground cover maintenance would be maintained at 50 percent existing levels.

   BMPEP form F25 would be utilized to evaluate implementation on those areas that are treated with the use of prescribed fire.

Watershed Management

7.8 Cumulative Watershed Effects
The objective of this practice is to protect the identified beneficial uses of water from the combined effects of multiple management activities when individually may not create unacceptable effects but collectively may result in degraded water quality conditions.

   The areas of concern relative to cumulative watershed effects associated with this project would include increases in runoff as a result of diminished ground cover and organic matter, increased fines and ash, and decreased soil roughness due to the wildfire effects. The increases in sediment and water yields could cause increases in erosion and sedimentation to stream courses. The project has been designed with practices in place to address these potential concerns. These practices would reduce the potential for cumulative watershed effects.
It is expected that Stream Side Management Zones (SMZ) and Riparian Conservation Areas (RCA) designated for stream courses and riparian zone protection would not alleviate the potential for cumulative watershed effects as the trapping capability of existing vegetation has been lost as a result of the fire. Therefore, the organic material generated by the restoration activity would serve to help restore the SMZ and RCA.

Landings and temporary roads would utilize previously compacted sites, reducing the potential to increase compaction from current levels. Landings and temporary roads could be slashed and would be properly drained and would not be expected to add to increased runoff and associated sedimentation above current levels.

Erosion has the potential to occur from concentrated water in any fire line, skid pattern or path created during operations. Water barring and slashing of fire lines and skid trails where these effects are seen would eliminate this effect. Landings would be drained and slashed to reduce the potential for water concentration and erosion. A 30 percent ground cover requirement for skid trails and landings would be expected after operations occur. This would require that at least 30 percent organic material would be left on these sites and no more than 70 percent bare ground could be seen.

Past and present activities within the analysis area include wildfire and wildfire suppression, prescribed burning, timber harvest, road construction and reconstruction, road maintenance, large storm flow events, trail construction and maintenance, recreation use, mining, residential development, and private land uses.

Future management activities in the project area include the continuation of trail maintenance and road maintenance. Potential future management activities may include timber management and fuel reduction projects. However, site-specific information (e.g., location, dates, affected area, etc.) is not available for these potential future activities. If additional activities are proposed within the project area in the future, those activities will be fully analyzed as part of the planning process.

A CWE analysis has been conducted following Forest Service protocols to address and minimize impacts of this project in combination with other past, present, and reasonably foreseeable future activities on public and private land.
Appendix C – Travel Analysis

2008 Piute Fire
Post-Fire Restoration Process
Travel Analysis Working Paper
Summer 2009

Background

In May 2006, the Kern River Ranger District (KRRD) completed a roads analysis report for the Clear Creek Project Area. In July of 2008, however, prior to completion of proposed activities in the Clear Creek area, the Piute Fire burned a large portion of the project area. The fire was followed by severe thunderstorms and flooding in the area, which damaged portions of the transportation system. The Forest Service Burned Area Emergency Response (BAER) effort provided emergency repairs where necessary, but the road network within the burned area continues to display effects from the fire and the flood. Because the conditions under which the previous roads analysis report was completed have changed and because roads outside the boundary of the Clear Creek project were affected, the KRRD has completed an updated travel analysis to guide future transportation decision making within the Piute Fire area. (In some cases, the condition remains unchanged and the original Clear Creek Roads Analysis continues to inform transportation system planning. That document is incorporated by reference.)

This travel analysis was completed under the requirements of the 2005, National Forest Travel Management Rule. The rule is intended to help ensure that additions to the National Forest System road network are those deemed essential for resource management and use; that the construction, reconstruction, and maintenance of roads minimizes adverse environmental impacts; and that unneeded roads are decommissioned and restoration of ecological processes are initiated. This analysis was guided by the procedures suggested in Forest Service Publication FS-643, Roads Analysis: Informing Decisions About Managing the National Forest Transportation System. The results of the analysis are summarized in this document.

Introduction

This travel analysis is not a decision making process. Rather, it is an opportunity to gather information, describe existing conditions, and identify management opportunities. Forest Service managers can then prioritize and propose management actions that are responsive to these opportunities. The product of a travel analysis is a report for decision makers and the public that documents the information and analyses used to identify opportunities and set priorities for future national forest road systems. In sum, the objective of this analysis is to provide decision makers with critical information to develop road systems that are safe and responsive to public needs and desires, are affordable and efficiently managed, have minimal negative ecological effects on the land, and are in balance with available funding for needed management actions.

The scale of a travel analysis is set by the responsible line officer and can range from landscape level to project level. In this case, the scale of the analysis is small and its results will be used to inform project level decisions. Each National Forest System (system) road located within the Piute Fire area is included in this discussion. Unauthorized roads and trails (U-Routes) are not included; the disposition of such routes will be considered under the Forest’s Travel Management process. This analysis will be used to inform any future resource management...
decisions and will be included in all National Environmental Policy Act (NEPA) project records. Public participation will be included as part of any NEPA analysis. The travel analysis interdisciplinary team (IDT) (Table C-1) includes specialists from each relevant field because roads and access are fundamentally linked to all aspects of ecosystem management.

Table C-1. Interdisciplinary Team

<table>
<thead>
<tr>
<th>Team Leader/Engineer</th>
<th>Mike North</th>
</tr>
</thead>
<tbody>
<tr>
<td>Archaeologist</td>
<td>Dennis Dougherty</td>
</tr>
<tr>
<td>Wildlife Biologist</td>
<td>Sean Hill</td>
</tr>
<tr>
<td>Botanist</td>
<td>Terry Miller</td>
</tr>
<tr>
<td>Hydrologist</td>
<td>Eric Moser</td>
</tr>
<tr>
<td>Hydrologist</td>
<td>Chris Stewart</td>
</tr>
<tr>
<td>Soil Scientist</td>
<td>Dustin Walters</td>
</tr>
<tr>
<td>Fuels Specialist</td>
<td>Nickie Washington</td>
</tr>
<tr>
<td>Recreation/Trails Specialist</td>
<td>Aaron Drendel</td>
</tr>
<tr>
<td>Minerals Administrator</td>
<td>Donna Duncan</td>
</tr>
<tr>
<td>Recreation Specialist</td>
<td>Bobby Frenes</td>
</tr>
<tr>
<td>Forester</td>
<td>Pat Dauwalder</td>
</tr>
</tbody>
</table>

Description of Location and Existing Condition

The Piute Fire area is located in Kern County, California approximately seven air miles southeast of Lake Isabella, California. The project area for this analysis is within the perimeter of the approximately 32,890-acre Piute Fire. The legal description is T. 28 S., R. 33 E., Sections 11, 13, 14, 22-26, and 36; T. 28 S., R. 34 E., Sections 8, 9, 16-20, and 29-32; T. 29 S., R. 34 E., Section 6; Mount Diablo Base and Meridian.

The transportation system in the Piute Fire Burned Area services a variety of resource management and access needs—primarily timber, private land ownership and recreation. The project area supports secondary activities such as dispersed recreation, hunting, fuelwood collection, and monitoring of wildlife and other resources.

Most of the roads in the project area were first constructed in the late 1890s and early 1900s for unregulated grazing, mining access and unregulated timber harvests. Some of the roads were built by the Forest Service for timber harvest, but the main roads were already built before the U.S. Forest Service existed. In the 1950s and 1960s, as a result of timber operations, many temporary roads were left open for other resource activities but not added to the transportation system: these are called “unclassified” roads. In addition, there are other user-created routes in the area that are considered “unclassified.” These routes are generally designated as U-routes and they will not be considered in this analysis. Attachment A is a listing of all system roads within the project area.

There are approximately 35 miles of inventoried, classified National Forest System (NFSR) roads within the analysis area. The road system is used seasonally as the roads are gated and closed in the winter. Management level (ML) 2 and 3 roads provide access for passenger car traffic and generally make up the arterial and collector roads of the Forest transportation system. ML 2 roads provide access for management activities and high clearance vehicles. ML 1 roads are roads that are maintained on the system but are only opened for management activities, when they are brought up to ML 3 standards during the operation and then returned to ML 1 afterwards.
The Piute Fire area is accessed from State Highway 178 east of Lake Isabella. From State Highway 178 drive south on Kelso Valley Road approximately 15 miles. Turn right, west onto Piute Mt. Road (Co Rd. No. 501), continue ahead to the intersection with Forest Road 27S02 on the right. Access to the project area from the west is by way of the Havilah- Bodfish road. Turn east on Forest Rd. 27S02, continue east to the Brown Meadow Road (28S18) intersection on the right. See map, below.

Management Direction

The Standards and Guidelines for the transportation system from the 1988 Sequoia National Forest Land and Resources Management Plan include:

1) Provide and manage a Forest transportation system to achieve resource management objectives while protecting resource values. Plan, design, and construct local roads to the lowest standard commensurate with intended use. Plan and construct arterial and collector roads to the standard appropriate for safe and economical use, and commensurate with the road development, and multiple resource management. Maintain all Forest roads to their objective maintenance levels. Provide for signing in accordance with road management objectives and MUTCD (Manual on Uniform Traffic Control Devices) standards.
2) Cooperate with federal, state, and country agencies, and private companies to construct, reconstruct, and maintain roads under their jurisdictions, if needed. Review location and design specifications for roads built under permit or license, and require protection of all resources. Coordinate road management and closures with local agencies.

3) Manage and maintain the transportation system to protect soil, water, and all other resources values. Close local roads as needed to meet these objectives. Develop road closure and OHV plans.

Forest Service roads are maintained to varying standards depending on the level of use and management objectives. There are five maintenance levels (ML) used by the Forest Service to determine the work needed to preserve the investment in the road. These maintenance levels are described in FSH 7709.58 – Transportation System Maintenance Handbook.

Description of Access Needs

**Timber Management:** Commercial timber treatments generally require ground based skidding systems, and thus, road access. In addition, roads provide access for collection of fuelwood, poles, and other forest products. The existing road system should be designed to allow efficient management of the suitable timber base.

**Recreation:** The roads in the Piute Mountain area provide access for motorized and non-motorized recreation. Recreation includes hunting, OHV riding, mountain biking, site seeing, fuelwood gathering, snowmobiling, and dispersed camping.

**Fire Management:** Maintaining road access allows for the gathering of fuelwood, posts, and poles. These actions reduce fuels and help strengthen the use of roads as firebreaks. In addition, roads provide a means for Forest Service fire suppression crews and cooperators to keep fires in check.

**Range Management:** Roads allow range managers to monitor allotment conditions. Additionally, roads can provide a livestock driveway.

Transportation System Risks and Benefits

Public input during the scoping periods for the Piute Fire Roadside Hazard Tree Removal Project and the Piute Fire Restoration Project provided information regarding concerns associated with the transportation system. The IDT reviewed these concerns and used them to develop a list of risks and benefits associated with the road system. For each risk and benefit, the team then developed evaluation criteria to be used in assessing each road segment. Finally, the team assigned benefit/risk rankings of high, medium, and low to each road segment and used these rankings to populate a recommendation matrix. These risks and benefits, their associated criteria, and the recommendation matrix are shown below.

**Benefit: Access**
The NFS road network must be adequate to meet access needs. Vegetation treatments are usually accomplished with mechanized equipment. Road access is generally required within 1,200 feet of treated stands for commercial entry, pre-commercial thinning, and/or planting. When prescribed fire is included as a treatment, roads serve as holding lines and safety zones for personnel. In addition, National Forest System roads are a primary means by which the public gains access to these lands. System roads are used by motorized, foot, horse, and bicycle traffic. The public uses system roads for a variety of purposes: outdoor recreation, access to private property, mineral leases, public utilities, fuelwood collection, and commodity production.
Evaluation Criterion #1. Forest users and visitors desire the opportunity to enjoy OHV activities. Current Forest Plan direction allows wheeled vehicle travel on designated routes, trails, and limited OHV use areas. Roads provide access for OHV use.

Evaluation Criterion #2. Administrative access is needed for vegetation management purposes, including reforestation and maintenance of plantations, planned salvage and fuel treatment units, and anticipated long term needs for implementing forest health projects.

Evaluation Criterion #3. Administrative access is needed manage special use permits and rangeland permits. Permittees need access to the permitted areas, and private land owners use system roads to access their lands.

Risk: Soil Erosion and Water Quality
Roads, by their very nature, disturb top soil and intercept precipitation, concentrating runoff and potentially causing erosion. Poorly located or poorly designed roads collect water, which causes motorized users to drive around the wet spots and create ribbon roads. The development of these ribbon roadways causes changes in vegetative cover and species and undesirable hydrologic effects. While the existing Piute Mountain road system is largely located on dry, uplands, there are segments located in close proximity to ephemeral channels and/or meadows. Any future projects proposed for this area may consider removing or rerouting these segments. Finally, any road segments so severely damaged by the post-fire flooding associated with the Piute Fire that they are beyond reasonable repair and that are contributing to excess soil erosion should be considered for removal from the system.

Evaluation Criterion #4. Roads modify subsurface and surface flow paths when located below and near contacts between Mesozoic granitics and overlying pre-Cretaceous metamorphics, particularly limestone inclusions.

Evaluation Criterion #5. Roads generate surface erosion when too few drainage points are provided on a segment, and/or when road cuts intercept slopes with seeps or spring water or in influence of large rock outcrops.

Evaluation Criterion #6. Roads affect stream channel geometry and water quality at pipe crossings. Stream energy is increased several times in passage through pipes by reduced friction and increased depths of flow.

Evaluation Criterion #7. Roads hydrologically connected to a channel have potential to pollute streams with pollutants commonly spilled or used within the road prism, such as motor oils on running surfaces and herbicides on road shoulders. Roads that are hydrologically connected to a steam may also affect water quality and quantity by elevating peak flows and delivering sediment and pollutants.

Evaluation Criterion #8. Roads may affect the channel dynamics when physically occupying the valley bottom and floodplain by constraining channel movement, and reducing riparian vegetation. These situations may restrict movement of aquatic species or destroy habitat. Secondary benefits of stream shading, litter fall and woody debris may also be reduced.

Risk: Wildlife
The presence of roads can cause a significant increase in cumulative effects to wildlife (including Threatened, Endangered, Proposed, and Sensitive, species). Roads provide a means by which easy mechanized access induces increased human activities. These may include management activities such as timber harvesting, grazing, mining, water development, fuelwood cutting, etc. They also may include recreational activities such as hunting, fishing, camping,
hiking, ATV/OHV use, etc. The increased presence of human activities such as these could contribute to a disruption of lifecycle activities necessary for wildlife populations to maintain themselves. In addition, the presence of roads can cause direct vehicular disturbance to wildlife species. These disturbances may include wildlife/vehicle collision, increased engine noise, increased visual presence, and reduced air quality from hydrocarbon and carbon monoxide emissions.

_Evaluation Criterion #9._ Road use can adversely impact yellow-blotched salamander habitat quality by increasing sedimentation.

_Evaluation Criterion #10._ Road use can adversely impact northern goshawk reproductive success by increasing noise-related disturbance during critical seasons.

_Evaluation Criterion #11._ Road use can adversely impact California spotted owl reproductive success by increasing noise-related disturbance during critical seasons.

_Evaluation Criterion #12._ A road may affect the ability of non-native aquatic species to move into a previously unoccupied area, or to alter habitat for a native species such that a non-native species has an advantage.

### Table C-2. Recommendation Matrix

<table>
<thead>
<tr>
<th>(RISKS)</th>
<th>(BENEFITS)</th>
<th>Scores</th>
<th>Low (6-9)</th>
<th>Medium (10-13)</th>
<th>High (14-18)</th>
</tr>
</thead>
<tbody>
<tr>
<td>High 12-15</td>
<td>(HL) Decommission or Close</td>
<td>(4.8) or 11.9%</td>
<td>(HM) Mitigate or Restrict</td>
<td>(6.3) or 15.6%</td>
<td>(HH) Maintain-Highest Priority</td>
</tr>
<tr>
<td>Medium 8-11</td>
<td>(ML) Restrict or Close</td>
<td>(1.3) or 3.3%</td>
<td>(MM) Mitigate-Maintain</td>
<td>(21.4) or 53.1%</td>
<td>(MH) Maintain-Second Priority</td>
</tr>
<tr>
<td>Low 5-7</td>
<td>(LL) Mitigate-Close or Convert</td>
<td>(0) or (0%)</td>
<td>(LM) Maintain-Low Priority</td>
<td>(0.6) or 1.5%</td>
<td>(LH) Maintain-Low Priority</td>
</tr>
</tbody>
</table>

**Risk: Vegetation**

Research indicates that the introduction of exotic plant species may be accelerated by the development of roads. The likelihood of invasion, however, and the rate at which it occurs, is highly variable, and depends on a number of factors such as location, soils, traffic and type of improvements. In addition, motorized use in or near of known rare plant sites can cause direct habitat loss, direct mortality and reduce populations of sensitive native plant species.

_Evaluation Criterion #13._ Roads present a risk of new populations of undesirable plant species. Vehicles carry and spread plant part or seeds along motorized travel ways. The main risk of infestation is from users coming from outside the local area, as the current level of noxious weed infestation on the Piutes is near zero. Non-local users include people recreating and special use permittees, i.e. utility companies who must regularly inspect their infrastructure.
Evaluation Criterion #14. Motorized use in or near (within 30 feet) of known rare plant sites can cause direct habitat loss, direct mortality and reduce populations of Regional Forester’s Sensitive species. Roads located closer than 30 feet from such habitat can cause increased erosion and sedimentation resulting in reduced habitat quality.

Informing Decisions About Managing Road Systems

Forest Service Publication FS-643, Roads Analysis: Informing Decisions About Managing the National Forest Transportation System contains an appendix consisting of approximately 73 questions designed to help IDTs develop appropriate approaches to transportation system design and management. Not all of the questions are relevant to the Piute area or to this evaluation, but a number of them were considered and addressed by the team.

What ecological attributes, particularly those unique to the region, would be affected by roading of current unroaded areas? Roading of unroaded areas may have a negative effect on wildlife and soils. For example, roads can fragment and diminish wildlife habitat and disturb sensitive species (Ruggiero and others 1994). Roads can also cause soil erosion and reduce infiltration rates (Egan 1999). On the other hand, the roading of unroaded areas may have a positive effect on fuel loads and the potential for catastrophic wildfire. Roads provide opportunities for fuel removal and can break up fuel continuity across the landscape. Finally, building roads into unroaded areas would potentially allow for vegetation management activities that could result in changes in forest composition, density, and structure.

In this case, the Forest considers the existing road system to be adequate and has not proposed “roading” in any unroaded areas.

To what extent does the road system overlap with areas of exceptionally high aquatic diversity or productivity or areas containing rare or unique aquatic species or species of interest? There are no areas of exceptionally high aquatic diversity or productivity or areas containing rare or unique aquatic species or species of interest within the project area.

To what degree do the presence, type, and location of roads increase the introduction and spread of exotic plant and animal species, insects, diseases, and parasites? Some research indicates that the introduction of exotic species may be accelerated by the development of roads (Greenberg and others 1997). The likelihood of invasion, however, and the rate at which it occurs, is highly variable, and depends on a number of factors such as location, soils, traffic and type of improvements (Gelbard and Belnap 2003). For the Piute Mountains, the risk of invasion by noxious weeds is probably of greatest concern. Of the potential noxious weeds in the area, none have been identified in the burned area. Care should, however, be taken during any road management activity, including maintenance of existing roads, to avoid moving any of these species into the Piute Fire area (Gordon and others 2005).

There are no known instances of exotic animal species, insects, diseases, or parasites being introduced by roads on the Sequoia National Forest to date, according to Forest and California Department of Fish and Game personnel. Noxious weeds, on the other hand, are a serious concern and transportation systems are one of the main conduits for their introduction on the Forest. Although the spread of noxious weeds would have no direct impact on threatened, endangered or sensitive wildlife species on the Sequoia National Forest, there would be a more pronounced impact on herbivores or species dependent on herbaceous cover, such as deer, elk, pronghorn, and turkey. Noxious weeds may displace native plants, may modify habitat structure
such as changing grassland to a forb-dominated community, or may change species interactions within the ecosystems (Belcher and Wilson 1989; Trammel and Butler 1995).

**To what degree do the presence, type, and location of roads contribute to the control of insects, diseases, and parasites?** Roads allow for efficient detection of potential insect infestations and provide access for silvicultural treatments designed to minimize the impacts of such infestations (Goyer and others 1998; Liang and others 1997). In general, however, roads have little effect on forest diseases (Gucinski 2001).

**How does the road system affect ecological disturbance regimes in the area?** The road system is unlikely to affect major ecological disturbance agents such as drought or wind events. Roads can provide access for vegetative treatments designed to reduce insect and disease related disturbances. Roads help reduce the continuity of fuels and can assist in fire management activities.

**What are the adverse effects of noise caused by developing, using, and maintaining roads?** While studies have shown that many wildlife species are sensitive to human disturbance, it is generally difficult to measure the role that noise alone plays in this disturbance (Seiler 2003). Exposure to noise may also negatively impact those seeking a “restorative” backcountry experience (Gramann 1999).

Because the Piute’s system is, however, composed of low volume, low speed roads, it is unlikely that noise is having a significant effect on the ecosystem.

**How and where does the road system modify the surface and subsurface hydrology of the area?** Roads expand the channel network, convert subsurface flow to surface flow, and reduce infiltration on the road surface. All these factors affect the overall hydrology in a watershed, particularly the quantity and timing of flow. The channel network is expanded by road ditches, which may create channels in previously unchannelized portions of the hillside (Wemple and others 1996). Road ditches may also intercept subsurface flow and convert it to surface flow. An expanded channel network augments peak flows since water traveling as concentrated surface flow reaches the channel faster than water traveling as subsurface flow. Reduced infiltration contributes to additional surface flow since water does not infiltrate for storage in the soil profile, but rather runs off as overland or surface flow. Storage and movement of water through the soil profile as subsurface flow regulates and sustains base flows. When roads disrupt these processes, more water becomes available during peak flows, and less water is available to sustain base flows.

**How and where does the road system generate surface erosion?** With the exception of virtually flat areas, the loss of vegetation and compaction associated with roads will likely cause an increase in erosion rate (Wemple and others 2001). In this case, road segments that may generate surface erosion include: 27S02, 28S18, and 28S44. Road grades at and above 10%.

**How and where does the road system affect mass wasting?** Road-related mass wasting results from 1) improper placement and construction of road fills and stream crossings, 2) inadequate culvert sizes to accommodate the peak flows, sediment loads, and woody debris, 3) roads located on soils prone to mass wasting, 4) water diversion onto unstable hillslopes, 5) Soil saturation due to heavy rainfall and a raising of the subsurface water table. The sensitivity of an area to mass wasting depends on the interaction of the soils and underlying bedrock, slope steepness, and the subsurface hydrology. Mass wasting is not a major concern on the Sequoia
National Forest. It does occur as a localized event in areas with steep side slopes or where a high water table may saturate a small portion the of road prism.

After the Clear Creek project roads field survey was completed, it was determined not to be a problem within this area. Road locations were generally placed on flat to moderate steep side slopes or on ridge tops. Roads in the project area have been in place and stable for many years.

**How and where do road-stream crossings influence local stream channels and water quality?** Roads have the potential to contribute sediment to stream systems and reduce water quality (Grace 2002). Poorly designed crossings directly affect hydrologic function when they constrict channel flow, when they are misaligned relative to the natural stream channel, or when improperly sized culverts are installed. Road-stream crossings also act as connected disturbed areas where water and sediment are delivered directly to the stream channel. Connected disturbed areas are defined, as “high runoff areas like roads ... that discharge surface runoff into a stream or lake ... connected disturbed areas are the main source of damage in all regions” (FSH 2509.25-99-2). Increasing peak flows through the extended channel network increases the energy available for in-channel erosion, which affects stream stability and increases sedimentation. The biggest water quality concern associated with the road system is sediment delivered to the stream system through connected disturbed areas.

The density of road-stream crossings is a good indicator of which watersheds have the highest risk to stream channels and water quality. At the sub-Forest scale, road/stream density should be assessed considering roads of all maintenance levels, including nonsystem and temporary roads. Road-stream crossing density at the sub-Forest scale can be used to identify those watersheds where road-stream crossing density is a watershed-wide issue, but road-stream crossing density should also be assessed at the project scale (2nd or 3rd-order watersheds) to identify site-specific areas where crossing density poses a concern and where restoration opportunities can be identified.

In addition to road-stream crossing density, diversion potential is also important to consider when assessing road-stream crossing influence on stream channels and water quality. Diversion potential exists when a road crossing is configured such that water overtopping the culvert would travel down the road rather than directly across the road and back into the channel. This occurs mainly in cross-drain culverts in ditches taking water under the road. If the culvert in the ditch plugs with debris, the flow moves out of the ditch and flows on the road surface till it finds an outlet – usually over the side of the road.

Forest Road No. 27S02 requires ditch cleaning, surface blading and rolling dip reconstruction to facilitate intermittent flows from the hillside during storm runoff and snowmelt. This should be done as a routine part of spring road maintenance.

Forest Road No. 28S18 has several areas that may require some road maintenance to facilitate proper road and ditch and culvert drainage. This will allow the normal drainage flow to be contained in the natural channels as much as possible.

**What downstream beneficial uses of water exist in the area? What changes in uses and demand are expected over time? How are they affected or put at risk by road-derived pollutants?** Downstream beneficial uses of surface water in the project area are fire protection, large scale recreation and propagation of fish and wildlife. The project area road system does not pose a known risk to downstream uses, on the basis of historical past practices. Water for
dust abatement and road maintenance will come from the water source tank at Brown Meadow at the end of Rd. No. 28S18. There will be no need to draft from live streams.

How does the road system alter physical channel dynamics, including isolation of floodplains, constraints on channel migration, and the movement of large wood, fine organic matter, and sediment? Roads can directly affect physical channel dynamics when they encroach on floodplains or restrict channel migration. Floodplains help dissipate excess energy during high flows and recharge soil moisture and groundwater. Floodplain function is compromised when roads encroach on or isolate floodplains. This can increase peak flows. When peak flows increase, more water is available for in-channel erosion, which, in turn, affects channel stability. Restricting channel migration can cause channel straightening which increases the stream energy available for channel erosion. This can also result in channel instability. Altering channel pattern affects a stream’s ability to transport materials, including wood and sediment. Proper road maintenance before, during and after the project activity must be done to minimize sedimentation and erosion.

How and where does the road system create potential for pollutants, such as chemical spills, oils, de-icing salts, or herbicides, to enter surface waters? Anywhere roads run adjacent to or across live streams or floodplains there is some potential for spilled pollutants to access streams. Cross-drained ditches may transport spilled pollutants to standing or flowing water bodies. Generally, these pollutants are not transported in bulk across the Sequoia National Forest. Log haulers and other heavy equipment associated with harvest and road activities carry sufficient fuel and oil to cause localized water quality problems should an accident occur. This is minimized by stipulations in timber sale contracts that specify haul speeds, fueling practices, weather or road moisture limitations, and other aspects of the operations. The potential for pollutants associated with log haulers would be highest on those roads commonly used for timber harvest access, particularly maintenance level 3 roads. Road 27S02 (Saddle Springs) and County Road 501 (Piute Mtn.) would be the roads receiving the bulk of hauling traffic and the ones most likely to be exposed to spills of hazardous materials.

What are the direct effects of the road system on terrestrial species habitat? Besides direct habitat loss from road construction, road systems can fragment the structure of terrestrial species habitat by reducing patch size (Reed and others 1996). In addition, roads can break up habitat connectivity by forming barriers between habitat patches (McGregor and others 2003; McDonald and St. Clair 2004). As regards connectivity, however, most studies have focused on the barrier effect of paved roads and highways where traffic volume can be measured in the thousands or tens of thousands of vehicles per day (Seiler 2003). In the case of the Piute Fire area, however, daily traffic volume can likely be measured in the single digits and is unlikely to constitute a significant barrier to habitat connectivity. On the other hand, one road (FR 27S02) intersects an identified northern goshawk protected activity center (PAC) and has the potential to disturb nesting birds.

How does the road system affect the agency’s direct costs and revenues? What, if any, changes in the road system will increase net revenue to the agency by reducing cost, increasing revenue, or both? Costs and revenues are associated with timber harvest, recreation, and special use permits. Generally the cost of maintaining roads to forest standard translates into higher forest product values. Better road conditions reduce harvest times and increase the season of use for logging operations.

How does the road system affect fuels management? Evaluations of historic fire regimes have shown that fuel loading can be exacerbated by forest management—primarily through the
accumulation of slash and dense undergrowth following timber harvest (DellaSala and Frost 2001; McKelvey and others 1996). While roads frequently provide access for these activities, the road system itself does not increase fuel loads. Fuels can be effectively managed by a combination of mechanical treatment and prescribed fire (Stevens 1998). Road access is typically desirable when implementing these management actions—though not required for prescribed fire (DellaSala and Frost 2001).

In the Piute Mountains, the road system is not only used for access to project areas but also serves as control lines for prescribed burns. Using roads for control lines allows for efficient use of fire fighting forces and equipment. The roads are wider than holding lines constructed with a small dozer or hand crew and are more effective in protecting resources and structures. This allows prescribed burns to be more cost effective and safe. Removal of hazardous fuels by mechanical means can only be carried out when there is an adequate road system adjacent to or through a project area.

**How does the road system affect the capacity of the Forest Service and cooperators to suppress wildfires?** The most efficient and safest way to deliver firefighters to a wildland fire is by vehicle on roads. Roads are the primary way local wildland fire departments access the urban interface areas of the Forest. Although agencies such as California Department of Forestry and Fire Protection do have some aerial resources at their disposal, Forest roads remain key to providing access to wildland fires. Roads also serve as control lines, safety zones and escape routes for wildland firefighting personnel. The National Fire Management Analysis System depends heavily on the roads for access, combined with quicker response times to certain areas to formulate a budget for the Fire Management program on the Forest. Reducing road access to parts of the Forest could have an impact on Fire Management budgets.

**How does the road system affect risk to firefighters and to public safety?** A safe road is one that provides two-way travel, does not dead-end and allows any residents of the wildland urban interface the opportunity to leave an area in a safe and orderly manner. Roadside vegetation is also an important factor affecting the risk to firefighters and public safety. Clearing of roadside vegetation allows for better visibility for equipment operators and the public should a fire occur. Brushing of roads would increase the opportunity for a particular road to be used as a fireline or safety zone. Lower maintenance level roads in the project area are generally dead end roads with clearing needing to be done.

**How does the road system affect access to range allotments?** Generally, Forest Service roads provide access to range permittees for repair and maintenance of their allotments. Roads also allow for monitoring of forage conditions. Finally, roads frequently serve as livestock driveways, reducing the need to “sacrifice” other areas for this purpose (Gucinski and others 2001). Currently, Piute Mountain road access to allotments is needed to haul livestock and for administrative use of the allotments and is sufficient for that purpose.

**Is there now or will there be in the future excess supply or excess demand for unroaded (and roaded) recreation opportunities?** There is not now nor is it anticipated that there will be an excess in supply or demand for these recreation opportunities in the project area. The area is well roaded and access is therefore provided into the unroaded areas within the project.

**What are the adverse effects of noise and other disturbances caused by developing, using, and maintaining roads, on the quantity, quality, and type of unroaded (and roaded) recreation opportunities?** Many participants in unroaded or “undeveloped” recreation activities do so because they value the quiet and solitude associated with absence of motorized or
mechanized sights and sounds (Gramann 1999). Disturbances caused by road noise or dust are likely to annoy and disrupt the enjoyment of those users. In this case, the roads in this area receive moderate use by recreation or other forest visitors. The potential for the above listed adverse effects will be during the active logging and haul periods.

**Who participates in unroaded (and roaded) recreation in the areas affected by constructing, maintaining, and decommissioning roads?** Hunters, OHV users and firewood cutters are the primary visitors to this area.

**How does road management affect people’s sense of place?** Roads allow access to local places associated with spiritual and cultural sites, hunting camps and historic sites or traditional rural activities such as wood cutting and camping. Valuing and assessing these needs are difficult but essential. Changes in road access through management decisions can disrupt the social and economic value of an area. Altering road system access can disrupt long-established availability and use patterns and, at least in the short run, result in not meeting visitor expectations.

**How does the road system affect access for collecting special forest products?** Road access is a “critical” cost factor for those who depend on special forest products for a portion of their income (Gucinski and others 2001). And recent data show that demand for these products is growing (Mater 1997). Locals value the roads for general access and for resource extraction including fuelwood gathering, mushroom gathering and pinecone gathering. The current primary use of many of the roads is for hunting, OHV use, fuelwood and general forest dispersed camping.

**How does the road system affect access to timber stands needing silvicultural treatment?** The current transportation system in the Piute Mountains of the Sequoia National Forest provides access for silvicultural treatment of timberlands. These treatments include planting, thinning, plantation release, animal damage control, and monitoring. These are intensive activities and require frequent access; these needs are served by the current transportation system. The project area has 25 miles of ML 1 and 2 roads that are available for timber management activities.

**Opportunities**

The team assigned to this analysis identified a number of opportunities for improving the condition of the Piute road network through road closure, obliteration, and improvement. Table C-3 identifies road segments that were evaluated. Table C-4 displays the ID Team’s recommendations.
### Table C-3 Road Segments Evaluated

<table>
<thead>
<tr>
<th>Road Number</th>
<th>Miles</th>
<th>Maintain</th>
<th>Decommission</th>
</tr>
</thead>
<tbody>
<tr>
<td>27S02</td>
<td>4.80</td>
<td>4.80</td>
<td></td>
</tr>
<tr>
<td>27S02E</td>
<td>0.44</td>
<td></td>
<td></td>
</tr>
<tr>
<td>27S02F</td>
<td>1.00</td>
<td>Convert to trail first 0.50 mile</td>
<td>Decommission next 0.50 mile</td>
</tr>
<tr>
<td>28S17</td>
<td>2.79</td>
<td></td>
<td></td>
</tr>
<tr>
<td>28S17A</td>
<td>0.52</td>
<td></td>
<td>0.52</td>
</tr>
<tr>
<td>28S17B</td>
<td>1.23</td>
<td></td>
<td>1.23</td>
</tr>
<tr>
<td>28S18</td>
<td>0.90</td>
<td></td>
<td>0.90</td>
</tr>
<tr>
<td>28S18A</td>
<td>0.34</td>
<td></td>
<td></td>
</tr>
<tr>
<td>28S23</td>
<td>1.64</td>
<td>Maintain first 0.75 mile</td>
<td>Decommission next 0.89 mile</td>
</tr>
<tr>
<td>28S24</td>
<td>6.12</td>
<td>Maintain to trailhead: 5.78 miles</td>
<td>Decommission past trailhead: 0.34 mile</td>
</tr>
<tr>
<td>28S24B</td>
<td>0.33</td>
<td></td>
<td>0.33</td>
</tr>
<tr>
<td>28S24C</td>
<td>0.96</td>
<td></td>
<td>0.96</td>
</tr>
<tr>
<td>28S24D</td>
<td>0.30</td>
<td></td>
<td>0.30</td>
</tr>
<tr>
<td>28S25</td>
<td>0.55</td>
<td></td>
<td>0.55</td>
</tr>
<tr>
<td>28S27</td>
<td>3.60</td>
<td></td>
<td>3.60</td>
</tr>
<tr>
<td>28S27A</td>
<td>1.06</td>
<td></td>
<td>1.06</td>
</tr>
<tr>
<td>28S29</td>
<td>0.50</td>
<td></td>
<td>0.50</td>
</tr>
<tr>
<td>28S30</td>
<td>0.47</td>
<td></td>
<td>0.47</td>
</tr>
<tr>
<td>28S33</td>
<td>0.62</td>
<td></td>
<td>0.62</td>
</tr>
<tr>
<td>28S43</td>
<td>2.09</td>
<td></td>
<td>2.09</td>
</tr>
<tr>
<td>28S47</td>
<td>2.60</td>
<td></td>
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</tr>
<tr>
<td>28S47A</td>
<td>0.43</td>
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<tr>
<td>28S47B</td>
<td>1.50</td>
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<td>1.50</td>
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</table>
### Table C-4. ID team recommendatons and evaluation of impacts

<table>
<thead>
<tr>
<th>Road Number</th>
<th>Proposed Change</th>
<th>Positive (+), negative (-), or neutral (=) effect on recreation</th>
<th>Direct Effect on Recreation</th>
</tr>
</thead>
<tbody>
<tr>
<td>27S02E</td>
<td>Decommission</td>
<td>=</td>
<td>Very small effect on recreation. 27S02E does cross System trail 33E65, but there are better access points for OHV use of the trail.</td>
</tr>
<tr>
<td>27S02F</td>
<td>Convert to trail ½ mile, Decommission ½ mile</td>
<td>+</td>
<td>Small beneficial effect for OHV use. The conversion of the first ½ mile of 27S02F would slightly increase the mileage of system trails in the Piute mountains. The decommissioning of the second ½ mile would have little effect on the recreational opportunities, because it is not heavily used by the public and it duplicates access via the Liebel peak Trail to Liebel Peak.</td>
</tr>
<tr>
<td>28S17A</td>
<td>Decommission</td>
<td>-</td>
<td>Small negative effect. Decommissioning 28S17A would represent a small loss in riding opportunity for OHV users as it is currently a ML2 – High clearance road open to OHVs. OHV riders could still access U00043 &amp; U001234 via other Forest roads.</td>
</tr>
<tr>
<td>28S18A</td>
<td>Decommission</td>
<td>=</td>
<td>No negative effect on recreation. 28S18A is a short, dead end spur that does not connect to any trails.</td>
</tr>
<tr>
<td>28S23</td>
<td>Maintain 0.75 miles, Decommission 0.89 miles</td>
<td>-</td>
<td>Road would be maintained to 33E68, so OHV use would not be significantly impacted. 28S23 is used by hunters, so there would be a negative effect with regards to reduced motorized access on the last 0.89 mile of 28S23.</td>
</tr>
<tr>
<td>28S24</td>
<td>Maintain to Dry Meadow Trailhead: 5.78 miles, Decommission past trailhead: 0.34 miles</td>
<td>-</td>
<td>Decommissioning the road at 5.78 miles would end the road at 34E31. No significant loss of opportunity would occur as connectivity with system trails would remain intact.</td>
</tr>
<tr>
<td>28S24B</td>
<td>Install gate or barrier</td>
<td>=</td>
<td>Already listed in INFRA as ML1, so 28S24B is currently not intended for public use.</td>
</tr>
<tr>
<td>28S24C</td>
<td>Decommission</td>
<td>-</td>
<td>Decommissioning 28S24C would decrease hunting access for motorized users.</td>
</tr>
<tr>
<td>28S24D</td>
<td>Decommission</td>
<td>=</td>
<td>There would be no negative effect to the recreation resource. 34E42 would still exist for motorcycle riding. 28S24D dead ends in Woolstaf Meadow after only 0.3 miles so no significant hunting access would be lost.</td>
</tr>
<tr>
<td>28S29</td>
<td>Decommission</td>
<td>=</td>
<td>Does not provide any substantial OHV opportunities or hunting access.</td>
</tr>
<tr>
<td>28S30</td>
<td>Decommission</td>
<td>=</td>
<td>Does not provide any substantial OHV opportunities or hunting access.</td>
</tr>
<tr>
<td>28S33</td>
<td>Decommission</td>
<td>=</td>
<td>Does not provide any substantial OHV opportunities or hunting access.</td>
</tr>
<tr>
<td>28S43</td>
<td>Decommission</td>
<td>-</td>
<td>Decommissioning this road would be a negative effect for OHV use. The first portion of FR 28S43 is used to access Trail 33E65 at the southern end.</td>
</tr>
</tbody>
</table>
References


Appendix D – Response to Comments on the Draft Environmental Impact Statement

The Sequoia National Forest circulated the Piute Fire Restoration DEIS for a 45-day public comment period during November and December of 2009. In response, the Forest received 14 comment letters (Table 23).

Table 23. Names and letter numbers from commenters

<table>
<thead>
<tr>
<th>Letter No.</th>
<th>Author</th>
<th>Affiliation</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Richard Artley</td>
<td></td>
</tr>
<tr>
<td>2</td>
<td>Monica Bond</td>
<td></td>
</tr>
<tr>
<td>3</td>
<td>David Dills</td>
<td></td>
</tr>
<tr>
<td>4</td>
<td>Chad Hanson</td>
<td></td>
</tr>
<tr>
<td>5</td>
<td>Chris Horgan</td>
<td>Stewards of the Sequoia, Bakersfield Trailblazers, Southern Sierra Fat Tire Association, High Desert Multiple Use Coalition, Kernville Chamber of Commerce and Kern River Valley Chamber of Commerce, California Trails Users Coalition, California Off Road Vehicle Association, Stewards of the Sierra, Lake Isabella-Bodfish Homeowners Association, Piute Mountain Recreation Club, Valley View Homeowners, Piute Mountain Homeowners, Arrow T Ranch</td>
</tr>
<tr>
<td>6</td>
<td>Ray Huber</td>
<td></td>
</tr>
<tr>
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<td>Jerry Jensen</td>
<td>American Forest Resource Council</td>
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<td>Hayward Mendenhall</td>
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<td>Patricia Port</td>
<td>USDI Office of Environmental Policy and Compliance</td>
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<td>Edwin Royce</td>
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<td>11</td>
<td>Rene Voss</td>
<td>Sequoia ForestKeeper</td>
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<td>Janet Westbrook</td>
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<td>Larry Duysen</td>
<td>Sierra Forest Products</td>
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<td>14</td>
<td>Gary Gilbert</td>
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Under direction provided by the CEQ, the Forest Service analyzed the content of every comment letter looking for four things: comments specific to the DEIS (40 CFR 1503.3(a)); substantive comments (40 CFR 1503.4(b)); comments that address the adequacy of the DEIS (40 CFR 1503.3(a)); and/or comments that address the merits of the alternatives (40 CFR 1503.3(a)). Specific, substantive comments that addressed the adequacy of the DEIS or the merits of the alternatives are included below, along with the Forest Service response to those comments.

Many comments included in the letters were statements of support, personal opinion or preference, were concerns that are not specific to this statement, or were statements of generalized dissatisfaction with the Forest Service. These comments have been noted, and do not warrant further agency response (40 CFR 1503.4(a)(paragraph 6)). Examples include:
“How sad it is supervisor Terrell that you resort to telling untruths to the public to remove your precious timber.”

“I believe special interest groups who would like to see these closures have an extreme view and should be disregarded.”

“Based on your analysis I fully support proceeding with the Proposed Action (Alternative B).”

“There is just no reason to recommend Alternative B as a proposed action. The lumber from the trees is not really needed right now.”

“Sequoia ForestKeeper (SFK) opposes the Piute Fire Restoration Project in its current form as biased and unnecessary in response to conditions after the Piute Fire.”

Comments and Responses

**Air Quality**

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<td>“More analysis is needed concerning dust abatement under Air Quality . . . . If water is used it is in extremely short supply and timing of harvest activates may need to be targeted for when it is available. Coordination with Kern County may be needed since a large part of the Piute Mountain Road system belongs to the county.” (Letter #6)</td>
<td>Dust abatement of National Forest System native surface roads will be required in any timber sale contract associated with this project. While water sources are limited, it is expected to be sufficient for the number of loads to be hauled per day (4-5 loads). The Forest Service will coordinate with Kern County regarding use of native surface Kern County roads along the haul route, such as the Piute Mountain Road.</td>
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<td>“[T]he Forest Service must disclose whether any of the roads that are in use or will be used during three Piute projects lead to or pass through areas where natural occurring asbestos (NOA) exposes the public and forest workers to lung disease-causing asbestos particulates . . . . [For this project], the Forest Service plans to use routes and will disturb soils in areas with potential NOA, and the Forest Service must discuss and analyze the presence of NOA and any efforts it will take to minimize or restrict the use of routes or areas with potential NOA. If it does not restrict the use of these routes or areas, it should discuss the potential adverse impacts on human health from NOA in the revised DEIS or FEIS.” (Letter #11)</td>
<td>None of the roads in the project area has been identified as having high potential for NOA and no public health risks have been identified. Under Forest Service policy, no NOA-related restrictions or alterations of public land access will be required at this time. Prior to implementation of ground disturbing activities, however, the Forest will conduct a site-specific hazard assessment on any areas considered to have low to moderate potential for NOA.</td>
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**Climate Change**

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<td>“The proposed action including timber harvesting and reforestation will help reduce global warming. Dr. Thomas Bonnicksen, among other scientists, has documented that young, actively growing forests are much more efficient in sequestering carbon than are brush fields that persist for decades. Dr. Bonnicksen has also published data that show that the untreated dead trees and logs will decompose and return nearly all their carbon to the atmosphere, whereas that portion of the timber converted to wood products will be stored for a substantial period of time in houses and, eventually, landfills. The wood products used by society also substitute for alternative materials such as metal and plastic that has much higher energy and environmental costs.” (Letter #7)</td>
<td>While a project of this magnitude (~350 acres of proposed post-fire economic salvage) is unlikely to have a significant beneficial impact on global climate change, a section discussing the topic has been added to the FEIS on pages 26, 53, and 54. In addition, some of Bonnicksen’s work has been considered and added to the climate change specialist report. This research is also cited at FEIS page 123.</td>
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<td>“[T]he DEIS fails to discuss how the Piute Restoration Project will potentially emit CO2 that may contribute to climate change or what efforts will be taken to mitigate these emissions . . . . At the very least, because this project includes fuel reduction treatments and burning that will contribute carbon, the FEIS or revised DEIS must include an acknowledgment of carbon emissions and must provide a response to this issue.” (Letter #11)</td>
<td>The DEIS did not discuss climate change because climate change was never raised internally or externally as an issue during the entire DEIS process. In compliance with the CEQ regulations at 40 CFR 1500.4, the Forest Service attempts to narrow the scope of what is discussed to those things that are identified as significant. The commenter is well aware, however, that the Sequoia National Forest considered climate change in compliance with the Washington Office guidance, because the commenter requested, and was provided, a copy of this project’s climate change working paper prior to the end of the DEIS comment period. A summary of this paper has been added to the FEIS on pages 26, 53, and 54.</td>
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### Economics

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<td>“The economic analysis summarized in Table 14 on page 61 clearly demonstrates the value of the proposed action. However, to capture the remaining value of the deteriorating timber that was burned in 2008, the project must be implemented without further delay...the timber sale portion of the project [must] be sold early next year (2010) to prevent further deterioration of the dead &amp; dying timber, and to stabilize supply for the remaining saw mills in the area.” (Letters #7, #13)</td>
<td>Timber volume estimates were adjusted for deterioration by 40 percent and small tree volumes less than 16 inches d.b.h. were also eliminated to estimate available volume in the summer of 2010. Timber values have been adjusted to account for devaluation due to deterioration and blue stain in pine in the appraisal. The sale did appraise as deficit, which means the appraised sale value is less than the appraised market value. Market values continue to be low. It is important to harvest deteriorating timber as quickly as possible to preserve its value. There is only one remaining sawmill in California south of Yosemite National Park.</td>
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<td>[T]he argument that there are societal/economic benefits from the project, made on pages 60 and 61 [of the DEIS] is totally fallacious. There are no such benefits nationally, but only locally, at best. (Letter #10)</td>
<td>There is no requirement that benefits must accrue, or apply, nationally. The analysis attempts to display where (and what entity) stands to receive any such benefits or costs.</td>
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<td>“Please explain the statement that ‘The value of trees removed covers the cost of their removal and associated fuel treatments...restoration, and watershed improvement projects.’” DEIS at 5-6. But at page 60, the DEIS states that receipts from the salvage sale can only be used to prepare other salvage projects and are not deposited into the US Treasury. This means that these receipts cannot be used to ‘reduce the costs of reforestation activities’ as stated in the P&amp;N #2.” (Letter #11)</td>
<td>The statement: “The value of trees removed covers the cost of their removal and associated fuel treatments; it can also be used to pay for other restoration work...” (Purpose and Need, p. 5) is not in conflict with the statement “Revenue from salvage sales may be retained internally by the Forest Service to prepare and administer other salvage projects and do not have to be deposited to the U.S. Treasury” (p. 62). It merely displays a minor discretionary consideration available to the Forest Service in determining the optimum use of such receipts for the Government. These considerations may change with time due to market fluctuations and a purchaser’s actual bid for the product. This analysis assumes no “bid premium” (a bid in excess of the “advertised rate”. In this case, the “advertised rate” equals the “base rate” or the minimally acceptable rate for timber sold by the Forest Service).</td>
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<td>“[T]axpayers will lose over $1.832 million in preparing and administering this project because the costs of the project are $1.842”</td>
<td>The economic analysis displays the major appropriate cost centers, and provides reasonable estimates for each alternative.</td>
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### Economics

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<td>million while timber receipts will bring in only an estimated $9,403. Further, the estimated $360,233 in benefit to the local economy has a differential cost of about $1,472 million. This is fiscally irresponsible and simply bad policy. The Forest Service states that there is a $5.22 return for every $1.00 invested (comparing the estimated $1.083 million in benefits to an additional $207,000 investment to administer the contract). But this is a false comparison (essentially only comparing Alts. B &amp; C, since these costs would not be incurred in comparison with the no-action alternative. The DEIS must discuss the economic comparison of the action alternatives with the no-action alternative, which makes more sense, fiscally, and the opportunity cost of investments of that same money in projects that could provide greater benefits to society.” (Letter #11)</td>
<td>Taxpayers may invest in the project to obtain the benefits of addressing the purpose and need for the project. The analysis attempts to display comparative costs between the alternatives, and reasonable implications of investing in those costs. The interdisciplinary analysis team does not present a “personal valuation” of the project on either economic or environmental concerns. The commenter is correct in that the selection of Alternative A provides no economic benefit or cost, as is displayed in the document for comparison purposes. Alternatives B and C provide differing approaches and different levels of achievement in obtaining the desired purpose and need. The economic analysis attempts to display the major considerations to be evaluated by a decisionmaker when making an informed selection among the alternatives. Addressing the alternative “opportunity costs” to this NEPA consideration is outside the scope of this analysis. NEPA requires analysis of alternatives to meet the purpose and need stated for the project, not an analysis of alternative projects for which the government can apply its finances. That determination is more a policy analysis and is not a site-specific consideration under NEPA.</td>
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<td>“[T]he [economics] analysis is fundamentally flawed and incomplete because the economic comparison must include the direct and indirect Washington and Regional office costs for project planning and administering the timber sale.” (Letter #11)</td>
<td>Washington and Regional Office direct and indirect support costs are considered as a subset of the estimated project planning and administration costs included in the analysis estimates. These direct and indirect costs are assessed and addressed by the Federal budget process and Forest Service allocation process on an annual basis.</td>
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<td>“As previously expressed, the fact that the Clear Creek Timber Sale Contract is still in place, which obligates the Forest Service to provide substantially the same amount of timber to the contractor for this project, makes selection of any alternative other than Alt. B impossible without significant contractual penalties.” (Letter #11)</td>
<td>The consideration of the Clear Creek Timber Sale contract is outside the scope of this NEPA analysis. This project may address Forest Service obligations under the Clear Creek contract by providing an opportunity to offer substitute volume, or the Forest Service may become obligated to pay the purchaser for the lack of product provided by the contract, or the obligations may be discharged under some other consideration.</td>
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**Forest Vegetation**

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<td>“I felt the Forest Vegetation and the Fuels section were weak in their optimistic outcome predictions over the first three decades. On the more productive soils, I will predict you will have very healthy brush fields with some scattered conifers. Herbicides may be needed to control the brush. One or the other, or both will occupy the better site. If you want successful plantations, they need to be planned from the start. Past fire history gives a good indication of what brushfields will develop into in the future. More fires and the disappearance of more of the old growth forest types on the Piute Mountains. Planting 150 to 200 trees per acre (with 50% survival) and growing them with chaparral sounds like a planned chaparral model for a long time. Long-term management needs to be directed at developing stands like the Kelso Timber Sale Thinning Units was trying to develop.” (Letter #6)</td>
<td>We recognize that planting 150 to 200 seedlings per acre will require more time for trees to become dominant over the brush species (Nelson 2008). But the number of local site-adapted seedlings available is a limiting factor for planting on this project. Planting trees at a relatively low density will still create sustainable forested stands over the long run, while assuring that there are enough seedlings available to plant high priority deforested areas (Silviculture Report, p. 10).</td>
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<td>Planting native seedlings is both unnecessary and counterproductive. There is no scientific basis for planting seedlings after a fire and the SQF may not plant seedlings without conducting scientifically valid surveys of natural regeneration. (Letter #4)</td>
<td>Waiting several years to assess natural regeneration would delay any planting to the point where competing vegetation like brush and grasses would make additional site preparation and weeding treatments necessary in order for the planted seedlings to survive. Most areas proposed for planting were severely burned and do not have enough live trees to provide an adequate seed source for natural reforestation (see p. 66).</td>
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<td>Planting native seedlings is both unnecessary and counterproductive. Scientifically valid surveys of the proposed treatment areas conducted by Dr. Hansen, among others, have demonstrated that natural regeneration is more than adequate in the project area and that the Forest Service is using reforestation as an excuse for logging. (Letter #4)</td>
<td>Small tree seedlings experience very high mortality rates due to factors like drought, sun damage, fungi, insects, rodents and frost. At this time it is just too soon to tell how many, if any, of the new 2009 germinants will survive. Any areas with established green trees will not be planted as part of this project (see p. 66; Silviculture Report, p. 9). The reason for logging is to meet the purpose and need to recover economic value of trees killed or severely damaged by the wildfire (see p. 4).</td>
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<td>Planting native seedlings is both unnecessary and counterproductive. Even if natural regeneration is unsuccessful, there is still no reason to plant trees because “this is an</td>
<td>Given that Alternatives B and C propose about 500 acres of planting, and up to an additional 3,000 acres may be planted under a separate reforestation proposal, there are still</td>
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### Forest Vegetation

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<td>ecologically-desirable condition, since montane chaparral is vitally-important to native biodiversity, but has declined in the era of fire suppression, and conifer regeneration will quickly succeed chaparral and replace it.” (Letter #4)</td>
<td>about 15,400 acres of deforested stands that will receive no planting, and will rely entirely on natural recovery. These areas will provide an abundance of chaparral habitat until natural succession restores trees to the sites over time.</td>
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<td>Planting native seedlings is both unnecessary and counterproductive. The main thing is to avoid salvage logging because salvage logging “tramples” naturally occurring regeneration, which is plentiful. In fact, “[t]he use of heavy equipment to fell trees in a post-fire landscape hinders regeneration.” (Letters #11, #12)</td>
<td>Contract specifications will limit harvesting equipment to approved skid trails, so only a small portion the area will be directly impacted by logging machinery. Any areas with established natural regeneration will be avoided during harvest and planting operations.</td>
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<td>Planting native seedlings is both unnecessary and counterproductive. The entire burned area should be off-limits to OHVs and domestic livestock until at least 2012 in order to protect naturally occurring regeneration. (Letter #12)</td>
<td>OHV use is limited to forest roads and trails, and should not impact forest regeneration. Domestic stock use can cause seedling damage (usually from trampling) but no significant reforestation damage has been documented in the Piute area in the past, and none is expected under current range management direction. Currently there is an OHV closure in place for motor vehicle use off of Forest Service system roads through May 1, 2010 within the Piute Fire. Once this order expires (if not extended first), the Forest Service plans to issue another order prohibiting cross-country travel in the Piute area.</td>
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<td>The 2009 Smith and Cluck marking guidelines used by the Forest Service are scientifically flawed. “Data from the scientific literature demonstrates that the marking guidelines exaggerate mortality. Their use will result in the cutting of many trees that would otherwise live and contribute to natural forest restoration.” “The most important contributor to the discrepancy between the mortality predictions from the scientific literature and the predictions underlying the guidelines is a fundamental problem with the tree selection carried out in the creation of the data base.” “The guidelines for yellow pine do not correctly reflect the data base upon which they are supposedly based.”</td>
<td>The 2004 SNFPA ROD on page 52 gives the direction to “use the best available information for identifying dead and dying trees for salvage purposes as developed by the Pacific Southwest Region Forest Health Protection Staff.” To follow this direction, Alternative B uses the marking guidelines in Forest Health Protection Report # R0-09-01, Marking Guidelines for Fire-Injured Trees in California, by Smith and Cluck (April 2009). These guidelines are based on post-fire monitoring data collected on thousands of fire-damaged trees from across California (Silviculture Report, pp. 6-8). Because there is no sure way to predict tree mortality, there are other opinions on the validity of Smith and Cluck’s methods and conclusions drawn from their tree data. These</td>
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**Forest Vegetation**

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<td>“The data base has been altered, with results that are improbable, that increase predictions of mortality, and that will increase the harvest of green trees.” (Letters #4, #10, #11)</td>
<td>same issues have been raised and addressed by the Forest Service repeatedly in other fire salvage marking situations, including the Kern River District Vista Fire Restoration Project. Specifically, comments regarding the marking guidelines have been addressed on pages 12-15 of Appendix G of the Vista Fire Restoration Project Environmental Assessment, which is available as part of the Piute Fire Restoration project record.</td>
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<td>No tree with even one green needle should be cut. (Letters #10, #12)</td>
<td>This is the prescription for Alternative C. Alternative B uses marking guidelines to also harvest trees that are expected to die. Harvesting dying trees at this time provides better harvest economics, limits site disturbance to one entry, and improves fuels treatment. This is the direction given in the SNFPA (2004) ROD page 52 (see p. 14; Silviculture Report, page 6).</td>
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<td>NASA remote-sensing data collected in 2009 “must be used to make any necessary adjustments to the where treatments may or may not be necessary in the proposed actions. For example, this data can be used to determine areas where trees have ‘flushed’ in the 2009 growing season, which indicates that these trees are more likely to survive and should not be marked has hazard or ‘dying’ trees.” (Letter #11)</td>
<td>Remote sensing data are routinely used by the Forest Service to provide emergency maps to burned area emergency response (BAER) teams. BAER teams use the maps to quickly identify areas at risk and to prescribe emergency treatments intended to mitigate those risks (Safford and others 2008). Remote sensing derived emergency maps, on the other hand, are NOT used to select trees for salvage harvest. In this case, the trees will be selected using the 2009 Smith and Cluck marking guidelines. As a result, there is no need to collect additional remotely sensed data.</td>
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<td>“The Forest Service must clarify whether herbicide use is a possibility in response to future ‘survival examinations.’ If so, the FEIS should analyze the negative impacts to the ecosystem and to the human environment from the possible use of herbicides, pesticides, and poison bait when requirements for these occur in later years due to failures in planting tree farms in a dry, arid forest which historically has a regeneration success rate of 45 percent . . . . Since the plantation regeneration success rate for Sequoia National Forest is historically at 45 percent, due to the low rainfall and dry conditions of Sequoia</td>
<td>The only anticipated need for pesticides on this project is treatment of stumps greater than or equal to 18 inches in diameter with borax (commercial formulation is Sporax) as a fungicide to help stop the spread of Annosus root disease (see p. 20; Silviculture Report, pp. 8-9). Herbicides for site preparation or plantation release have not been used on the Kern River Ranger District since the 1980s, and no use is anticipated as a result of this project. Gopher populations in and near the Piute Fire Restoration treatment areas were</td>
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**Forest Vegetation**

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<td>NF, and since Sequoia NF historically uses herbicides and poisons to protect plantations after five years, and since there is a chance that California spotted owls in the area could catch gophers and other rodents that might be writhing above ground prior to succumbing to the poison, herbicide and poison use must be analyzed in the FEIS.” (Letter #11)</td>
<td>observed to be very low, and no baiting with rodenticides is anticipated or proposed.</td>
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**Fuels**

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<td>“The statement in the paragraph at the top of page 5 -- that fallen dead trees will similarly contribute to extremely high fuel loading within 5 to 10 years -- also excessively inflates the need for reducing long term fuel loading in the form of large woody debris. Some white firs may break and fall in this time frame, but yellow pines, such as Jeffreys, do not. Their snags stand for tens of years, especially in dry climates such as in the Piutes. If the Forest Service has data to support their statement, it should be cited -- else the erroneous statement should be corrected. Other examples where dead trees falling in an incorrectly short time frame are on pages 36 and 68. Additionally, the whole discussion of fuel loading gives insufficient attention to the decay of large woody debris. Trees that fall eventually will decay eventually. By exaggerating the rate of tree fall and ignoring decay, the present discussion in the DEIS generates the impression of substantially greater future fuel loadings than are realistic.” (Letters #10, #12)</td>
<td>The statement (now on page 4) has been corrected to read “Dead trees that aren’t removed, will contribute to extremely high fuel loading within 10 to 20 years.” For this analysis, the fire-killed trees fall rate started impacting fuel models at year 20. Cluck and Smith (2007) reviewed literature on snag fall rates and found that several factors affect longevity, such as size, species, cause of mortality, soils, climate, fire occurrence, and severe weather events. Their review also indicates that fire-killed trees fall faster than insect killed trees and the larger the diameter at breast height (d.b.h.), the longer the snag lasted. Their review shows that in almost all cases, the majority of the dead trees were on the ground in less than 20 years. In several cases, the snags were on the ground in less than 10 years. For the purpose of this report, a conservative approach was taken and fuel models in the high conifer mortality areas started being influenced at year 20 (Fire and Fuels Report, Appendix A). Decay would not be a factor in this analysis. The Fire and Fuels Report analyzed the impacts of the proposed activities for up to 30 years post fire. Large woody debris would have some decay 10 to 30 years after a fire. High burn severity would primarily occur where large woody debris was lying on or close to the ground. It is not until 30 to 60 years after the fire that large woody debris would have considerable decay (Brown and others 2003).</td>
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### Fuels

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<td>“The first, third, and fifth purpose and needs (P&amp;N) are inconsistent, and the Forest Service must explain how to reconcile these inconsistencies. P&amp;N #1 states the need to reduce long-term fuel loading by reducing large woody debris and surface fuels. On the other hand P&amp;N #3 states the need to recruit and retain large down logs for dependent species and P&amp;N #5 states the need to establish effective ground cover in the form of limbs, treetops, and small tree boles, otherwise known as surface fuels. Please explain these inconsistent needs and how the Forest Service can reduce long-term fuel loading while also meeting the needs of species that require large down logs and leaving lots of surface fuels as ground cover.” (Letter #11)</td>
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<td>This project meets the needs of fuels, soil and wildlife management. An average of 5 logs per acre that are at least 20 inches in diameter and 10 feet long will remain throughout the project area. Concentrations of surface fuels will be lopped and scattered or mechanically chipped or masticated within 18 inches of the ground. Fuel loadings in excess of 10 to 15 tons/acre will be piled and burned to reduce long-term fuel loadings (see p. 16).</td>
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<td>“The proposed action does not establish what the project’s down wood material needs are, based on desired conditions. What are the desired conditions for this area of the forest? While the project discusses 3-5 tons/acre of large woody debris and less than 5 tons/acres of woody debris 3 inches and less (DEIS at 69-70), is this what the desired conditions are for the Project area? See 2004 Framework ROD at 51.” (Letter #11)</td>
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<td>Desired conditions are the following: An average of 5 logs per acre that are at least 20 inches in diameter and 10 feet long will remain throughout the project area. Concentrations of surface fuels will be lopped and scattered or mechanically chipped or masticated within 18 inches of the ground. Pile and burn fuel loadings in excess of 10 to 15 tons/acre (see p. 16). Leaving an average of 5 logs per acre that are at least 20 inches in diameter and 10 feet long would total 3-5 tons/acre of large woody debris. Concentrations of surface fuels that would be lopped and scattered or mechanically chipped or masticated within 18 inches of the ground would total less than 5 tons/acres of woody debris 3 inches and less. This leaves total fuel loading at an average of 10 tons/acre. Anything exceeding 10 to 15 tons/acre would be piled and burned. Typically, requests are made prior to pile burning to leave piles for wildlife habitat. The additional 5 tons/acre gives the flexibility to make those decisions during implementation while still meeting the desired condition of 10 to 15 tons/acre.</td>
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**NEPA Process**

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<td>The Piute Restoration DEIS is in violation of the NEPA because it does not disclose and address scientific opinion opposed to the project. (Letter #1. Mr. Artley submitted a brief letter intended to make this point. In addition, Mr. Artley attached approximately 90 pages of bibliographic material to prove that many scientists believe that post-fire treatments have “tragic” effects.) “Current Forest Service regulations require that projects that implement forest plans consider the best available science in their analysis.” (Letter #11)</td>
<td>The Forest Service routinely considers the best available science when designing and evaluating forest management practices. This is noted on pages iv, 123-144, and Appendix A. In this case, the Forest also considered hundreds of additional documents, including those submitted by Mr. Artley, among others, purporting to oppose the treatments proposed under this project. This is documented both in the FEIS and in the project record (see, for example, the working paper on best available science). Finally, it is worth noting that the agency is supposed to consider comments but is not required to agree with them (see Earth Island Institute v. Carlton, 2:09-cv-02020-FCD-EFB (E.D. Cal. Aug. 20, 2009)).</td>
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<td>“The proposed Piute Project includes many of the same activities as the proposed Piute Reforestation Project, including artificial planting of conifer seedlings, felling of snags, and impacts from ground-based machinery, including masticators and feller-bunchers. These activities pose significant or potentially significant cumulative effects along with the effects of the Piute Restoration Project within the same fire perimeter (many of the units of the two projects are even adjacent to one another). It is clear from the proposed activities and the stated purposes and needs of the two projects, and their juxtaposition, that they are really one project that you are segmenting into two. NEPA does not allow segmentation, and requires that similar/related proposals be evaluated in a single EIS. Moreover, NEPA requires an analysis of cumulative effects in an EIS. You must produce a Revised Draft EIS for the Piute Salvage Logging Project that includes the Piute Reforestation Project, or simply withdraw your proposal for the Piute Reforestation Project. The DEIS for the Piute Salvage Logging Project (p. 11) claims that the two projects are not ‘connected’ actions. This is not germane to the issues raised herein. The two projects have ‘cumulative’ effects, and are ‘similar’ actions.” (Letter #4, #10, #11, #12)</td>
<td>The NEPA regulations at 40 CFR 1508.25 provide direction on the “scope” of a project. To determine the scope of a statement, the agency is to consider three things: Connected actions (40 CFR 1508.25(a)(1)); cumulative actions (40 CFR 1508.25(a)(2)); and similar actions (40 CFR 1508.25(a)(3)). Connected actions are addressed on page 11, although you have determined that the question is irrelevant in this case. Regarding cumulative actions, the CEQ holds that these should be discussed in the same document when impacts are “cumulatively significant.” Here, the decisionmaker has made a preliminary determination that the Piute Reforestation Project falls within a category of actions (category 11) listed in the Forest Service Handbook that are excluded from documentation in an environmental assessment or environmental impact statement, and that no extraordinary circumstances exist that would preclude use of the category. In short, the reforestation project is categorically excluded from NEPA analysis because it does “not individually or cumulatively have a significant effect on the human environment” (40 CFR 1508.4, emphasis added). Finally, regarding similar actions, the CEQ explains that agencies “may wish” to evaluate them in the same statement, but is not required to do so unless this is the</td>
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**NEPA Process**

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<td>“best” way to assess them. In this case, the Sequoia National Forest has determined that even if some of the reforestation actions are similar to the replanting proposed under the Piute Fire Restoration Project, it does not wish to evaluate them together because post-fire salvage activities are typically more complex and controversial than categorically excluded reforestation projects.</td>
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<td>“We suggest that you fully consider an alternative with the following features: a) conduct no salvage logging in moderate severity or high severity areas; b) do not mark trees with green foliage for removal as ‘dead or dying’; c) remove no large snags (snags over 15 inches in diameter); d) decommission and revegetate all roads in moderate and high severity areas wherever such roads are not essential to access private land inholdings, and do not conduct hazard tree felling on such roads; e) do not construct or reconstruct any new logging roads; f) along roads indispensible for private land access, and which cannot be decommissioned, fell roadside hazard trees within 150 feet of roads, leaving all hazard trees over 15 inches in diameter on the ground to provide habitat for small mammal prey species; and g) suspend livestock grazing within the fire areas for at least 20 years.” (Letter #4, #11)</td>
<td>This list of features was submitted by you during scoping. The DEIS responded to this list by a) noting that that some items had been considered but not analyzed in detail because they did not meet the purpose and need of the project, among other things (see pp. 13-15), and by b) selecting the remainder of the items for analysis under Alternative C (see p. 17). Your features, which were carried forward into Alternative C are highlighted in bold font at that location.</td>
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<td>The scope of the proposal does not meet the purpose and need. “In order to better meet the Purpose and Need we encourage the [SQF] to expand the proposed thinning and planting areas in order to ‘prevent a future high intensity, stand-replacing wildfire’.” In addition, the SQF should perform treatments in all areas where road access is currently available. (Letter #5)</td>
<td>A proposal to expand the Piute Restoration treatments was submitted during scoping and considered by the interdisciplinary team. This proposal was not considered in detail because much of the proposed area was either in inventoried roadless areas or was too steep for ground-based operations. This is discussed on page 13.</td>
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<td>Road closure proposals (under Alternative C) do not meet the purpose and need. “[T]he Purpose and Need of this plan is about fuel reduction, tree planting and safety. This plan does not include any issues that require Roads to be analyzed. The current Route Designation Process would be the appropriate place in which to analyze these factors with regards to”</td>
<td>Road closure proposals were considered under Alternative C in response to public comment submitted during scoping. This is discussed on pp. 14-17.</td>
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**NEPA Process**

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<td>Roads.” (Letter #5)</td>
<td>The proposed activities would take place on approximately 2,300 acres of the 32,890 acres of Forest Service land within the Piute fire perimeter. At several places in the assessment of environmental impacts, the fact that this is only a small fraction of the area within the fire perimeter is cited to minimize the importance of any adverse effects. (Letter #10)</td>
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<td>As the EIS notes, the interdisciplinary team considered the entire burned area, all the trees potentially killed by the Piute Fire, the effect of increased fuel loads across the burned area, the potential erosion associated with the entire burned area (see Chapter 1), and the potential for up to 19,000 acres of economic recovery (see p. 13). In short, the interdisciplinary team considered the post-fire condition of the entire burned area prior to proposing and analyzing treatments. As discussed under the &quot;Effective Restoration Alternative&quot; much of the burned area was not included in our alternatives due to inventoried roadless area considerations, lack of access, and economic infeasibility (see p. 13).</td>
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<td>“The FEIS or a revised DEIS should restate its reasons for proposing Alternative C (the so-called ‘non-commercial alternative’) to also include the recent Sierra Forest Legacy (SFL) v. Rey permanent injunction requirements. Otherwise, it must include an additional alternative that meets the requirement that ‘the Forest Service include a detailed consideration of project alternatives, including a non-commercial funding alternative, for all new fuel reduction projects not already evaluated and approved as of the date of this Memorandum and Order.’ SFL v. Rey, 2:05-cv-00205-MCE-GGH, 2:05-cv-00211-MCE-GGH, 2009 WL 3698507 at *5 (E.D. Cal. Nov. 4, 2009).” (Letter #11)</td>
<td>The DEIS stated that Alternative C, the Modified Action Alternative, was not economically feasible, would not sell timber, and would provide no forest products to local and state economies (see p. 63). Thus, Alternative C is now called the “noncommercial” alternative and was evaluated as such. The language describing the alternative has been modified in the FEIS to comply with SFL v. Rey explicitly.</td>
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Recreation

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<td>Single track trail reconstruction should be done by hand to keep the tread width to 18”. In addition, “[t]he SQNF should reconstruct all existing trails, not just the previously designated trails.” (Letter #5)</td>
<td>While it is correct to state that work will need to be accomplished by hand on certain trails and segments to maintain appropriate tread widths, other situations may warrant the use of trail machines during construction so long as the designed tread width is not exceeded. Tread width would be maintained to the appropriate design parameters as defined by Forest Service Handbook FSH 2309.18, section 23.11, exhibit 01, through section 23.33, exhibit 01. The trails most affected by the action alternatives would be Trail Class 2, single-track motorcycle trails, which can have tread widths ranging from 8 to 24 inches. It is likely that the majority of the reconstruction work would be done by hand crews; however, a skilled operator using a modern trail machine could construct tread that would be within the Forest Service design parameters for Trail Class 2. The permanent status of the non-system trails, or U routes, in the Piute Mountains will be determined with travel management planning. Currently, no decision has been made to convert U routes into National Forest System Trails, which would be maintained by the Forest Service. Until the appropriate environmental analysis is completed and a decision is made, these trails remain user-created and maintained trails. If a travel management decision is made before or during project implementation that converts U routes into National Forest System trails, those newly incorporated system trails would be protected and reconstructed to Forest Service standards.</td>
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### Roads

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<td>27S02F and 28S24C. I disagree with the proposal to close these roads. Closing these roads would prevent legitimate access, and is unnecessary. (Letter #3, #8)</td>
<td>The proposal to decommission specific road segments under Alternative C was based on a travel analysis. Specialists created evaluation criteria to rank the effects of each road on their resource. Individual rankings were combined for an overall risk/benefit assessment for each road. This assessment included evaluating existing conditions of roads, access needs, and cumulative effects to wildlife. The report associated with this process provides rationale for all road recommendations and is included in the FEIS as Appendix C.</td>
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<td>28S17A. I disagree with the proposal to close this road. Closing this road is unnecessary. (Letter #8)</td>
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<td>28S23. I disagree with the proposal to close this road. With a small amount of work, this could be a good road. In fact, with the installation of a single culvert, the SQF could use the road for post-fire treatments. (Letter #5, #8)</td>
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<td>28S24D and 28S33. I disagree with the proposal to close these roads. These roads provide important access, and closing them is unnecessary. (Letter #5, #8)</td>
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<td>28S30 and 28S43. I disagree with the proposal to close these roads. Closing these roads is unnecessary. (Letter #8)</td>
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<td>28S44. This road is missing from the map. “The SQNF should not close any roads as the SQNF has not provided accurate information regarding the roads proposed for closure in order for the public to make meaningful comments on the road closure segment.” (Letter #5)</td>
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<td>28S29. I think there is a road numbering issue associated with this road. I think it is 28S18A. In any case, I think it is a great road and that it should not be closed. (Letter #5, #8)</td>
<td>28S29 is posted incorrectly on the ground as 28S18A. 28S18A begins off of 28S29, and currently is blocked to vehicular traffic.</td>
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<td>“The SQNF has not shown the need to decommission existing roads is greater than the value of the roads as infrastructure . . . . Should the SQNF determine the need for road closure the SQNF should do an economic investigation, study and report on the impact of restoration of that road based on the requirement under 212.1 . . . . the SQNF should [also] determine the adverse impacts associated with decommissioning . . . . The SQNF has shown it is likely these roads will be required in order to complete reasonably anticipated future program of work. The SQNF has shown these roads will</td>
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The Sequoia National Forest analyzed the road system within the burned area at the request of the public during scoping (see p. 17). The Forest completed a science-based travel analysis process and determined that approximately eight miles of system roads could be decommissioned (Appendix C). We included the potential closure of these roads in Alternative C (see p. 17). We also analyzed the potential social and environmental effects associated with Alternative C (Chapter 4).
## Roads

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<td>be needed to meet resource and management objectives and therefore should not close them.”  (Letter #5, #14)</td>
<td>Any National Forest project may include travel management proposals. In fact, access is often a key element of any forest management activity and must be included in the NEPA discussion. The Sequoia National Forest route designation process can incorporate previous decisions (36 CFR 212.50(b)) or propose changes as appropriate (36 CFR 212.54).</td>
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<td>“The SQNF should not close any roads while a simultaneous Route Designation plan is being done . . . . The Sequoia National Forest is currently working on a Route Designation Plan for the same area which is included in the Piute Restoration Plan Area. The public has been involved in this Route Designation Plan since 2005, the purpose of which is to determine which roads and trails will remain open . . . . To close roads in a separate Fire Plan at this time lacks credibility. Very few of the public are aware of the Piute Fire Restoration Plan and even fewer of them would dream that roads are going to be proposed to be closed in a Fire Plan.”  (Letter #5)</td>
<td>Any closure of roads and trails due to work in progress, when needed for public safety, will be of short duration, generally less than one week at a time.</td>
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<td>“Considering the importance of roads and trails to the public, the SQNF should specify that only Roads and Trails in the immediate area of work in progress and while the work is actually in progress, will be closed with signs on the Roads and Trails. The closed signs will be taken down at the end of each day. This would be similar to a Cal Trans Road project, which would close a road while work is in progress, but not while work is not being done.”  (Letter #5)</td>
<td>Thank you for your comment. The table you refer to is indeed incorrect. The table has been corrected in the FEIS on page 150 to show waterbar spacing consistent with the Region 5 Timber Sale Administration Handbook (FSH 2409.15).</td>
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<td>“On page 147, the table on Cross Drain Requirements appears to be wrong. On moderate slopes, water bars would be constructed almost on top of each other.”  (Letter #6)</td>
<td>We analyzed the road system within the burned area because you requested it during scoping (see p. 17; SFK scoping letter, February 23, 2009, p. 5). We also completed a science-based travel analysis and determined that approximately 8 miles of system roads could be decommissioned (Appendix C). This was done in compliance with the Forest Service Travel Management Regulations, as noted in the FEIS on page iv. We included the potential closure of</td>
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<td>“The Sequoia National Forest has improperly proceeded to carry out route designation without first following the requirements under Subpart A of the Travel Management regulations. Specifically, the Forest has not: a) identified the minimum road system needed for safe and efficient travel and for administration, utilization, and protection of National Forest System lands; b) identified the roads under their jurisdiction that are no longer needed to meet Forest resource management objectives, and</td>
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Kern River Ranger District
## Roads

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<td>that, therefore, should be decommissioned or considered for other uses, such as trails; and c) completed a science-based Travel Analysis to inform these decisions.” (Letter #11)</td>
<td>these roads in Alternative C (p. 17). We also analyzed the potential social and environmental effects associated with Alternative C (see Chapter 4).</td>
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<td>“Nor is the Forest using Travel Analysis to inform motor vehicle route and area designations under Subpart B of the Travel Management regulations; there is no comprehensive, broad-scale, science-based analysis of NFTS routes to determine whether the transportation system designated for motor vehicle use meets resource and other management objectives adopted in the Forest Plan, meets applicable statutory and regulatory requirements, reflects long-term funding expectations, minimizes conflicts among forest visitors, and minimizes adverse environmental impacts. Due to this deficiency, cumulative environmental impacts of the designated motor vehicle route system are not fully addressed.” (Letter #11)</td>
<td>The forest transportation system has been developed through both active management and decisionmaking over time, both before and after the National Environmental Policy Act became law. The baseline system represents those routes included in the forest transportation atlas, roads with Forest Service signs and numbers, and documentation of maintenance and other management activities. The transportation system was reviewed prior to the start of this project and was established as the baseline. NEPA documentation and other agency documentation, per the Paperwork Reduction Act of 1995 (Federal Register, 45 USC 3501), is required for six years. Many NEPA decisions on the transportation system were made more than six years ago. Record of maintenance and other management actions are part of the determining factors of what roads and trails are part of the National Forest transportation system. The baseline system changes from year to year based on project-level decisions.</td>
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<td>“The Forest has not provided adequate or reliable documentation for what they consider to be the “baseline” of the current transportation system. The Forest has not provided Decision Notices, Records of Decision (ROD), National Environmental Policy Act (NEPA) documentation, Road Management Objectives, or funding allocation data for putative system routes in its jurisdiction in the fire area. The Forest has failed to provide convincing evidence that all of the routes under consideration in the fire area were designed to be open for long-term, public motorized recreation.” (Letter #11)</td>
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### Roads

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<td>Access to the project area via “the road up from Kelso Valley” will “make a general mess” of a steep, narrow road. Maintenance will be costly. (Letter #12)</td>
<td>“The road up from Kelso Valley” is maintained by Kern County (County Road 501). No significant increase in maintenance cost is expected from the approximately four to five log loads per day associated with implementing the proposed action.</td>
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### Watershed

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<td>“The DEIS fails to discuss cumulative effects from this project in combination with the reforestation and roadside hazard project that would occur in the same watersheds in units directly adjacent to each other . . . [T]he soil and hydrology section does not even mention [the roadside hazard and reforestation] projects in its cumulative effects subsections.” (Letter #11)</td>
<td>A detailed description of the ERA method by which cumulative effects were quantified is presented starting on page 83 in the section Cumulative Effects—Hydrologic Resource for Alternative A. The roadside hazard and reforestation projects are mentioned, among others, as data being included in the model runs. Hydrology cumulative effects sections Alternative B and C (starting on pp. 93 and 98 respectively), do not specifically mention reforestation and roadside hazard projects, but the effects of both were included in ERA modeling runs nonetheless. The document in the project record titled “Projects in the Piute Fire Area or Piute Mountains” (7 pages, created 8/12/09) also discusses, at length, all activities with cumulative impacts that were considered in ERA model runs. Soils cumulative effects are analyzed on a stand-by-stand basis, not on the watershed scale. There were no units in any of the alternatives that had portions of the roadside hazard units contained in them. Effects from reforestation are discussed in the effects analysis.</td>
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<td>“Because ground disturbance is a major issue, I would hope that you will insist on minimal disturbance, and that could be accomplished with careful use of the feller-buncher machine.” Skidding should not be allowed and log landings are also a major source of ground disturbance that should be avoided. (Letter #12)</td>
<td>On page 85, in the section Direct Effects—Soil Resource, subsection Ground Based Salvage Harvesting, it states “. . . with proper layout of the skid trail pattern and post-harvest mitigations, detrimental disturbance can be kept within allowable limits (15 percent of each unit).” The 15 percent limit refers to Forest Service Region 5 (California)</td>
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Watershed

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<td>guidelines for thresholds of detrimental disturbance. Detrimental disturbance in excess of 15 percent of treatment area (on a unit basis) would be scarified to break up compaction (p. 85). Further, “All landings not associated with permanent roads would be scarified after use.” (p. 86). While landings, if not skidding, are necessary in the process of removing logs from the forest in volume, the impact on hydrology may be mitigated. Compaction can be decreased, or eliminated, as noted, recovering infiltration capacity of the ground. Scarifying (as well as applying a mulch cover) also creates surface roughness that reduces erosion power of flow, were it to develop from high-intensity precipitation during the recovery period.</td>
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Wildlife

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<td>Spotted Owl. “[A]reas beyond the 1,000-ac administratively designated PAC/HRCA also are likely to be potentially important habitat for resident owls. Several of the largest proposed salvage logging units [1S and the amalgamated 8S/7S/6S] are located well within 1.5 km (0.9 mile) of 2 spotted owl PACs (BA/BE, Figure 2 at page 13). The elimination of foraging habitat within this close distance to the core-use area could potentially negatively impact the resident owls within the project area. (Letter #2, #4)</td>
<td>Within 1.5 kilometers of the salvage-affected PAC/HRCAAs (a single, merged buffer), there are four entire salvage units and portions of three others. These units or portions thereof are roughly 210 acres. Within that 1.5-kilometer PAC/HRCA buffer there are about 10,850 acres. Thus, the area impacted by salvage is about two percent of the referenced distance, leaving the remaining 98 percent of the area not salvaged. Fuels treatment units within this same distance from all three PAC/HRCAAs cover about 810 acres, or seven percent of the area (18,180 acres). While there may always be potential for negative impacts associated with this activity, this proposed action presents a reasonable minimization of negative impacts.</td>
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<td>Spotted Owl. “The BA/BE summarized the current research on fire and spotted owls but often mischaracterized results or omitted important information, leading the reader to incorrectly conclude that high-severity fire had detrimental impacts on owls in several</td>
<td>The BE included the research regarding spotted owl use of burned forests, in particular for foraging. While these references document spotted owl use of severely burned forest, large-scale decreases in dense, mature forest as a result of fire still decreases habitat</td>
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**Wildlife**

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<td>studies when in fact this was not the case . . . California spotted owl post-fire occupancy data from Bond et al. (2002) and Bond et al. (2009), Mexican spotted owl occupancy data from Jenness et al. (2004) in Arizona and New Mexico, northern spotted owl radio telemetry data from Clark (2007) in southwestern Oregon, and many other observational reports indicate that spotted owls use a variety of burn classes — including high-severity burn — for roosting, nesting, and particularly foraging throughout the year, and they preferentially select unlogged high severity areas for foraging . . . In fact, recent scientific literature provides evidence that owls actually select highly burned areas with few or no green trees for foraging — in contrast to the statements made in the BA/BE.” (Letter #2, #4)</td>
<td>suitability, especially in nesting and roosting category. There was no intention by the author or reviewers to mischaracterize research or mislead any readers. Rather, the intent was to summarize the research, and in particular, incorporate the recent research that indeed does suggest spotted owls will utilize burned forests. Nonetheless, the majority of research indicates a strong correlation between mature, live forests and spotted owl habitat suitability (BE, pp. 7-13).</td>
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<td>Spotted Owl. “[B]y intensively removing large snags (in many cases through clearcutting) and by establishing conifer plantations at the exclusion of large shrub patches in sites near owl territories, the proposed alternative could cause serious harm to spotted owls in the project area by removing vital prey habitat which owls depend upon for foraging. This impact would be significantly exacerbated by the cumulative impacts of artificial tree planting, use of ground-based mechanical equipment for tree felling, and resulting adverse impacts to shrub habitat and owl perches from the proposed Piute Reforestation Project, which has adjacent units to those in the Piute Fire Restoration Project.” (Letter #2, #4)</td>
<td>Natural regeneration will occur over most of the Piute Fire perimeter, be it in conifers or a shrub component. The salvage area is a very small portion of the total burn perimeter. Planting associated with this project and the Piute Reforestation project would use native sources in order to meet other desired conditions.</td>
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<td>Other Wildlife. High severity wildfire has not been rare in the Sierra Nevada and post-fire landscapes—such as montane chaparral—have historically provided critical habitat for many key wildlife species. In the era of fire suppression and post-fire salvage/reforestation, however, the areal extent of this important burned habitat has been in decline across the region. As a result, burned habitat dependent wildlife species are</td>
<td>Shrub habitat (including chaparral) burned in the Piute Fire occurs mostly on the western and northern boundaries of the fire perimeter, and only small pockets are in the project area. Fuel reduction and planting units may include some areas of chaparral incidentally. Shrubland (west-slope chaparral types) were assessed as a Category 2 habitat in the MIS report. An assessment of burned forest habitat and</td>
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**Wildlife**

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<td>also in decline and are, in fact, imperiled. If this project were implemented it would</td>
<td>the amount salvaged was included in the Snags in Burned Forest Ecosystem Component in the MIS report. About seven percent of nearly 70,000 acres burned in the vicinity in since 2000 has been salvaged. The impacts of this project on the hairy woodpecker habitat were analyzed in the MIS report under the snags in green forest habitat type (MIS Report, pp. 13-16).</td>
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<td>“ecologically devastating” and would directly harm the Hairy Woodpecker. (Letter #4)</td>
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Other Wildlife. High severity wildfire has not been rare in the Sierra Nevada and post-fire landscapes—such as montane chaparral—have historically provided critical habitat for many key wildlife species. In the era of fire suppression and post-fire salvage/reforestation, however, the areal extent of this important burned habitat has been in decline across the region. As a result, burned habitat dependent wildlife species are also in decline and are, in fact, imperiled. If this project were implemented it would be “ecologically devastating” and would directly harm the Olive-sided Flycatcher. (Letter #4)

The implementation of either action alternative is unlikely to be ecologically devastating to the olive-sided flycatcher. The mixture of severe and moderately severe fire may have increased habitat suitability in still-green stands by not only increasing snag quantities, but also by naturally thinning dense forest stands. Severely burned forests may have increased suitability as a result of a potential decrease in nest predators, in addition to snag increases and an overall decrease in stand density. Nonetheless, a primary cause in the reduction of olive-sided flycatchers may be the loss of wintering habitat outside the U.S. and beyond the influence of the Forest Service (Altman and Sallabanks 2000).

Other Wildlife. There is no scientific support for post fire treatments, burned habitat is critical for many, many wildlife species, this proposal will result in “large-scale elimination” of such habitat, thus harming birds, insects, small mammals, amphibians, ungulates, and predators. (Letter #4, #12)

It is correct that burned forest landscapes provide wildlife habitat. However, the scale of the project is small relative to the fire, and as such will not result in large-scale elimination of habitat. Furthermore, as seen in the MIS report, there has been a substantial amount of burned habitat that has not been salvaged in the vicinity of the project area since 2000 (see p. 49.).