USDA United States Department of Agriculture | Forest Service | Santa Clara/Mojave Rivers Ranger District | 28245 Ave. Crocker, Ste. 220 Valencia, CA 91355 661-296-9710 Voice 626-447-8992 TTY

File Code: 1950-1
Date: November 23, 2007

Dear Interested Citizen:

We have prepared an environmental assessment (EA) for the Wrightwood Project, which analyzes our proposal to reduce wildfire risk and improve forest health on approximately 2,156 acres of National Forest System lands near Wrightwood, CA. This project is a key component of the Wrightwood Community Wildfire Protection Plan, a community-based strategy designed to ensure the protection of the people and natural resources in and around Wrightwood.

The Wrightwood Project proposes the following treatments: removing dead and dying trees, thinning overstocked stands, reducing chaparral/shrubs, and creating fuel breaks. These treatments would reduce the potential wildfire rate of spread and intensity, maintain vegetation conditions favoring lower intensity fire, and change forest stand conditions to reduce future susceptibility of trees to insect and drought mortality. The project is located within the San Gabriel Mountain Range in T3N, R8W Sections 1, 2, 3, 10, 11, 12, 13, 14 and T3N, R7W Sections 3-10, 14-22 of Los Angeles and San Bernardino Counties.

You may view the Wrightwood Project EA, including maps, on the Angeles National Forest website at www.fs.fed.us/r5/angeles/projects/. If you need a hard copy, you may contact Marty Dumpis (Acting Forest Resources/Planning Staff Officer) or Kathy Peterson (Forest Planner) in the Angeles National Forest Supervisor's Office, 701 N. Santa Anita Avenue, Arcadia, CA 91006. Phone: 626-574-5200.

This project is being accomplished under the Healthy Forests Restoration Act (HFRA) of 2003 (Public Law 108-148). The HFRA contains a variety of provisions to expedite hazardous-fuel reduction on federal lands. Under this Act and implementing regulations in 36 CFR 218, the Forest Service administrative appeals process is replaced with an "objection process" that provides for a 30-day administrative review period after the EA is made available for public review and before a decision by the Responsible Official approving the project. I am the Responsible Official for this project.

Only individuals or organizations that submitted specific written comments related to the proposed project during the comment period (July 23, 2004 through September 9, 2004) are eligible to participate in this objection process. Federal agencies may not file objections. Those eligible to object may mail or hand-deliver written objections to the Reviewing Officer, Jody Noiron, Forest Supervisor, Angeles National Forest, 701 N. Santa Anita Avenue, Arcadia, CA 91006 (Monday-Friday, 8:00 a.m. – 4:30 p.m.), or email to llugo@fs.fed.us.

The **30-day objection filing period for this project begins on Saturday, November 24, 2007.** Comments from eligible individuals or organizations **must be received on or before Monday, December 24, 2007.**

Objections must be in writing and must provide all documents used in citing the objection. Incorporation of documents by reference is not allowed. The objector is responsible to provide

sufficient narrative description of the aspects of the project addressed by the objection, specific issues related to the project, and suggested remedies which would resolve the objection. The objection must include: Objector's name and address, and phone number if available; signature (scanned signature for email); name of project, name and title of Responsible Official, and name of National Forest and/or Ranger District on which project will be implemented.

The Reviewing Officer will prepare a written response to objections. Prior to this response, objectors may request to meet with the Reviewing Officer to discuss issues and potential resolutions. There will be no further review from any other Forest Service or USDA official of the Reviewing Officer's written response.

If you have questions about the objection process or this project, you may contact me at 661-296-9710; you may also contact Marty Dumpis or Kathy Peterson at 626-574-5200.

Thank you for your interest and participation.

Sincerely,

JOHN F. CAPELL
District Ranger

Legal Notice

USDA Forest Service
Angeles National Forest
Santa Clara/Mojave Rivers Ranger District
Los Angeles and San Bernardino Counties, CA
WRIGHTWOOD PROJECT
Notice of Environmental Assessment, Objection Process

The U.S. Forest Service, Angeles National Forest, Santa Clara/Mojave Rivers Ranger District has prepared the Wrightwood Project Environmental Assessment (EA) that analyzes the agency's proposal to reduce wildfire risk and improve forest health on approximately 2,156 acres of National Forest System lands near Wrightwood, CA. The project would remove dead and dying trees, thin overstocked stands, reduce chaparral/shrubs, and create fuel breaks. These treatments would reduce potential wildfire rate of spread and intensity, maintain vegetation conditions favoring lower intensity fire, and change forest stand conditions to reduce future susceptibility of trees to insect and drought mortality.

The Responsible Official for the Wrightwood Project EA is John Capell, District Ranger, Santa Clara/ Mojave Rivers Ranger District. The EA is available on the Angeles National Forest website (www.fs.fed.us/r5/angeles/projects/). Hard copies are available by contacting Marty Dumpis or Kathy Peterson at the Angeles National Forest Supervisor's Office, 701 N. Santa Anita Avenue, Arcadia, CA 91006; phone 626-574-5200.

This project is authorized by the Healthy Forests Restoration Act (HFRA) of 2003 (Public Law 108-148). Under the HFRA and pursuant to 36 CFR 218 subpart A, the Forest Service administrative appeals process is replaced with an "objection process" that provides for **a 30-calendar-day administrative review period** after the EA is made available for public review and before a decision by the Responsible Official approving the project. **The day after publication of this legal notice is the first day of the 30-day objection filing period.**

Only individuals or organizations who submitted specific written comments related to the project during the official comment period (July 23, 2004 – September 9, 2004) may participate in this review process by filing an objection (see 36 CFR 218.6). Federal agencies may not file objections. Those eligible to object may mail or hand-deliver written objections to the Reviewing Officer, Jody Noiron, Forest Supervisor, Angeles National Forest, 701 N. Santa Anita Avenue, Arcadia, CA 91006 (Monday-Friday, 8:00 a.m. – 4:30 p.m.), or email to llugo@fs.fed.us.

Objections must be in writing and must provide all documents used in citing the objection. Incorporation of documents by reference is not allowed. The objector is responsible to provide sufficient narrative description of the aspects of the project addressed by the objection, specific issues related to the project, and suggested remedies which would resolve the objection. The objection must include: Objector's name and address, and phone number if available; signature (scanned signature for email); name of project, name and title of Responsible Official, and name of National Forest and/or Ranger District on which project will be implemented.

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Persons with questions about the objection process or this project may contact District Ranger John Capell (661-296-9710), or Marty Dumpis or Kathy Peterson at 626-574-5200.

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USDA

United States
Department of
Agriculture

Forest Service
Pacific Southwest
Region

R5-MB-153
November 2007

Environmental Assessment

Wrightwood Project

Santa Clara/Mojave Rivers Ranger District, Angeles National Forest
Los Angeles and San Bernardino Counties, California

Courtesy WrightwoodFSC.com

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Summary

The Wrightwood Project is proposed to protect the people and natural resources in and around Wrightwood, California by reducing wildfire risk and improving forest health. It was developed in collaboration with, and implements actions of the Wrightwood Community Wildfire Protection Plan.

The goals of the Wrightwood Project are to cause an immediate change in potential wildfire behavior by reducing the rate of spread and intensity of fire, to maintain vegetation conditions that allow fires to burn with lower intensities, and to cause long-term changes in forest stand conditions to reduce further susceptibility of trees to insect outbreaks.

The Wrightwood Project is part of the Wrightwood Community Wildfire Protection Plan and is proposed to protect the people and natural resources in and around the Community of Wrightwood, California.

The project would reduce the amount of hazardous fuels or tree density on approximately 2,156 acres of Angeles National Forest-administered lands in the wildland-urban interface (WUI). Two alternatives are analyzed in detail in this EA: the No-Action Alternative (Alternative 1) and the Modified Proposed Action (Alternative 2).

Wrightwood has been designated as a "Community at Risk" from wildfire as defined in the Federal Register, August 17, 2001 (Vol. 66, No. 160). It occurs within the WUI of the Angeles and San Bernardino National Forests, which are currently experiencing extended drought, significant tree mortality, and increased accumulation of wildland fire fuels.

Figure 1. Trees dying from insects and disease in the Wrightwood project area.

The Wrightwood Project proposes to reduce wildland fire risk and improve forest health by removing dead and dying trees, thinning overstocked stands, reducing chaparral/shrubs, and creating fuelbreaks. These actions complement projects by Los Angeles and San Bernardino Counties, California Department of Forestry and Fire Protection, and other Forest Service fuel reduction projects designed to protect the community.

1. Introduction

1.1 Document Structure

The Forest Service has prepared this Environmental Assessment (EA) in compliance with the National Environmental Policy Act (NEPA), the Healthy Forests Restoration Act (HFRA), and other relevant Federal and State laws and regulations. This EA discloses the direct, indirect, and cumulative environmental impacts effects that would result from hazardous fuel reduction and forest health thinning activities in the proposed Wrightwood Project. It also provides the supporting information for a determination to prepare either an Environmental Impact Statement (EIS) or a Finding of No Significant Impact (FONSI). The document is organized into four parts:

- *Introduction:* This section presents information on the history of the project proposal, the purpose and need for the project (including a description of the existing condition and the desired future condition), and the agency's proposal for achieving that purpose and need. It also details the collaborative process used in developing and modifying the proposal, including how the Forest Service informed and involved the public, and how the public responded.
- *Alternatives, including the Proposed Action:* This section provides a detailed description of the agency's proposed action as developed and modified based on public comment and new data. The section also provides a comparison of the No Action Alternative (Alternative 1) and the Modified Proposed Action Alternative (Alternative 2), and a summary of the environmental consequences associated with each alternative.
- *Affected Environment and Environmental Consequences:* This section describes the environmental effects of implementing the No Action and Modified Proposed Action Alternatives. For each resource described and analyzed, the affected environment is described first, followed by a description of the effects of implementing the alternatives. Detailed discussions of purpose-and-need accomplishments and issue analysis are included for each resource.
- *Consultation and Coordination:* This section provides a list of preparers and agencies consulted during the development of the environmental assessment, as well as a list of references used in the analysis.
- *Appendices:* The appendices provide detailed information to support the analyses, and copies of project maps referenced throughout the environmental assessment.

Additional documentation, including more detailed analyses of project-area resources, is located in the project planning record on file at the Angeles National Forest Supervisor's Office (701 N. Santa Anita Avenue, Arcadia, CA 91006). The References section of this EA also lists documents used in completion of the analysis.

1.2 Background

1.2.1 Project Location

The Wrightwood Project surrounds the community of Wrightwood, California in Los Angeles and San Bernardino Counties, California (Figure 2). The project area is located in T. 3 N., R. 8 W., Sections 1-3, 10-14 and T. 3 N., R. 7 W., Sections 3-10 and 14-22. Although it includes portions of both the Angeles and San Bernardino National Forests, all National Forest System lands in the project area are administered by the Angeles National Forest and guided by the 2005 Angeles National Forest Land Management Plan (Forest Plan).

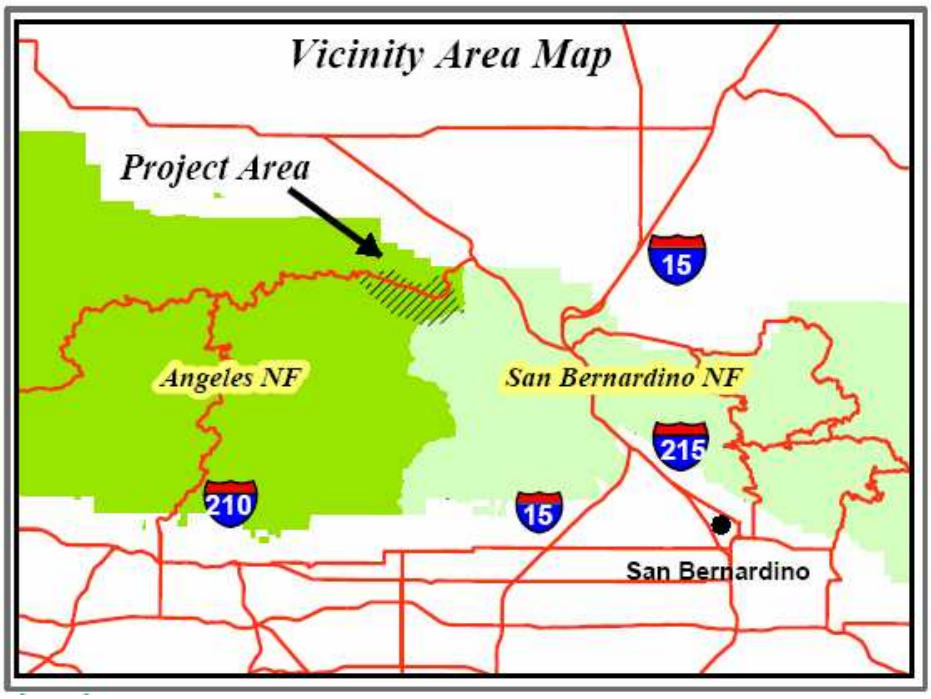

Figure 2. Wrightwood Project vicinity map

1.2.2 Legal Authorization and Policy Framework

This project is proposed to make progress toward goals embodied by the 2005 Angeles National Forest Land Management Plan (Forest Plan). The Plan consists of three parts: Part 1, Southern California National Forests Vision (Forest Vision; USDA Forest Service 2005a); Part 2, Angeles National Forest Strategy (Forest Strategy; USDA Forest Service 2005b); and Part 3, Design Criteria for the Southern California National Forests (Forest Design Criteria; USDA Forest Service 2005c). The Angeles National Forest Land Management Plan (2005), hereinafter referred to as the Forest Plan, provides the basic direction and standards for management of the Angeles National Forest. Additionally, as a fuels reduction and forest health project, this proposal is specifically designed to serve public purposes outlined by the National Fire Plan of 2000 (NFP; USDA Forest Service and USDI Bureau of Land Management 2000).

Environmental review of the proposal, including this assessment, is being conducted as required by the National Environmental Policy Act of 1969 (NEPA). This includes compliance with NEPA-implementing regulations of the Council on Environmental Quality (CEQ) at 40 CFR Part 1500, and application of CEQ's Guidance for Environmental Assessments of Forest Health Projects of December 9, 2002 and Forest Service Handbook 1909.15—Environmental Policy and Procedures Handbook.

This project is planned under authorization of the 2003 Healthy Forest Restoration Act (HFRA) (P.L. 108-148). The Act contains a variety of provisions to expedite hazardous-fuel reduction on federal lands. For an HFRA-authorized project such as the Wrightwood Project, the Forest Service administrative appeals process is replaced with an "objection process" that provides for a 30-day administrative review period *after* the EA is made available for public review and *before* the decision (Decision Notice) approving the project (see 36 CFR 218).

Only individuals or organizations who submitted specific written comments related to the project during the scoping period or other public involvement opportunities for this EA may participate in this review process by filing an objection (see 36 CFR 218.6). Individual members of organizations must have submitted their own comments to meet the requirements of eligibility as an individual; objections received on behalf of an organization are considered as those of the organization only. For more information on how this objection process works and the requirements, you may read the regulations under 36 CFR 218 Subpart A on the Forest Service web site at http://www.fs.fed.us/emc/applit/36cfr218a.htm.

1.2.3 Forest Plan Direction Relevant to this Analysis

The Wrightwood Project was designed to meet the following Forest Plan goals defined by the Forest Vision (USDA Forest Service, 2005a):

Goal 1.1 - Community Protection. Improve the ability of southern California communities to limit loss of life and property and recover from the high-intensity wildland fires that are a natural part of this state's ecosystem.

Goal 1.2 - Restoration of Forest Health. Restore forest health where alteration of natural fire regimes has put human and natural resource values at risk.

Goal 1.2.1 - Fire Regime I (0-35 years - low severity). Reduce the potential for widespread losses of montane conifer forests caused by severe, extensive, stand-replacing fires.

Goal 1.2.2 - Fire Regime IV (35-100+ years – stand replacement). Reduce the number of acres at risk from excessively frequent fires while improving defensible space around communities. Establish a diversity of shrub age classes in key areas near communities. Strategically placed blocks of young chaparral around certain forest types could be used to reduce the risk of crown fires.

Goal 4.1b - Energy and Minerals Production. Administer Renewable Energy Resource Developments (biomass) while protecting ecosystem health.

1.2.4 Comprehensive/Collaborative Planning

Issues regarding wildland fire risk and forest health conditions in the Angeles National Forest have remained in the news since the summer of 2003. This publicity has generated feedback to the Forest Service from local residents and visitors concerned about health of the forest, public safety, and fire hazard. In response, the Angeles National Forest has made numerous personal contacts and held meetings with individuals, community residents, agencies, and other interested parties during the last 3 years regarding these ongoing forest health issues.

The Angeles and San Bernardino National Forests held a series of public meetings with members of the Wrightwood community in order to listen to public concerns regarding forest health and wildland fire issues, to describe the present conditions around the community, to propose potential projects to address these concerns, and to discuss the potential consequences of those actions (see Public Involvement section below). The result of these meetings was to develop and carry out numerous projects to systematically address various community wildfire protection needs. The most immediate protection needs identified to be facing the community were: limit the threat of wildland fire in Lone Pine Canyon and provide escape routes to users of organizational camps located in the Big Pines area. These needs were met by the planning, approval, and implementation of the Lone Pine and Big Pines fuel reduction projects in 2004 and 2005. The Boundary Ridge Project was approved in 2007 and established fuel breaks at the head of Lone Pine Canyon. The Wrightwood Project is the next step for long-term wildland fuel management and forest health in the Wrightwood area.

The Wrightwood Project is a key part of a multi-jurisdictional comprehensive strategy to protect Wrightwood

1.2.5 Wrightwood Community Wildfire Protection Plan

The Wrightwood Project was first proposed in July of 2004, when Forest Service planners and representatives from other agencies began working with the Wrightwood Fire Safe Council to develop the Wrightwood Community Wildfire Protection Plan (2005). Agency representatives participated in meetings and field trips, shared data, developed project proposals, and mapped vegetation of non-federal lands. Forest Service specialists provided fire modeling and treatment strategies for forest lands to the Council and collaborated on treatments that crossed jurisdictional boundaries. The actions proposed in the Wrightwood Project are a result and a key part of this comprehensive protection strategy for the community. The Wrightwood Community Wildfire Protection Plan can be found at:
www.wrightwoodcalif.com/firesafecouncil/fireplan/WFirePlanFinal71205.pdf

1.2.6 Dying Trees

Many trees are dying in the Wrightwood project area due to bark beetles such as Jeffrey pine beetle, western pine beetle, and mountain pine beetle. Although recent yearly mortality rates due to bark beetles are moderate, most forest stands are considered at high risk to continued mortality and developing epidemic levels of bark beetles. Surveys in 2002, 2003, and 2004 found a progression of mortality throughout the project area (see Mortality Aerial Survey Map in Appendix D). The impact of years of reoccurring moderate levels of bark beetle-caused mortality may result in the loss of a large portion of the old-growth pine component (Amell 2005).

The interruption of the natural fire cycle combined with drought and insect infestation has killed many trees and created conditions ideal for future insect outbreaks. This could result in the potential loss of old growth forest components.

During the last 100 years or so, the number of trees per acre (stocking) continued to increase as new trees became established. Normally, stocking is naturally reduced in these types of forest by wildfire. However, fire suppression policies have interrupted this cycle resulting in a forest thick with trees. These conditions, combined with prolonged drought, have created ideal conditions for bark beetles (Amell 2005).

1.2.7 Fire History

The Angeles National Forest and surrounding area has a dramatic wildfire history, including an extensive history of large fires. Wildfires have burned an average of 18,500 acres of the Forest annually, excluding the fall 2003 wildfires (Hall 2005). Numerous large wildfires, dating back to the early 1900s, have occurred very close to the project area. Only a small percentage of the project area has burned in the past century; however, the community of Wrightwood has been threatened by wildfire from all directions since recorded history (see Fire History Map in Appendix D; Hall 2005).

Recent fires include the 1997 Narrows Fire, which consumed approximately 18,000 acres southwest of the project area, damaging resources and killing old-growth forests. The combined 2003 southern California fires were considered the most costly natural disaster in California history, consuming over 743,000 acres, destroying 3,600 homes and causing 22 deaths. Two of the larger fires, the Grand Prix and the Old Fire, consumed approximately 159,700 acres and burned to within 10 miles of the project area. The Lytle Creek Fire, which also occurred in 2003, burned in the Lone Pine Canyon area east of the project; the fire consumed approximately 550 acres and threatened the community of Wrightwood. In August 2004, the 86-acre Springs Fire burned within approximately one mile of the project area, threatening homes and other facilities in the area (see photos below; Hall 2005).

Figure 3. Photos from the Springs Fire in August 2004
(photos used with permission from IncidentControl.com)

1.3 Purpose and Need for Action

The Wrightwood Project was designed for the following purposes:

- **To Protect People.** To propose activities that will decrease the risk to life due to wildfire for the residents and visitors of the Wrightwood community.
- **To Protect Property.** To propose activities that will decrease the risk due to wildfire to homes and property within Wrightwood.
- **To Decrease Fireline Intensity.** To propose activities that will decrease potential fireline intensity so that we can employ reasonable suppression activities and ensure firefighter safety.
- **To Reduce Risk of Resource Damage.** To propose fuel reduction activities that will reduce fire intensity and subsequently reduce watershed, visual and wildlife habitat damage associated with wildfire. To propose activities that will reduce the likelihood of fire spreading outside of the project area.
- **To Improve Forest Health.** To propose activities that will improve forest health by reducing the risk of bark beetle mortality, disease presence, and risk of stand-replacing wildfire through reduced stocking levels.

The need for action is derived by comparing the existing conditions in the project area with the desired future conditions as defined by direction of the Forest Plan, its associated amendments, requirements of other applicable laws and public policies, and advice obtained through local cooperative planning. The comparison in this EA has identified a need for changing conditions on the ground in the Wrightwood Project area.

1.3.1 Existing Conditions

The 8,201-acre project area surrounds Wrightwood, an unincorporated community of approximately 3,840 people located in the northwestern area of the San Gabriel Mountains at an elevation of 5,900 feet. Sixty percent of the project area consists of National Forest System lands, of which 4,473 acres are administered by the Angeles National Forest (Figure 4, FS-ANG) and 416 acres by the San Bernardino National Forest (FS-SB). The community encompasses an area of 2.2 square miles and accounts for half of the private lands in the project area. The community has approximately 1,486 residences, multiple small businesses, and an active Fire Safe Council. Tourism is the main community industry highlighted by two ski areas, the Pacific Crest Trail, and other recreational opportunities.

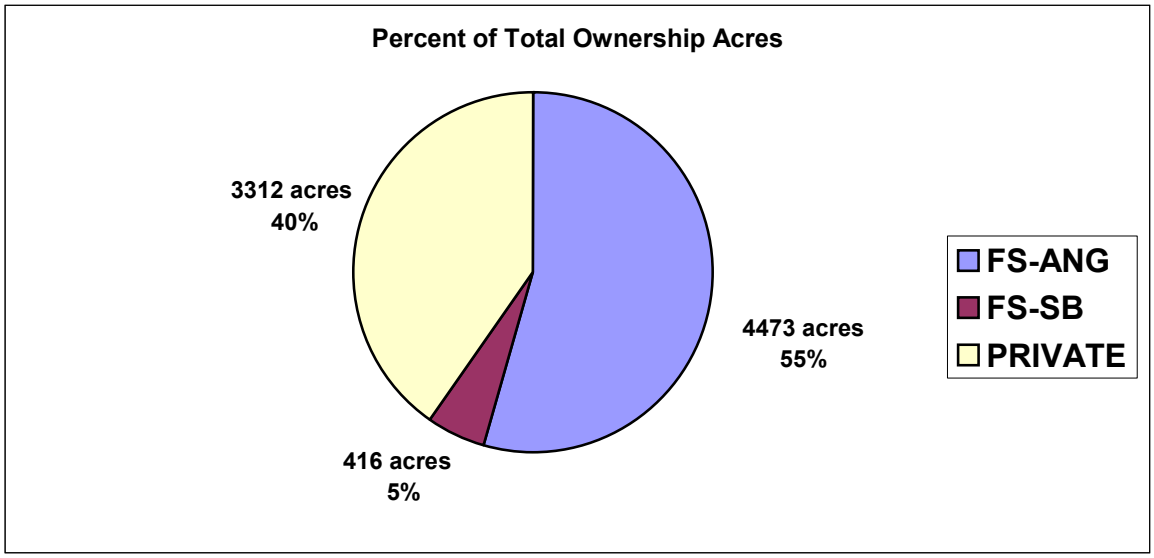

Figure 4. Land ownership in the Wrightwood project area

Forest Vegetation

Major vegetation in the project area consists of hardwoods (4%), shrubs (19%), and conifer/mixed-conifer trees (70%) (see Cover Types & Slope Breaks Map in Appendix D). All hardwood stands are mature; no young or early-successional (newly sprouting) hardwood stands have been observed. Hardwood stands are dense and stressed from drought and competition. Trees killed by bark beetles include Jeffery pine, Coulter pine, and single-leaf pinyon pine within the hardwood stands. Small numbers of oak have also died. It is not known if the oaks have died

from insects or competition, though the indirect causes are from the stress of too many trees per acre and the recent dryer-than-normal conditions. In addition, the oak trees have a relatively large number of branches dying from bark beetles (Amell 2005).

Beginning in 2003, trees began dying in increasing numbers in the area due to insects, disease, and drought.

Shrub stands in the area are dense and old (greater than 27 years). Shrubs are dying due to age, density, and the recent dryer-than-normal conditions. There are no young shrub stands in the project area (Amell 2005).

The structure of the conifer/mixed-conifer stands is essentially uneven-aged with dense canopy, multiple stories, and a high number of white fir trees per acre in the understory and mid-story. Most stands have changed from their historic open and "park-like" appearance, into dense stands with abundant young and middle-aged trees. As stand densities increased, the forest transformed from a single story to multi-storied structure. Tree species changed from open-grown ponderosa pine and Jeffrey pine to white fir and incense cedar, which grow well in shade and were historically thinned by wildfires. Beginning in 2003, trees began dying in increasing numbers in the area due to insects, disease, and drought effects (see fig. 5). Field surveys in the spring of 2004 indicated large pines were dying and all sizes of white fir were dying. Based upon field plots and subsequent analysis, all stands of conifer/mixed-conifer are at risk to high levels of bark beetle-caused mortality. Additionally, analysis of tree diameters shows existing stands are much denser than historically, even at sizes between 16 and 22 inches diameter (Amell 2005).

Conifer stands within the project area have changed from historically being open and "park-like" in appearance, to a denser stand structure.

Refer to the Affected Environment and Environmental Consequences section (Section 3) of this EA for further discussion of forest vegetation conditions.

Wildland Fuel Conditions

Historically, the project area experienced low-intensity to mixed-severity wildfires (called Fire Regime I; see text box on page 11) that occurred every 0 to 35 years. Today, 47 percent of the project area is classified as a Condition Class 3 wildland fuel type (see text box at right and Condition Class Map in Appendix D). This means that fire patterns and vegetation characteristics in these areas are very different from what occurred historically and the risk of losing key ecosystem components is high. Additionally, 33 percent of the project area is classified as Condition Class 2 fuel type, which means that fire patterns and vegetation characteristics are moderately different from their historic range (Hall 2005).

Condition Classes

Condition Class 1: Fire regimes are within a historical range and the risk of losing key ecosystem components is low.

Condition Class 2: Fire regimes have been moderately altered from their historical range and the risk of losing key ecosystem components is moderate.

Condition Class 3: Fire regimes have been significantly altered from their historical range and the risk of losing key ecosystem components is high.

Figure 5. Trees dying from fir engraver beetle; Wrightwood project area, spring 2004

Under the existing condition, fire could spread through all vegetation types in a variety of ways: on the ground, into the trees, or--in extreme weather conditions--throughout the entire forest.

Under the existing condition, fire could spread through all vegetation types—it could spread through surface fuels (surface fire), it could torch out individual or small groups of trees (passive crown fire), or it could produce a solid flaming canopy (active crown fire). Active crown fire is likely when vegetation and slopes are aligned with the wind, causing the entire fuel complex to ignite. Fire risk modeling of the project area predicts that shrub areas (19% of the project area) could exhibit crown fire under hot and dry weather conditions and conifer/mixed-conifer areas (70% of the project area) could exhibit surface fires that could turn into passive crown fires (Hall 2005). Fire suppression in these conditions would most likely be very difficult for firefighters.

Refer to the Affected Environment and Environmental Consequences section (Section 3) of this EA for further discussion of wildland fuel conditions.

1.3.2 Desired Future Conditions

The desired future condition of the project area is defined in the Forest Vision (USDA Forest Service, 2005a) and Forest Strategy (USDA Forest Service, 2005b). The Wrightwood Project area is located within the Angeles High Country Place and the Mojave Front Country Place. Land use zones include Back Country (BC), Back Country Non-Motorized BCNM), and Developed Area Interface (DAI) (see Land Use Zones Map in Appendix D). The desired future conditions for the Wrightwood Project according to the Forest Vision and Strategy are:

- A naturally evolving and appearing landscape that functions as a year-round forested mountain recreation area (Forest Strategy, Angeles High Country Place p. 41).

The desired future condition for the project area strives for community protection from wildfire, natural appearing landscapes, protected recreation sites, and forests that are resistant to large fires, drought, insects, and diseases.

- Forest health and community protection from fire around Wrightwood and large recreation complexes would be emphasized while maintaining the big tree character, vistas, and natural appearing landscapes (Forest Strategy, Angeles High Country Place p. 41).
- The montane conifer forests around Wrightwood would have a natural appearance and would be more open and resistant to large-scale, high-severity fires. Surface and ladder fuels would allow for low-intensity surface fires. The forest would trend towards its historic Fire Regime I (Forest Vision p. 23).
- Vegetation would be treated to enhance community protection and reduce the risk of loss of human life, structures, improvements, and natural resources from wildland fire (Forest Vision p. 20).
- The community of Wrightwood would be surrounded by strategically placed, young and less flammable blocks of chaparral to protect the community and improve the effectiveness of fire suppression (Forest Vision p. 26).
- Treatments on National Forest lands would complement activities planned in the Wrightwood Community Protection Plan (Forest Strategy p. 125, 127).

What Are Fire Regimes?

Fire regimes are generalized descriptions of the role fire plays in an ecosystem. The five natural (historical) fire regimes are classified based on the average number of years between fires (fire frequency) combined with the severity (amount of stand replacement) of the fire.

I – 0 to 35-year frequency and low- (surface fires most common) to mixed-severity fire (less than 75% of the dominant overstory vegetation replaced)

II – 0 to 35-year frequency and high (stand-replacement) severity fire (greater than 75% of the dominant overstory vegetation replaced)

III – 35 to 100+-year frequency and mixed-severity fire (less than 75% of the dominant overstory vegetation replaced)

IV – 35 to 100+-year frequency and high severity fire (greater than 75% of the dominant overstory vegetation replaced)

V – 200+-year frequency and high severity

- Fire behavior and fire intensity characteristics would allow for effective, rapid, and safe fire suppression (Forest Strategy p. 127).
- Fuelbreaks would be established to maintain multiple lines of community defense and minimize wildland fire size (Forest Strategy p. 128).
- The montane conifer forests would be more open and resistant to drought, insect outbreaks, and diseases. Forest species compositions and stand densities would be similar to presettlement compositions. Forest stand structures would contain large trees (Forest Vision p. 24).
- Coulter pine forests would occur on the landscape on appropriate sites and would have adequate seed sources to regenerate the species following a stand-replacing fire (Forest Vision p. 26).
- Timber and chipped woody material would be generated as a by-product of ecosystem management, healthy forest restoration, fuels management and community protection projects for energy production as well as other higher value uses (Forest Vision p. 39).

1.3.3 Comparing the Existing Condition to the Desired Future Condition

The Wrightwood project area does not meet desired conditions. Existing conditions conflict with the desired condition because:

1. Montane conifer forests are at risk for stand-replacing fires due to increased tree densities, and surface and ladder fuels brought about by fire suppression. **There is a need to move forest conditions from Fire Regime V to Fire Regime I.** Most fuels in the project area are classified as Condition Class 2 or 3. **There is a need to change vegetation in Condition Classes 2 and 3 in the project area towards Condition Class 1.**

2. Current wildland fuel conditions do not ensure firefighter safety. Chaparral within the wildland urban interface defense and threat zones surrounding Wrightwood is even-aged, dense, and highly volatile. Montane conifer forests are dense and have moderate to high predicted fire behavior. **There is a need to reduce wildland fire behavior potential in the shrub and conifer/mixed-conifer stands to reduce fireline intensity and ensure firefighter safety.**

3. Fuelbreak systems surrounding Wrightwood have not been maintained or properly established. **There is a need to develop or reestablish fuelbreaks surrounding Wrightwood and facilitate treatments on private lands.**

4. Montane conifer forests species have changed from historic compositions due to the increase in shade-tolerant species, especially white fir. Hardwoods such as black oak are declining in vigor due to their being overtopped and out-competed by dense conifers. **There is a need to push the species compositions toward historic levels by removing shade-tolerant species and maintaining black oak vigor.**

5. Forests in the area have more trees per acre than historically, and are at risk to drought-related mortality, developing epidemic levels of bark beetles, and losing key species components such as Coulter and pinyon pine. **There is a need to push the forests back toward historic stocking levels, reduce stress during periods of drought, and reduce the risk of bark beetles and stand-replacing fire risk to preserve stand components**.

1.4 Proposed Action

The proposed action for the Wrightwood Project, as originally released to the public in July 2004, proposed three general actions to meet the purpose and need of the project and to move the project area toward achieving the desired future condition:

- **Create Fuelbreaks (641 acres):** Fuelbreaks would be constructed and maintained around the community of Wrightwood to reduce fuel hazards as part of a coordinated set of fuels management activities.
- **Thin Forests (1,842 acres):** Forested areas would be thinned to reduce bark beetle risk, to reduce disease spread, and to modify wildland fuel conditions.
- **Thin Chaparral Shrubs (712 acres):** Chaparral shrub fields would be thinned to modify fire behavior by reducing fireline intensity. To achieve these actions, cut trees and shrubs would be removed using helicopter, cable, or ground-based systems. The project proposed to construct approximately six miles of temporary roads and up to 67 landings.

The proposed action was modified in response to public comment received during scoping, and new data. This EA analyzes the proposed action as modified rather than as originally proposed. The Modified Proposed Action (Alternative 2) proposes to **create fuelbreaks (352 acres), thin forests (1320 acres)** and **thin chaparral shrubs (484 acres).** Alternative 2 is described in detail on page **Error! Bookmark not defined.**. Specific details of the original proposed action are contained in the project record.

1.5 Past, Present, and Reasonably Foreseeable Actions in the Project Area

The project record contains a complete list of projects, descriptions, and maps used when considering resource-based cumulative effects in this assessment. Within the project area, the following Forest Service actions were considered in the design and analysis of the proposed action (see also Section 3.1.1, Cumulative Effects Analysis Areas):

1. The Mountain High Resort Master Development Plan/Expansion, Angeles National Forest (Draft)
2. Lone Pine Fuel Reduction Project, San Bernardino National Forest - 2004
3. Big Pines Fuel Reduction Project, Angeles National Forest - 2004
4. Boundary Ridge Project, San Bernardino National Forest – 2006

1.6 Decision Framework

The Responsible Official for this EA and subsequent decision is the District Ranger for the Santa Clara /Mojave Rivers Ranger District, Angeles National Forest. Based on the environmental analysis in this document and following a public review period of the EA, the

Responsible Official will decide whether and how to reduce fuel loading and improve forest health conditions in the Wrightwood project area. The decision will be in accordance with Forest Plan goals, objectives, and desired future conditions. If the Modified Proposed Action is selected, the decision will include:

- the location, timing, and design of the proposed thinning, burning, and other activities or connected actions;
- access management measures and;
- mitigation measures and monitoring requirements.

If the decision is to proceed, it is anticipated that project operations could begin in late 2007 or early 2008, and continue intermittently for at least three additional calendar years (through 2010 or beyond).

1.7 Public Involvement

The Angeles and San Bernardino National Forests have held a series of public meetings (10/20/2003, 10/21/2003, 2/10/2004, 4/17/2004) in the Wrightwood Community to notify and involve the public in development of the Wrightwood Project proposal. Additionally, the District Ranger, District staff, and members of the interdisciplinary team (ID team) that developed this proposal have regularly attended Wrightwood Fire Safe Council meetings. Maps of the proposals were displayed during Wrightwood Fire Awareness days in 2004 and 2005. Members of the ID team met with local residents to discuss concerns and ideas regarding the proposal and then modified the proposal to address their concerns. Working with the Wrightwood Fire Safe Council, the ID team developed a plan of potential treatments that could occur on private lands to augment projects proposed on National Forest System lands. This plan included treatment prescriptions with maps.

On July 23, 2004, the proposed action was mailed to 3,300 people, including the Angeles National Forest NEPA mailing list and all mailbox holders in Wrightwood. The proposed action and maps were posted at the following public locations: San Bernardino County Library, Wrightwood Branch; the Kiosk at Mountain Hardware, Wrightwood CA; Wrightwood Community Building; Big Pines Visitor Center; and the Santa Clara/Mojave Rivers Ranger District Office. The Angeles National Forest distributed a news release regarding the project to appropriate news organizations. Additionally, the proposed action and maps were posted on the Angeles National Forest and Wrightwood Fire Safe Council websites. The Forest Service received and reviewed comments from ten individuals/groups during the scoping period.

The project has also been listed in the Angeles National Forest's web-posted Schedule of Proposed Actions (SOPA), beginning with April 2007.

The Forest Service used input received during scoping to identify issues and to modify the project proposal.

1.8 Issues

An issue, as it relates to the NEPA process, is a point of disagreement, debate, or dispute with the proposed action based on some anticipated effect. Under NEPA, issues are identified as being either significant or non-significant. For this project, 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 for Environmental Quality (CEQ) National Environmental Policy Act (NEPA) regulations requires 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…" A list of non-significant issues and reasons regarding their categorization as non-significant may be found in the project record.

1.8.1 Significant Issues

The Forest Service identified the following significant issues during public scoping:

Issue 1. Snags and Down Woody Debris. There is a concern that the removal of snags greater than 18 inches diameter (measured as "diameter at breast height," or DBH) will not reduce fire risk and may have negative effects on wildlife.

Issue 2. California Spotted Owl. There is a concern that the proposed action may negatively impact California Spotted Owl (CSO) because it did not specify the location of or residual tree retention standards for the CSO (see also Issue 7 below).

Issue 3. Old Growth. There is a concern that the silvicultural prescriptions will not maintain or contribute toward old-growth conditions for decades.

Issue 4. Live Tree Diameter Limits. There is a concern that the proposed prescriptions remove live tree diameter size classes in the large diameter size class in excess of what is needed for fuels reduction or forest health.

Issue 5. Riparian Habitats. There is a concern that the proposed prescriptions do not provide adequate protection to riparian areas.

In addition, Forest Service resource specialists identified the following significant issues:

Issue 6. Forest Service Sensitive Plant Species. Six Forest Service Sensitive Plant Species were found in the Wrightwood Project Area. These species need protective measures to limit the negative effects of the proposed project.

Issue 7. Nelson's Bighorn Sheep; California Spotted Owl. Potential negative impacts to two Forest Service Sensitive Wildlife species occurring in the Wrightwood Project Area are a concern: Nelson's bighorn sheep (disturbance and displacement) and California spotted owl (disturbance to roosting birds; foraging habitat modification; see also Issue 2 above).

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2. Alternatives, Including the Proposed Action

2.1 Introduction

This section is 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. Analysis of alternatives in summary discussions is located in the Affected Environment and Environmental Consequences section. Detailed analysis is located in the project record, on file at the Angeles National Forest Supervisor's Office.

Under the Healthy Forests Restoration Act (HFRA), if proposed treatment areas are inside the wildland-urban interface and within 1½ miles of the boundary of an at-risk community, the Forest Service is not required to analyze alternatives to the proposed action, with one exception: If the at-risk community has adopted a Community Wildfire Protection Plan (CWPP) and the proposed action does not implement the recommendations in the plan regarding the general location and basic method of treatments, agencies are required to analyze the recommendations in the plan as an alternative to the proposed action (Sections 104(d)(2) and (3)).

The Community of Wrightwood has been designated as a Community at Risk from wildfire as defined in the Federal Register, August 17, 2001 (Vol. 66, No. 160). The project is within the established WUI of the Angeles and San Bernardino National Forests, and is within 1 ½ miles of the community. The proposed action was reviewed and found to implement the recommendations of the Wrightwood Community Wildfire Protection Plan.

Therefore, the decision was made not to develop other alternatives to the proposed action as modified. This decision is consistent with the HFRA (pp 9-10 of the 2004 Interim Field Guide) and is documented in the project record. A No Action Alternative is analyzed in this EA for comparative purposes.

2.2 Alternatives

2.2.1 Alternative 1: No Action

Under the No Action Alternative, current and ongoing management activities would continue, but no new federal management activities would be initiated. No forest health or fuels treatments would occur to accomplish project goals. This alternative provides a baseline against which to describe the environmental effects of the proposed action as modified, and responds to the concerns of those who would like no additional management activities to occur in the project area.

Beyond completing ongoing and previously approved activities, Alternative 1 would allow ecological processes to control vegetative development. Wildfires would continue to be suppressed in order to protect resources and property. Recreational activities such as hiking,

scenic drives, hunting, fishing, and trail riding would continue. Law enforcement patrols to enforce federal and state laws would continue.

2.2.2 Alternative 2: Modified Proposed Action

This alternative is the proposed action as modified to reflect public comments and new data. It was developed to respond to significant issues 1, 2, 3, 4, and 5. This alternative modifies the original proposed action by:

- restricting the removal of live and dead and dying trees over 18 inches DBH;
- removing from the project area 37 acres of treatments in California spotted owl Protected Activity Centers (PACS);
- removing from the project area 96 acres of treatments in some areas of California spotted owl *high valued habitat* where thinning prescriptions permitted by the Conservation Strategy would not meet the project's purpose and need;
- modifying 32 acres of prescriptions in other areas of California spotted owl *high valued habitat* within the project area where thinning prescriptions permitted by the Conservation Strategy meet the project's purpose and need; and
- clarifying riparian protections and incorporating suggestions made by the public to protect riparian habitats.

Additionally, this alternative reflects routine refinements to the proposed action made by the ID team during project analysis. These refinements further limit the original proposed action to reflect new data, such as field surveys, and include new prescriptions to protect sensitive plants, reductions in temporary roads and landings, refined visual quality prescriptions, removal of treatments from the project area that are included in the Boundary Ridge Project (San Bernardino National Forest), and removal of treatments from the project area that conflicted with areas used by local universities for educational field trips. Additional considerations based on significant issue 3 (maintain old growth) were conducted in the modification of this alternative. Thinning guidelines as proposed meet old-growth standards and guides of the Forest Plan, help protect existing old growth from continued bark beetle mortality, and help restore historic old growth conditions.

The Modified Proposed Action would implement the following general actions to meet the purpose and need of the project and to move the project area toward achieving the desired future condition (Please refer to Modified Proposed Action Details Map 1 in Appendix D):

Fuelbreaks (352 acres): Fuelbreaks would be constructed and maintained around the community of Wrightwood to reduce fuel hazards as part of a coordinated set of fuels management activities. Activities in fuelbreaks would include:

- removing all dead, diseased, and dying trees
- thinning and removing live trees
- reducing shrub cover
- pruning trees

Thin Forests (1,320 acres): Forested areas would be thinned to reduce bark beetle risk, to reduce disease spread, and to modify wildland fuel conditions. In these areas, activities would include:

- removing dead, diseased, and dying trees, and leaving residual snags and downed woody material for wildlife and long-term soil productivity
- thinning and removing live trees
- reducing shrubs in forest understories where needed

Thin Chaparral Shrubs (484 acres): Chaparral shrubfields would be treated to modify fire behavior by reducing fireline intensity. Activities in shrubfields would include:

- mechanically masticating (chopping and shredding) shrubs

Removal Methods: To achieve these actions, cut trees and shrubs would be removed using one of three methods: helicopter, cable, or ground-based systems. Each method is chosen based upon topography, soil conditions, access, and type of material to be removed (see Removal Methods Map in Appendix D).

- Helicopter-trees would be removed by a helicopter and transported to landing sites.
- Cable-trees would be removed by suspending them from a cable system similar to a ski lift.
- Ground-trees would be removed using equipment such as rubber-tired skidders or dozers. Shrubs would be chopped, shredded, and chipped on site using mechanical equipment.

Each of these removal methods may require the construction of temporary roads and landings. The project proposes to construct approximately six miles of temporary roads and up to 36 landings.

Vegetation Treatments and Stand Prescription Details

Treatments are practices used to achieve a project goal. For example, creating a fuelbreak in a conifer stand with a chaparral understory may require several treatments (e.g. thin trees, masticate brush) to meet the desired fuelbreak objective. Seven general treatment types are proposed to accomplish project goals (see Table 1):

- **Commercial Thin (CT) -** The cutting of trees that would produce a commercial sawtimber product
- **Precommercial Thin (PCT)** – The cutting of trees that are of a diameter that would not produce a commercial sawtimber product
- **Handpile and Burn Slash Residue (HP)** – A type of prescribed fire where cut material (small trees and shrubs) is arranged in piles to be burned later
- **Jackpot Burn (JB) -** A type of prescribed fire where emphasis is placed on burning concentrations of activity generated fuels
- **Lop and Scatter (LS) -** To chop branches, tops, and small trees after felling into lengths so that the slash will lie close to the ground, then spreading the slash more or less evenly over the ground

- **Masticate (MAS)** – Crushing, chopping, grinding, or chewing up of small trees and shrubs. This material is generally small (less than 3 ft long) and distributed on site
- **Prune** - Cutting low branches from trees and shrubs to reduce ladder fuels.

Table 1. Modified proposed action summary of treatments

General Treatment	Specific Treatment	Acres
Tree Removal/Harvest	Commercial Thin	1,150
	Precommercial Thin	1,755
Shrub Removal (SR)		
Slash Treatments(ST)	Masticate (SR)	638
	Hand Pile (SR/ST)	353
	Jack Pot Burn (ST)	1,165
	Lop and Scatter (ST)	1,404
Ladder Fuel Treatment	Prune	525

Individual stand measures such as tree species, size, density, age, number of dead trees, and topographic location dictate the specific combination of treatments needed for each forest stand prescription. Prescriptions are specific treatments, by stand, that would be implemented to achieve the projects goals. Table 2 summarizes acres of treatment combinations. Please refer to Appendix A for detailed prescription definitions and Modified Proposed Action Details Map 2 in Appendix D for stand locations of each prescription.

Table 2. Modified proposed action prescription summary

Prescription	Acres	Prescription	Acres
CT/PCT/HP/PRUNE	**12**	**MAS/PRUNE**	**43**
CT/PCT/LS/HP	**36**	**PCT/HP/PRUNE**	**153**
CT/PCT/LS/JB	**912**	**PCT/LS/HP**	**21**
CT/PCT/LS/MAS	**62**	**PCT/LS/HP/PRUNE**	**10**
CT/PCT/MAS/PRUNE	**128**	**PCT/LS/JB**	**253**
HP/PRUNE	**121**	**PCT/LS/MAS**	**110**
MAS	**237**	**PCT/MAS/PRUNE**	**58**
		Total acres **2,156**	
CT – Commercial Thin **PCT- Pre-Commercial Thin** **HP – Hand Pile** **PRUNE – Prune Branches**		**LS- Lop and Scatter** **MAS – Masticate** **JB - Jackpot Burn**	

Stand Prescriptions and Design Criteria

Stand prescription definitions and project design criteria are in Appendix A. Many comments or concerns brought forward during scoping are addressed within these specific designs including snag removal standards, live tree thinning guides, wildlife and plant protections, riparian protections, and visual standards.

Roads and Landings

No change in road density or travel management is proposed. The action proposes using 21 miles of existing roads to access and remove material associated with treatments. Portions of these roads

may require maintenance prior to use, such as replacing culverts, grading roads, and restoring road prisms. (See Modified Proposed Action Map 2 & Transportation Map in Appendix D)

Additionally, up to 2.6 miles of temporary roads may be required to access the treatment areas, yarding equipment access, and log hauling. These roads consist primarily of spurs off of existing roads, and would occur in T. 3 N. R. 8 W., Sections 1, 11, 12, 13 and T. 3 N., R. 7 W., Sections 4, 9,10, 15, 18, 20. Both temporary roads and existing closed roads would be rehabilitated after use for project activities.

For public safety, areas with timber harvest activities, prescribed burning, or other fuel treatments may be temporarily closed to public use. Harvest operations may be prohibited in heavy-use recreation areas on holidays or weekends to minimize conflicts with recreation use and traffic. Log-haul routes or other high-traffic areas would be signed to indicate presence of truck traffic. Log hauling may be restricted on school bus routes when school is in session. The public and adjacent landowners would be notified of a contact phone number or website for timing of treatment activities in specific areas where closures are planned.

Approximately 36 landings would be required for the proposed treatments.

2.3 Mitigation Common to All Alternatives

In response to the Wrightwood Project proposals, mitigation measures were developed to ease some of the potential impacts the project may cause. The mitigation measures for the Wrightwood Project are included in Appendix C of this EA, and may be applied to any of the action alternatives.

2.4 Alternative Comparison

This section summarizes effects of implementing each alternative. The summary is focused on activities and effects where different levels or outputs can be distinguished quantitatively or qualitatively among alternatives. Table 3 summarizes the primary actions proposed for each alternative considered.

Table 3. Summary of management actions by alternative

Management Actions	Alternative 1 No Action	Alternative 2 Modified Proposed Action
Commercial Thin	0 ac	1,150 ac
Pre-Commercial Thin	0 ac	1,755 ac
Masticate	0 ac	638 ac
Hand Pile	0 ac	353 ac
Jack Pot Burn	0 ac	1,165 ac
Lop and Scatter	0 ac	1,404 ac
Prune	0 ac	525 ac
Develop Temporary Roads	0 miles	Up to 2.61 miles
Existing Road Maintenance	0 miles	Up to 15 miles

2.4.1 Purpose and Need Accomplishment Summary

Section 1.3.3, "Comparing the Existing Condition to the Desired Future Condition," identifies project needs that must be accomplished to achieve the desired future condition. Analysis of these needs and how they would be accomplished by the alternatives is located in Section 3, "Affected Environment and Environmental Consequences." **Error! Reference source not found.** summarizes that analysis and displays purpose and need accomplishments by alternative.

Table 4. Accomplishment of project needs by alternative

Project Need Statement	Objective Measurement	Alternative 1 No Action		Alternative 2 Modified Proposed Action	
1. There is a need to reduce wildland fire behavior potential in the shrub and conifer/mixed-conifer stands in order to reduce fireline intensity and ensure firefighter safety.	Flame Length (feet)	Conifer Mix	Shrub	Conifer Mix	Shrub
		3.6 – 7.2	23.8 - 44	1.6 – 4.9	1.4 – 3.7
	Canopy Base Height (feet)	5-11	N/A	20 - 47	N/A
	Fire Type	Surface to Active Crown	Passive to Active Crown	Surface Fire	Surface Fire
	Fireline Intensity	Low to High	High	Low to Moderate	Low
2. There is a need to move condition class 2 and 3 fuel types in the project area towards condition class 1	Percent of Project Area by Condition Class (14% = non-forest)	Condition Class 1: 6% Condition Class 2: 33% Condition Class 3: 47%		Condition Class 1: 35% Condition Class 2: 23% Condition Class 3: 28%	
3. There is a need to develop or reestablish fuelbreaks surrounding Wrightwood and facilitate treatments on private lands.	Acres of Fuelbreaks Established	0 acres		352 acres	
	Consistent with Wrightwood Community Protection Plan	No		Yes	
4. There is a need to push the forests back toward historic stocking levels, reduce stress during periods of drought, and reduce the risk of bark beetles and stand replacing fire risk to important stand components	Acres of Cover Types Thinned to Historic Stocking Levels	0 acres		Hardwood: 57 acres Conifer: 1,534 acres Mixed: 173 acres	
	Projected Trend of Coulter and Pinyon Pine Composition in Project Area Stands	Continued decline of both species in shrub and hardwood cover types without regeneration. Loss of Coulter pine old growth components in the conifer and mixed cover types.		Temporary increase (5-10 yrs.) in health, vigor, & regeneration of both species in shrub and hardwood cover types. In conifer and mixed cover types, residuals of each species will have sustained increases in health and vigor and some regeneration is expected.	
5. There is a need to push the species compositions toward historic levels by removing shade-tolerant species and maintaining black oak vigor.	Acres of Forest with increased white fir treated (Proportion of Area With Increased White Fir Treated)	0 acres		1,143 acres	
	Trend of Black Oak Species in the Project Area	Black oak would continue to decline in vigor and site occupancy as it is overtopped and out-competed for site resources by conifers		Site occupancy would remain at current levels. Health & vigor would increase. Limited regeneration is expected although stocking levels would generally be too high for robust regeneration	

2.4.2 Issue Consequence Summary

The seven significant issues identified by the public and the Forest Service were addressed in the development of the project alternatives and the Avoidance and Minimization Measures for Wildlife and Plants. Section 3 of this EA ("Affected Environment and Environmental Consequences") analyzes the consequences and effects of the alternatives in terms of these issues; this information is summarized in Table 5.

Table 5. Issue consequence by alternative

	Alternative 1 No Action Issue Effects Summary	Alternative 2 Modified Proposed Action Issue Effects Summary
Issue 1. Snags and Down Woody Debris	High snag and down woody debris levels, in all size classes, are present to meet wildlife needs because of insect mortality. Future snag recruitment is expected to accelerate based upon stand susceptibility to insect and disease mortality. Snag and dead and down woody debris resources will continue to be at risk to wildfire because of this alternative.	Snags and downed woody debris would be removed. However, design prescriptions would ensure that snag and down woody debris levels, in all size classes, would be maintained to meet wildlife needs. Future snag recruitment is expected to reflect historic stand conditions. Fire risk would be diminished to residual snag and dead and down woody debris resources.
Issue 2. California Spotted Owl	No acres of California spotted owl habitat will be directly affected by this action. No immediate impacts to the species are anticipated. However, territories would continue to be at risk of stand degradation due to insect and disease mortality and habitat loss due to wildfire.	The actions may impact individual California spotted owls, but are not likely to cause a trend to federal listing or loss of viability. No actions would occur in PACs. Treatments would be consistent with Conservation Strategy guidelines. In high value habitats, a wildlife biologist would assist in selecting trees for removal in order to try to maintain stand integrity as much as possible. Habitat of all values would have diminished risk from insect and disease mortality and wildfire.
Issue 3. Old Growth	Existing old growth stands would keep their present multi-aged stand structure. Continued risk to trees of all ages and diameters would continue due to insect and disease infestation. Competition for site resources would negatively affect old growth trees as stands become denser. Wildfire would continue to present a significant risk to old-growth stands.	No trees over 18 inches DBH would be removed. The actions would move old growth stands towards their historic open park like conditions. Competition would be reduced for site resources thus reducing susceptibility of residual trees to insect and disease. Wildfire threats to old growth would be diminished.
Issue 4. Live-Tree Diameter Limits	No trees would be removed. Present tree class size distributions would be retained. Stocking would continue to increase.	Trees less than 18 inches DBH would be thinned to bring residual stands towards their historic stocking and diameter distributions.
Issue 5. Riparian Habitats	No direct effects to riparian habitats are anticipated. However, the habitats are at risk to losing vegetative components and stream integrity due to severe wildfire potential surrounding these habitats.	All riparian habitats are excluded from treatment. Design criteria (see Appendix A) have been included to protect these habitats from adjacent treatments. Risk associated with severe wildfire potential is diminished.

	Alternative 1 No Action Issue Effects Summary	Alternative 2 Modified Proposed Action Issue Effects Summary
Issue 6. FS Sensitive Plant Species	Fifty species considered. Six Forest Service Sensitive Species occur in the project area. They are crested milk-vetch, San Antonio milk-vetch, Bear Valley woollypod, Palmer's mariposa lily, lemon lily and short-joint beavertail. The long term effects of Alternative 1 are not known. A wildfire could have both negative and positive effects depending on fire intensity, location and suppression efforts.	Fifty species considered. Six Forest Service Sensitive Species occur in the project area. They are crested milk-vetch, San Antonio milk-vetch, Bear Valley woollypod, Palmer's mariposa lily, lemon lily and short-joint beavertail. Direct and indirect effects expected for these species. However, due to minimization measures, this project may effect but are not likely to adversely affect the above species.
Issue 7. Nelson's Bighorn Sheep; California Spotted Owl	No acres of bighorn sheep or spotted owl habitat will be directly affected by this action. No immediate impacts to these species are anticipated. However, dense brush provides less than optimal forage resources for bighorn sheep and may increase the risk of predation as sheep are less able to detect or escape predators. Owl territories would continue to be at risk of stand degradation due to insect and disease mortality and habitat loss due to wildfire.	The actions may result in temporary disturbance to sheep in the project area. Since the site is dominated by rams, disturbance to ewes and reproductive success are not expected. Vegetation treatments that reduce shrub density will improve bighorn sheep habitat as a result of improving forage conditions, visibility and escape routes. For spotted owls, project activities could disturb roosting birds. This disturbance would be limited to the duration of the treatments. Low to moderate value spotted owl foraging habitat would be modified by vegetation treatments. These modifications would be short term as vegetation is expected to resprout and regenerate over time.

2.4.3 Resource Effects Summary

Table 6 summarizes the environmental effects of each alternative on various biological, physical, and social resources identified by the ID team.

Table 6. Summary of effects to various resources

Resource	Alternative 1	Alternative 2
1) Air Quality	No expected change from current baseline levels. If large-scale wildfire occurs, air quality standards would be exceeded.	Short-term impacts to air quality from prescribed burning are expected. Alternative would not exceed established State Air Quality standards. Would reduce emissions from potential wildfires. No likely cumulative effects.
2) Noxious Weeds/Non-Native Plants	Existing levels of cheat grass would remain and would spread if a high-intensity wildfire occurs. Other invasive species such as yellow-star thistle and Spanish broom could be introduced via emergency equipment and spread due to disturbance after a wildfire. Reestablishment of native communities could be slowed or stopped.	Cheat grass could potentially increase especially in fuelbreaks. Measures to reduce spread during implementation are incorporated in the proposed action. Decreased potential for intense wildfires would limit weed spread. Overall increased domination of the species over native plant communities would decrease.
3) Rare Plants		
Threatened, Endangered, and Proposed Species	Six species considered. There may be effects, but they are not likely to adversely effect	Six species considered. There may be effects, but they are not likely to adversely effect
Region 5 Sensitive Species	Fifty species considered. Six Forest Service Sensitive Species occur in the project area. They are crested milk-vetch, San Antonio milk-vetch, Bear Valley woollypod, Palmer's mariposa lily, lemon lily and short-joint beavertail. The long term effects of Alternative 1 are not known. A wildfire could have both negative and positive effects depending on fire intensity, location and suppression efforts.	Fifty species considered. Six Forest Service Sensitive Species occur in the project area. They are crested milk-vetch, San Antonio milk-vetch, Bear Valley woollypod, Palmer's mariposa lily, lemon lily and short-joint beavertail. Direct and indirect effects expected for these species. However, due to minimization measures, this project may effect but are not likely to adversely affect the above species.
Management Indicator Species	Four species considered. White fir would continue to increase presence. Big Cone Douglas-fir would have no net change. Black oak and Coulter pine would continue to decline.	Four species considered. White fir would be reduced. Big Cone Douglas-fir would have increased vigor and possibly some regeneration. Black oak and Coulter pine would be retained and would experience limited regeneration.
4) Wildlife		
Threatened, Endangered, and Proposed Species	Ten species considered. No direct, indirect, or cumulative effects anticipated on any species.	Ten species considered. No USFWS threatened, endangered or proposed wildlife species or designated critical habitat occurs in the project area. Potentially suitable habitat for the southwestern willow flycatcher does exist in the project area but will not be impacted by the proposed action. Project will not affect any other threatened, endangered, or proposed species.

Table 6. Summary of effects to various resources

Resource	Alternative 1	Alternative 2
Region 5 Sensitive Species	Twenty-five species considered. No effects anticipated to any species. The risk of catastrophic wildfire threatens spotted owl habitat.	Twenty-five species considered. The project may affect individual California spotted owls, Nelson's big horn sheep, pallid bat, western red bat, Townsend's big-eared bat, San Gabriel Mtn. slender salamander, San Diego horned lizard, San Bernardino ringneck snake, San Bernardino mountain kingsnake, coastal rosy boa, and two-striped garter snake, but is not likely to result in a trend toward federal listing or loss of viability for these species.
Management Indicator Species	Four species considered. No effects are anticipated.	Four species considered. For the mule deer, mountain lion and California spotted owl, modification of habitat is anticipated. No modification of song sparrow habitat is expected.
5) Recreation	If mortality due to insects and disease or catastrophic wildfire occurs, the quality of the recreation setting would decrease and recreation use may decline.	Temporary closures during implementation would disrupt OHV use, campers, and hikers. There would be an increased chance for illegal OHV use; however, design criteria of the proposed action would minimize potential illegal use.
6) Scenery	Desired landscape characteristics would be lost should continued insect and disease continue or a catastrophic wildfire occurs.	Views from several trails and roads, including the Pacific Crest National Scenic Trail and the Angeles Crest National Scenic Byway would be impacted. The scenic integrity objective (SIO) is expected to be low during implementation and would transition to high or moderate within 3 years. Areas of fuelbreaks would retain their current scenic integrity objective of high or moderate through implementation and adherence to the Design Criteria specified in the Recreation and Visual Resources Report. However, the potential for a permanent drop of one SIO level is possible in a few areas of the project. Approval by the Forest Supervisor is required to allow for such a deviation. But overall, most, if not all, treatment areas should meet their scenic integrity objectives within 3 years of the project's completion.
7) Soils	No effects	Compaction, displacement, and erosion are anticipated. Effects would be short term, within regional standards, and not significant. Impacts to fines and coarse woody debris would occur with levels of coarse woody debris dropping below recommended levels in the short term. With project design criteria and mitigations, the project would meet soil productivity and soil porosity standards.

Table 6. Summary of effects to various resources

Resource	Alternative 1	Alternative 2
8) Watersheds	Watersheds would be at risk from catastrophic wildfire increasing the risk of significant erosion and landslides.	No municipal watersheds would be impacted. Short-term sediment increases may result, but would not have an appreciable increase to the amount of sediment already stored in the stream channels. First year impacts on 5 subwatersheds would approach threshold limits for cumulative impacts. Long-term impacts would decrease and be within thresholds.
9) Heritage	Potential exists for features of known cultural sites to be impacted by catastrophic wildfire.	No direct effects are anticipated. Indirect and cumulative effects may be beneficial as risk of severe fire is reduced.
10) Social Impacts	Local need of community for wildland fire protection would not be met.	Community fire protection needs would be met. No disproportionate negative effects to minority or low-income communities are anticipated.
11) Economic Impacts	No effects are anticipated. Costs associated with fire suppression of a catastrophic wildfire could occur.	Anticipated costs to the government may reach $12,000,000. Recovery of costs due to sale merchantability of material is not considered.

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3. Affected Environment and Environmental Consequences

3.1 Introduction

This section discusses the environmental consequences of the No Action and the Modified Proposed Action on various resources for which there may be potential direct, indirect and cumulative impacts. For the purposes of this analysis and under federal regulations, "impacts" and "effects" are assumed to have the same meaning and are interchangeable. The affected environment is described for each resource using the purpose and need accomplishments and significant issues, as applicable.

This discussion of environmental consequences is based on detailed analysis prepared and documented in the following reports:

- The Wrightwood Project Fire and Fuels Report (Hall 2005)
- The Wrightwood Project Silviculture Report (Amell 2005)
- The Wrightwood Project Biological Evaluation/Assessment for Animals and Plants and Wildlife/Botany Report (Sue, Welch, Nickerman, Sandburg 2007)
- The Wrightwood Project Air Quality Report (Hall 2005a)
- The Wrightwood Project Recreation and Visuals Report (Spencer 2005)
- The Wrightwood Project Watershed and Soils Report (Overland 2005)
- The Wrightwood Project Transportation Report (North 2005)
- The Wrightwood Project Heritage Report (Nykamp 2005)
- Management Indicator Species Analysis for the Wrightwood Project (Welch 2007)

These reports are located in the project record, on file at the Angeles National Forest Supervisor's Office in Arcadia, CA.

3.1.1 Cumulative Effects Analysis Areas

A cumulative impact is defined under federal regulations as "...the impact on the environment which results from the incremental impact of the action when added to other past, present, and reasonably foreseeable future actions regardless of what agency (federal or non-federal) or person undertakes such other actions. Cumulative impacts can result from individually minor but collectively significant actions taking place over a period of time" (40 CFR 1508.7).

The cumulative effects analysis in this EA evaluates the significance of the No Action's and Modified Proposed Action's contributions to cumulative impacts on environmental resources within specified Cumulative Effects Analysis Areas (CEAAs) (see Table 7). The boundaries of any given CEAA will vary with each resource, based on the geographic or biologic limits of that resource (see Table 7). As a result, the list of projects considered under the cumulative analysis may vary according to the resource being considered. (See also Section 1.5, Past, Present, and

Reasonably Foreseeable Actions in the Project Area.) In addition, the length of time considered in the cumulative effects analysis will vary according to the duration of impacts from the Action on a particular resource.

Table 7. Cumulative Effects Analysis Areas (CEAA) by Resource

Resource	CEAA[1]
Forest Vegetation	Wrightwood and Boundary Ridge project areas and adjacent stands
Fire and Fuels	San Gabriel Mountain Range
Air Quality	Antelope Valley and Mojave Desert Air Quality Control Districts
Noxious Weeds & Non-native Weedy Plants	Action Area (area including all direct and indirect effects) as defined in resource report
Rare Plants	Action Area (area including all direct and indirect effects) as defined in resource report
Wildlife	Action Area (area including all direct and indirect effects) as defined in resource report
Soils	Treatment units within the project area
Watershed	USGS 7th code HUC watersheds and finer scale sub-watersheds
Recreation and Scenery	Visual Nature Studio (VNS), a three-dimensional visualization-modeling program was used to portray the changes in the landscape that would take place. The models can be found in resource report.
Heritage Resources	Area of Potential Effects (APE) project area, and a one-mile buffer surrounding the entire project area.
Social and Economic Resources	Los Angeles and San Bernardino Counties, California (county information)
Transportation System	Project area and the extent to which main haul roads effect communities

[1]Detailed descriptions of CEAAs can be found in the resource reports, on file in the project record.

The cumulative effects analysis was accomplished through the following three steps:

- Step 1: Create a list of all past, present and reasonably foreseeable actions within the San Gabriel Mountain Range and produce a map depicting this (list and map are contained in project file);
- Step 2: Define CEAAs by resource. Each resource specialist defined the CEAA for their resource the report (see resource reports in project file);
- Step 3: Summary of Cumulative Effects: Identify and quantify the location of possible specific impacts from the Modified Proposed Action and analyze these contributions to the overall impacts.

3.2 Forest Vegetation

This section summarizes data from the Wrightwood Silviculture Report (Amell 2005). Details on methodology of analysis and the affected environment are disclosed in the report, which is on file in the project record.

3.2.1 Purpose and Need Accomplishment and Issue Tracking

Purpose and need accomplishments (see Table 6) discussed in this section include:

Accomplishment 4 - There is a need push the forests back toward historic stocking levels, reduce stress during periods of drought, and reduce the risk of bark beetles and stand-replacing fire risk to important stand components;

Accomplishment 5 - There is a need to push the species compositions toward historic levels by removing shade-tolerant species and maintaining black oak vigor.

Significant Issues (see Table 5) discussed in this section include:

Issue 3. Old Growth. There is a concern that the silvicultural prescriptions will not maintain or contribute toward old-growth conditions for decades.

Issue 4. Live-Tree Diameter Limits. There is a concern that the proposed prescriptions remove large-diameter live trees in excess of what is needed for fuels reduction or forest health.

3.2.2 Affected Environment

Forest Composition, Structure, and Stand Distributions

The forest in the Wrightwood project area is ecologically similar to other southern California forests. It is typified by a mix of conifers, oaks, and chaparral species with fire as the primary agent of vegetative change. Common species include Jeffery pine, white fir, sugar pine, Coulter pine, single-leaf pinyon pine, black oak, canyon live oak, Joshua tree, sage brush, scrub oak, manzanita, and birchleaf mountain mahogany. The four primary vegetation types found in the project area are hardwoods, shrubs, conifer and mixed-conifer, and hardwoods (see Cover Type/Slope Break Map in Appendix D). Together, these represent 89 percent of the private and National Forest System lands in the analysis area.

Tree diameter distributions of the forested stands in the Wrightwood area are very different from representative historic distributions. Figure 7 displays the diameter distribution of trees in a representative site in the Wrightwood area.

Figure 6. Most stands in the project area have changed from their historic (pre-fire suppression), open and "park-like" appearance into dense stands with prominent understory and mid-story.

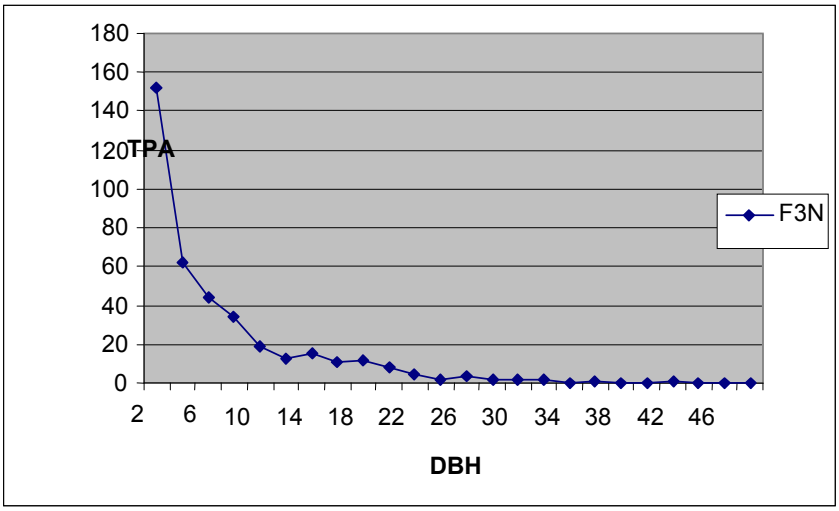

Figure 7. The diameters of trees in the Wrightwood project area (F3N) are concentrated in the lower diameter classes, rather than evenly distributed in all sizes. (TPA=trees per acre).

In the Wrightwood project area, the number of trees per acre in each two-inch diameter class below 22 inches DBH (diameter at breast height) is higher than what we would expect to see in pine-dominated forests historically maintained by frequent and low-intensity fires. In addition, stocking in white fir in the smaller size classes is higher than would occur historically with normal disturbance such as wildfire.

Bark Beetle-related Mortality and Strategies to Reduce Future Mortality

As mentioned previously, the Wrightwood project area has experienced significant tree mortality due to bark beetles. Although recent yearly bark beetle-caused mortality rates are moderate, the impact of years of reoccurring moderate levels of bark beetle mortality could result in the loss of a large portion of the old-growth pine, greatly increasing fuel levels and the risk of high-severity fire. Surveys in 2002, 2003, and 2004 found a progression of mortality through the project area (see Mortality Aerial Survey Map in Appendix D) (Amell 2005).

Bark beetle risk in the Wrightwood area has been shown to be related to high stand densities. Thinning stands to reduce densities and stocking levels will lower the risk of bark beetle infestations (Amell 2005).

Old Growth

Old-growth descriptions for the Jeffrey pine and Jeffrey pine/white fir mixed-conifer forest types found in the Wrightwood project area can be found in "Ecological Characteristics of Old-Growth Jeffrey Pine in California" (Potter et al. 1992) and "Preliminary Ecological Old-growth Definitions for Mixed-Conifer (SAF type 243) in California" (Fites et al. 1991). Using these

definitions, all Jeffrey pine and Jeffrey pine/white fir stands found in the project area can be classified as old growth.

Management Indicator Tree Species

The Forest Vision (USDA Forest Service 2005a) defines several tree species found in the project area as management indicator species (MIS). MIS species are used to indicate the effects of management activities over the entire planning area as defined by the Forest Plan.

Bigcone Douglas-fir is present in portions of the project area as a scattered and very minor component of Jeffrey pine or Jeffrey pine and white fir-dominated stands. It is generally healthy with very low levels of disease and mortality. Most of these trees are mature to old (greater than 100 years old) with understory regeneration almost absent.

California black oak is a minor midstory and understory species. It is generally being overtopped and out-competed by conifers except for small areas where site conditions favor black oak. Due to the competition with conifers and high numbers of trees, black oak tree vigor is poor and declining. Reproduction is sparse (fewer seedlings and saplings than larger trees observed).

Coulter pine occurs sporadically on harsher sites such as the top of Blue Ridge or as a codominant species in drier conifer stands. In the project area, Coulter pine is generally old (greater than 75 years old) with poor vigor. Regeneration is very sparse. Recent drought and bark beetle activity has impacted Coulter pine more than other conifer species resulting in a high level of mortality (estimated 20 percent or greater).

3.2.3 Environmental Consequences

Alternative 1 (No Action)

Direct and Indirect Effects

With no treatment, the chaparral shrub stands (see 1.3.1, Existing Conditions) would continue to age, and dead material would continue to accumulate, increasing volatility of the shrub fields. There would continue to be only old chaparral shrubs on Angeles and San Bernardino National Forest lands in the project area. Diversity of age classes would continue to be low in the project area. In the hardwoods, trees would continue to die at low levels. The stands would continue to age, and there would be no young or newly establishing hardwood stands in the project area. With mortality in the pines, stands on the cooler and moister mixed-conifer sites would continue to progress from dominance by pine toward dominance by white fir.

With no treatment, chaparral shrubs would become volatile, and black oak stands would continue to decline. Conifer forests would be further stressed by drought and overcrowded stands. The number of trees killed by bark beetles would likely increase, especially in larger pine trees within old growth stands.

Diameter distributions would remain the same as the existing conditions. Bark beetle risk would remain high and bark beetle-caused mortality could increase. The greatest risk would be to Jeffrey pine and Coulter pine. The area supports a relatively

large and isolated expanse of old-growth Jeffrey pine forest that has transitioned from an old single-story structure to an old multiple-story structure with the absence of frequent fires. With no action taken to reduce stocking and bark beetle risk, it is expected that bark beetles would continue to affect these stands.

Bigcone Douglas-fir would likely not be heavily impacted by bark beetles or influenced by the dense stand conditions since this species regenerates well in shady conditions.

Black oak, where it occurs with conifers, would continue to decline in vigor and presence as it is out-competed by conifers. Dwarf and leafy mistletoe would continue to spread in infected stands, increasing tree stress and mortality. There would continue to be very small inclusions of black oak within many stands on small sites incapable of growing conifers. Bark beetle mortality would most likely be extensive in the pine component over most of the area. With the abrupt loss of many of the old-growth Jeffrey pine and Coulter pine trees to bark beetles, the stands would no longer be considered old growth.

Cumulative Effects

East of Wrightwood, the Lone Pine Canyon Fuels Reduction Project on the San Bernardino National Forest would convert about 3,300 acres of chaparral to an early-seral (young, regenerating) stage. Over the entire Angeles National Forest, fires within the last 10 years have cumulatively involved about 2,044,914 acres of all vegetation types. South and east of Wrightwood, wildfires have burned substantial acreages of shrubs within the last 10 years; in 2004, a wildfire east of Wrightwood on private land burned a small acreage of chaparral. Most of this acreage is not on the Angeles National Forest and is not used to determine chaparral age-class diversity on the Angeles National Forest.

The only other proposed treatment in the vicinity of the Wrightwood Project affecting the shrub vegetation on the Angeles National Forest is the Big Pine Fuel Reduction project, which would convert about 130 acres of chaparral shrubs to an early-seral stage. As mentioned previously, under the No Action Alternative for the Wrightwood Project much of the chaparral in the Wrightwood project area would continue to age and would not meet the need to diversify chaparral age structure on the Angeles National Forest.

Within the Lone Pine Canyon project area and the areas burned by wildfires south and east of Wrightwood, there are areas containing hardwood stands. Age-class diversity in hardwood stands within the Wrightwood Project area would remain low with no young stands present. In the Big Pines Fuel Reduction Project, about 47 acres of oak forest is being thinned. This represents only 0.1 percent of the oak hardwood forest on the Angeles National Forest. Within the last 10 years, wildfires have involved about 23 percent of the hardwood stands on the Angeles National Forest and possibly converted them to newly establishing stands.

Within the project area on about 494 acres of conifer forest, timber harvests about 30 years ago removed a portion of the overstory, retaining most of the overstory trees and doing nothing to reduce the number of trees per acre in the understory. Also, on the San Bernardino National

Forest in Slover Canyon, about 53 acres of similar treatments took place. These treatments had little effect on stand structures, species compositions, and stocking levels.

Treatments are currently proposed in the conifer and mixed-conifer vegetation for several areas near or adjacent to the project area: 1) Highway 2 Dwarf Mistletoe Control, 2) Big Pines Dwarf Mistletoe Control, and 3) Big Pines Fuel Reduction. The first two projects concentrate upon removing dwarf mistletoe-infected trees immediately adjacent to highways and will have little effect upon reducing bark beetle risk. The second project mentioned is entirely within the area covered by the Big Pines Fuels Reduction project. The Big Pines Fuels Reduction project will reduce stocking on about 760 acres of conifer and mixed-conifer vegetation immediately adjacent to the Wrightwood Project area on the northwest side. These projects will reduce bark beetle activity in some stands to the west and northwest of the Wrightwood project area and provide some small measure of protection to stands in the project area; however they will have no effect on reducing stocking and risk within the project area itself, which is the main factor contributing to bark beetle mortality there.

Under the No Action Alternative, age-class diversity in hardwood stands within the Wrightwood Project area would remain low with no young stands present. Bark beetle activity would be reduced on some stands adjacent to the project area, but would have no effect on stocking levels within the project area.

Alternative 2 (Modified Proposed Action)

Direct and Indirect Effects

The Modified Proposed Action would convert about 334 acres of chaparral to a younger stage of growth. This is about 54 percent of the chaparral in the project area, and about 0.8 percent of the chaparral in the Angeles National Forest. In the treated areas, shrub coverage would be reduced to about 15 percent old shrubs, with the remaining shrubs reduced to a younger stage. Cut or masticated shrubs would quickly resprout, and within about five to ten years, coverage would approach pretreatment levels. Treatments in the birchleaf, mountain mahogany and scrub oak stands would thin the shrubs to open shrub patches, but would not convert the shrub patches totally to early seral. The cut shrubs would also quickly resprout, and the shrub stands would be distinctly two-storied with both old and young shrub components.

If the Modified Proposed Action was implemented, chaparral would be less volatile, and the potential for crown fire in conifers would be reduced. Growth and vigor of trees left on site would increase, and bark beetle risk would be reduced. Tree diameters would be distributed more evenly throughout the stands, and old growth would more closely resemble historic stand conditions.

In hardwood stands, the potential for crown fire would be reduced, and growth and vigor of the residual trees would be increased. Bark beetle risk in the conifers within the stands would be reduced as tree vigor increased. The general appearance of these stands would be as a very open hardwood savanna with individuals

and small patches of pine trees. Shrub patches would be reduced to about 15 percent coverage. Reducing the tree and shrub coverage would enhance the development of herbaceous vegetation. Within five to ten years, the oak stands would be two-storied with a heavy understory of young oak stems and shrubs.

In the fuelbreak, trees would be thinned to 20-foot crown spacing in both commercial and precommercial thinning to ensure adequate spacing between tree crowns. The thinning would reduce tree densities but most of the larger trees would be retained. The thinning would also retain an uneven-aged distribution, but the tree spacing would conform to the 20-foot crown spacing requirement. This would result in some small, heavily stocked groups of large trees remaining. Treatments in all sizes would retain all species present, but the composition would be pushed toward dominance by pines and Douglas-fir, if present. White fir would be greatly reduced. As in the hardwood stands, shrubs would be reduced to about 15 percent ground coverage.

In areas to be thinned outside of the fuelbreaks, about 1,320 acres would be commercially and/or precommercially thinned. The stands would be thinned to a level that would allow for minimal competition between trees, and allow for optimal growing conditions. The commercial thinning would concentrate upon cutting less than 18-inch diameter trees. This would result in some small, heavily stocked groups of large trees remaining. The thinning would not have the rigid spacing requirement of the fuelbreak, and it is expected that tree spacing would vary greatly.

Diameter Distributions and Old Growth

The treatments would create a diameter distribution and stocking levels closely reflecting historic levels (see Figure 8). Additionally, it would greatly reduce white fir and push species dominance back toward Jeffrey Pine. Following the treatments, all old growth stands would still be classified as old growth. The nature of the old growth would change, however, as the stands are pushed back toward the more historic and open structures, stocking levels, and species compositions. Within the project area, white fir would be reduced in about 1,143 acres of stands where white fir is proliferating in the understories and midstories.

Under the Modified Proposed Action, white fir would be reduced, and would push species dominance back toward Jeffrey Pine. Due to diameter limit, very few larger trees would be removed, and old growth stands would still be classified as old growth.

Treatments would retain all species present, but would favor Coulter pine, black oak, and Douglas-fir, over Jeffrey pine and white fir, which would maintain these species at their current levels.

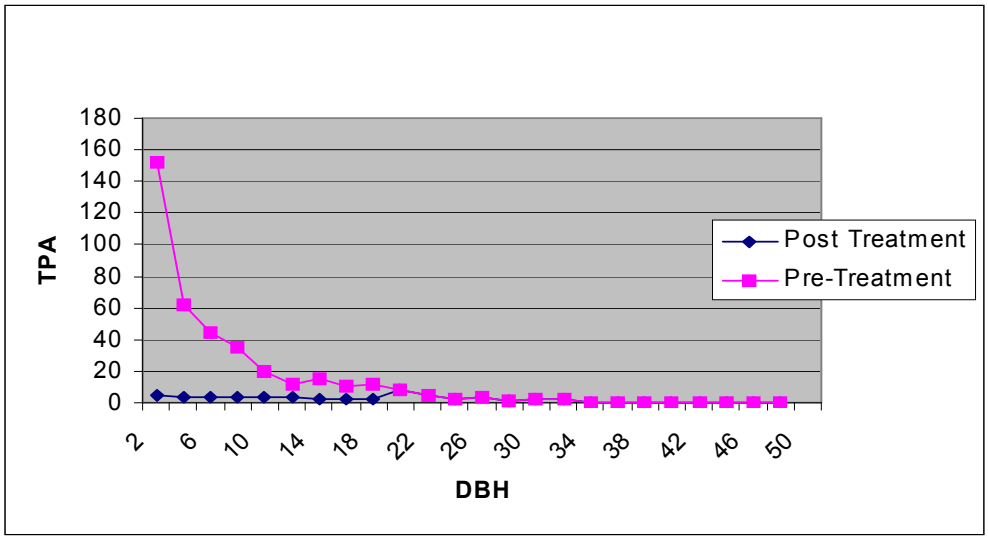

Figure 8. Trees per acre by two-inch diameter class before and after treatment

Management Indicator Species

Bigcone Douglas-fir would be favored for retaining over other species during thinning. Reduced tree stocking and competition for site resources would improve tree vigor and prolong the lives of mature trees. Thinning and prescribed burning would open up forest canopies and prepare sites for the establishment of seedlings. However, the magnitude of the regeneration would not be great because the stands would only be thinned with jackpot or handpile burning. The regeneration would be at approximately replacement level only and would not greatly increase future site occupancy of the species.

The treatments under Alternative 2 would increase black oak tree vigor, and slightly increase black oak regeneration, resulting in the maintenance of the species on the landscape. During thinning, black oak would have precedence for retention over competing Jeffrey pine and white fir. In places, the forest would be opened up sufficiently to allow black oak seedlings to become established, increasing understory stocking to some degree. The amount of area stocked with black oak probably would not increase because the post-treatment uniform conifer stocking surrounding the current black oak would continue to inhibit regeneration of black oak.

Treatments under the Modified Proposed Action would retain Bigcone Douglas-fir and Coulter pine, and increase black oak tree vigor.

Coulter pine is growing in the montane conifer stands in two general scenarios. In the moister montane conifer stands, proposed treatments would favor retaining Coulter pine over other species (i.e., Jeffrey pine, white fir, and singleleaf pinyon pine). By reducing competition in the under- and mid-stories, thinning would increase vigor of the remaining Coulter pine, reduce bark beetle risk, and prolong life expectancy. Prescribed burning would prepare sites by reducing competing vegetation and organic material layers. Opening up of forest canopies and preparing sites would increase the potential for Coulter

pine to regenerate, but only slightly due to the amount of trees that would be left on site. Treatments would likely maintain Coulter pine at its current and historical level and range of site occupancy.

In the drier transition zone stands, proposed tree thinning would favor retaining Coulter pine over Jeffrey pine and singleleaf pinyon pine. Treatment units involved would be units 106 (17 acres), 107 (10 acres), and 132 (13 acres). Understory canyon live oak and chaparral shrubs would be thinned or reduced by mastication. The proposed treatments would reduce competition and bark beetle risk to the remaining mature Coulter pine trees, prolonging their life expectancy. The few mid- and understory Coulter pine trees present would be protected from the risk of wildfire, allowing them to mature and become seed sources for regenerating the species. Prescribed burning and mechanical treatments to reduce chaparral shrubs would prepare sites for the establishment of conifers. Protection of remaining mature and immature Coulter pine and an expected increase in regeneration would push the species back toward its pre-bark-beetle-mortality level of site occupancy in these stands.

Bark Beetle Risk

Proposed thinning treatments would help trend the various vegetation types toward historic stocking levels. Following treatment, the stands would be much more open and at low risk to bark beetles. Reducing the shrub coverage would temporarily enhance the growth and vigor in residual trees and reduce the risk of losing the minor Coulter pine and single-leaf pinyon pine components to bark beetles in the hardwood cover types. Thinning in the conifer and mixed-conifer vegetation would reduce stocking, increase tree health and vigor, and greatly reduce the susceptibility of these stands to future bark beetle infestations.

Untreated stands in conifer stands would remain at a high risk to bark beetles. Bark beetle mortality would probably reduce stocking in these stands and a large portion of the mortality would be in the larger pine trees. Of greater concern are the stands in the west portion of the project area, for example, the area west of Mountain View Camp. These stands are uniformly and heavily stocked and at high risk of bark beetle mortality. It is likely that bark beetle-caused mortality would increase and be high in these stands in the near future. However, this area and other unthinned patches are generally surrounded by stands proposed for thinning. Bark beetle outbreaks within the unthinned stands would be relatively small and contained, since the trees in thinned stands surrounding the unthinned areas would be more vigorous and better able to resist the bark beetle attacks.

Proposed thinning in the conifer and mixed-conifer vegetation would reduce stocking, increase tree health and vigor, and greatly reduce the susceptibility of these stands to future bark beetle infestations.

Cumulative Effects

South and east of Wrightwood, wildfires have burned substantial acreages of shrubs within the last 10 years, and in 2004, a wildfire east of Wrightwood on private land burned a small acreage

of chaparral. Most of this acreage is not on the Angeles National Forest and is not used to determine chaparral age-class diversity on the Angeles National Forest.

Since spring 1995, about 6,869 acres of the semi-desert and mixed-chaparral vegetation found in the Wrightwood project area on National Forest System lands have been converted to an early growth stage. This amounts to about 15 percent of this vegetation type on the Angeles National Forest.

The treatments proposed in the Wrightwood Project would convert about 0.8 percent of the mixed and semi-desert chaparral on the Angeles National Forest to a younger stage. The treatments would only slightly change age-class diversity in chaparral on the landscape. On the San Bernardino National Forest, proposed treatments would increase early growth chaparral in the Cajon watershed by only 0.5 percent.

The Big Pine Highway project would convert a small acreage (130 acres) of mixed chaparral shrub to a younger stage. In addition, the Lone Pine Canyon Fuels Reduction Project on the San Bernardino National Forest would convert about 3,300 acres of chaparral to a younger stage. In both projects, proposed treatments would increase early seral by very small amounts.

Following proposed treatments, maintenance activities would likely occur on existing and planned fuelbreaks. These activities would result in about 222 acres of the shrub vegetation being managed perpetually in an early growth condition, contributing a small amount to maintaining the early growth condition on the Angeles National Forest. If no other activities occur within the project area, after ten years the fuelbreaks would contain the only early growth shrubs in the project area.

Although most of the high-risk and heavily stocked Jeffrey Pine-dominated stands would be thinned, there would likely be an increase in bark beetle activity on the remaining high-risk stands within and adjacent to the project area. However, most of the Jeffrey Pine old growth stands would not be affected by bark beetles.

In the Big Pines Highway project, about 47 acres of oak forest is being treated. Both projects would result in only about 162 acres of oak forest being thinned in the vicinity of Wrightwood and converted to an open oak savanna. This represents only 0.3 percent of the oak hardwood forest on the Angeles National Forest. Future fuelbreak maintenance activities would keep about 15 acres of this vegetation in an open oak savanna condition. Since the oak forest is being thinned, it would not increase the proportion of regenerating hardwood forest on the forest.

Conifer stand treatments adjacent to the Wrightwood and Boundary Ridge project areas that are planned to take place are the: 1) Big Pines Dwarf Mistletoe Control Project 2) Dwarf Mistletoe Control Project, 3) Big Pines Highway Project, and the Big Pines Fuels Reduction. The first two projects concentrate upon removing dwarf-mistletoe-infected trees immediately adjacent to the highways and would have little effect upon reducing stocking and bark beetle risk. The Big

Pines Highway Project would reduce stocking on about 760 acres of conifer and mixed-conifer vegetation immediately adjacent to the Wrightwood project area on the northwest side. This project would thin stands from below and would not remove many large and old trees. Conifer stands north of the Wrightwood area would be unthinned; however, most of the unthinned stands to the north are dominated by pinyon pine with a relatively small proportion of them being stands of Jeffrey pine and Coulter pine.

The cumulative effects of all treatments would be that within the Wrightwood and Boundary Ridge project areas, most of the high-risk and heavily stocked Jeffrey pine-dominated stands would be thinned and become low risk. However, some stands would remain at high risk. The high-risk stands within and next to the project area would probably have increased bark beetle activity, but most of the Jeffrey pine old-growth stands within the project area would be resistant to bark beetles and would be little affected. The value of treated stands as old growth due to tree thinning in the all projects would change little because large trees would not be cut (except for large trees removed for safety and forest health purposes). Treated stands would be pushed from a relatively dense and multi-story old growth back to a more historic open and single-story old growth.

Future fuelbreak maintenance activities would keep understory trees and shrubs to low levels of coverage on about 324 acres. The shrubs would be maintained in a young condition, but because these are primarily forested stands, the low coverage shrub vegetation would not contribute toward Forest goals for younger, regenerating stands. Stands within these areas would remain low risk.

The treatments described above address changes in density, structure and species composition. They are very similar to the “comprehensive restoration treatments” discussed by Fiedler et al. (2004). In their study, Fiedler et al. (2004) found the comprehensive restoration treatments to be significantly more effective at reducing fire hazard than thin-from-below treatments.

3.3 Fire and Fuels

Due to tree mortality occurring in the project area, a fire behavior assessment was conducted for the Wrightwood area. This analysis compares fire regimes, condition classes, fuel loading, and fire hazard/fire behavior characteristics to measure the difference between existing and post-treatment conditions. See the Fire and Fuels Report (Hall 2005) for more details on methodology and analysis. The full report is located in the project record, on file at the Angeles National Forest Supervisor's Office in Arcadia, CA.

3.3.1 Purpose and Need Accomplishment and Issue Tracking

Purpose and need accomplishments (see Table 6) discussed in this section include:

Accomplishment 1 - There is a need to reduce wildland fire behavior potential in the shrub and conifer/mixed-conifer stands to reduce fireline intensity and ensure firefighter safety.

Accomplishment 2 - There is a need to move Condition Class 2 and 3 fuels types in the project area towards Condition Class 1.

Accomplishment 3 - There is a need to develop or reestablish fuelbreaks surrounding Wrightwood and facilitate treatments on private lands.

Significant issue (see Table 5) discussed in this section:

Issue 4. Live-Tree Diameter Limits - There is a concern that the proposed prescriptions remove live tree diameter size classes in the large-diameter size class in excess of what is needed for fuels reduction or forest health.

3.3.2 Affected Environment

Fire Regimes

The project area historical fire regime is classified as Fire Regime I (see Fire Regime text box in Section 1.3.2, Desired Future Conditions). The conifer and mixed-conifer/hardwood woodland stands in the project area are presently characterized as Fire Regime V. Field observations indicate that ladder fuels that initiate and maintain crown fire are developing in this vegetation type. High stocking levels and tree mortality discussed in the Forest Vegetation section can lead to larger wildfire size, intensity, and severity (Hall 2005). Based on recorded fire history, only a small proportion of the project area has burned since 1928, resulting in the conifer and mixed-conifer stands missing one or more fire return intervals. Consequently, a wildfire initiating within the project area today would likely become more severe than in the past (Hall 2005). Historically, the fire return interval in southern California montane conifers averaged 30 – 50 years (Everett 2003). Before suppression, Fire Regime I was prevalent in the montane conifer forests. However,

Montane conifer forests are at risk for stand replacing fires due to increased tree densities, and surface and ladder fuels brought about by fire exclusion.

due to the success of suppression, these fires have moved from the historic Fire Regime I into Fire Regime V (Hall 2005).

Generally, the shrub vegetation in the project area is currently characterized as Fire Regime IV (Hall 2005). The chaparral shrub fields in the Wrightwood project area are considered old, with some degree of mortality occurring. Based on past fire history, most chaparral shrub fields in the project area are estimated to be at least 27 years old, even-aged, dense, and within the WUI defense and threat zones surrounding Wrightwood (Hall 2005). High-intensity, stand-replacing fires have burned chaparral for millennia, and except for areas of unusually high ignition rates at the urban interface or next to major transportation routes, the interval between fires probably has changed little from prehistoric times. Thus, unlike montane conifer forests in Fire Regime I, fire sizes and intensities in chaparral generally remain within the natural range of variability (USDA Forest Service 2005a, p.26). It is believed that historic and prehistoric fire-return intervals in chaparral likely ranged from 40 to 60 years (Minnich 1988 in USDA Forest Service 2005, p.95).

These stands of chaparral are considered to be even-aged, dense and are within the WUI defense and threat zones surrounding Wrightwood.

Condition Class

Condition classes categorize how much key ecosystem components such as species composition, structural stage, and stocking levels have changed in an area due to changing fire regimes (see Condition Class text box in Section 1.3.1, Existing Conditions). One or more activities such as fire exclusion, insects and disease, and past management activities can cause a change in fire regimes (Schmidt et al. 2002).

A general analysis conducted by the California Department of Forestry and Fire Protection, Fire and Resource Assessment Program (FRAP), indicates that the project area is considered primarily within Condition Classes 2 and 3 (CDF 2003). Table 8 shows estimated acres by condition class in the Wrightwood project area. See also the Condition Class Map in Appendix D.

Table 8. Existing condition class of the project area

Condition Class	Existing (Acres)	% of Project Area
Condition Class 1	455	6%
Condition Class 2	2,546	33%
Condition Class 3	3,635	47%
Non-forest	1,152	14%
Totals	7,788	100%

Fuel Loading

Fuel loading is one of the many factors considered in the ability of firefighters to construct fireline to control wildfire. Estimated surface fuel loading in the conifer-mixed conifer vegetation ranges from 5.3 – 11.9 tons/acre. These loadings do not include litter or duff. Tonnages in this vegetation type are considered to be relatively low and not a significant factor in the ability to suppress wildfire (Hall 2005).

The estimated fuel loading in the shrub vegetation is 13.5 – 22.5 tons/acre. Fuel loading in this vegetation type is considered high and a significant factor in the ability of firefighters to construct fireline to control wildfire (Hall 2005).

Fire Hazard and Fire Behavior in the Project Area

Analysis of fire hazard and fire behavior for the Wrightwood Project used the following measurement indicators:

- Increased canopy base height in the conifer vegetation as measured in feet;
- Reduced fireline intensity as measured by flame length in feet;
- Changed fire type, as illustrated by surface fire, passive crown fire and active crown fire.

Canopy base heights were modeled to estimate crown fire potential. Canopy base height is one factor that can be measured to evaluate susceptibility to crowning. Fireline intensity is widely used as a means to relate visible fire characteristics and interpret general suppression strategies. A visual indicator of fireline intensity is flame length (DeBano et al. 1998). Table 9 compares fireline intensity, flame length, and fire suppression difficulty. Fire type (surface fire/passive fire/active crown fire) is used as an indication of fire severity.

Fuel loading is one the many factors considered in the ability of firefighters to construct firelines to control wildfire.

Table 9. Fireline intensity interpretations (based on Rothermel 1983)

Fireline Intensity	Flame length	BTU/ft/sec	Interpretations
Low	<4 feet	Less than 100	Direct attack at head and flanks with hand crews, handlines should stop spread of fire
Low-Moderate	4-8 feet	100-500	Employment of engines, dozers, and aircraft needed for direct attack, too intense for persons with hand tools
Moderate	8-11 feet	500-1000	Control problems, torching, crowning, spotting; control efforts at the head are likely ineffective
High	> 11 feet	Greater than 1000	Control problems, torching, crowning, spotting; control efforts at the head are ineffective

Fire behavior modeling was conducted to evaluate the existing condition. Table 10 shows the potential range of existing fire hazard and fire behavior generalized by vegetative cover type within the project area (Hall 2005).

Table 10. Alternative 1 - Existing potential fire behavior by vegetation type

	Conifer/Mix	Shrubs
Flame Length (feet)	3.6 – 7.2	23.8 - 44
Canopy Base Height	5 – 11	N/A
Fire Type	Surface to Active Crown	Passive to Active Crown**
Fireline Intensity*	Low to High	High

* See Fireline intensity interpretations for Low to High ratings in Table 9.
**The model does not display Fire Type in the shrub component; however, passive to active crown fire is likely, based on local history.

Fire behavior modeling of the existing conditions suggests that if a wildfire should occur during very high fire danger conditions, high-intensity fires could take place in all vegetation types.

Under the existing condition in the conifer-mixed-conifer vegetation, wildfire would vary from surface to passive crown fire. This means that fires may spread through surface fuels, and individual or small groups of trees may torch out. Fire modeling within the project area did not indicate that solid flaming canopy was likely except for short periods in the conifer. Ignitions in the mature chaparral shrub areas would likely cause intense fires, while fire starts in the younger chaparral would be more effectively controlled and fires would remain relatively small (hundreds of acres vs. thousands of acres). Fire behavior modeling also suggests that, should a wildfire occur during very high fire danger conditions (90th percentile weather), high-intensity fires could take place in all vegetation cover types.

A spatial analysis of existing wildland fire potential, using the FlamMap model, was also conducted over the project area (see Appendix D of the Fire and Fuels Report, Hall 2005). Table 11 shows that approximately 37 percent of the project area is predicted to have low fireline intensity, and about 63 percent of the project area could range from low-moderate to high fireline intensity.

Table 11. Existing potential fire behavior resulting from FlamMap model

Existing Condition			
Intensity	Flame Length	Acres	Percent Project Area
Low	<4 feet	2,890	37
Low-Moderate	4-8 Feet	2,973	38
Moderate	8-11 Feet	858	11
High	>11 Feet	1,067	14
Total		7,788	100%

Within the community of Wrightwood, there are areas where tree canopy is dense, tree crowns are touching, and ladder fuels are present. Houses serve as a fuel component within these stands. It is difficult to model fire behavior of vegetation intermingled with structures; however, it is likely that fire could spot from house to house under severe weather conditions. Defensible space varies among structures in the Wrightwood area. Inadequate defensible space around structures has been identified as a major factor in destruction of homes in wildfires. Studies indicate that treatment focused on structures and their immediate surroundings can be effective (Cohen and Saveland 1997, Cohen 1999, 2000, 2002; Scott 2003). They also indicate that some treatments on National Forest land may reduce fire intensity, crown fire potential, and spotting, but not directly protect homes unless those treatments were in close proximity.

3.3.3 Environmental Consequences

Alternative 1- No Action

Direct and Indirect Effects

Under the No Action Alternative, there would be no direct effects because fuel reduction and forest health treatments as proposed would not occur in the Wrightwood project area, a federally designated Community at Risk. Under this alternative, no progress would be made towards the desired condition, and vegetation would continue to trend toward Condition Classes 2 and 3. Effective fire suppression would continue to be implemented with the "control" response on all fires in all locations.

Under this alternative, fireline intensities and fuel loading are likely to increase in the conifer/mixed-conifer vegetation. Tree mortality is likely to continue and increased understory vegetation in these stands would result in increased fuel ladders, torching, and crown-fire activity. Wildfires that escape initial attack (usually those burning under severe conditions) would likely become larger and more damaging.

With no action, fire behavior potential will increase. Wildfires in severe weather conditions would likely become larger and more damaging.

As discussed in Section 1.3.1, Existing Conditions, the chaparral shrub fields in the Wrightwood project area are considered old and dense. With no treatment, there would be no age diversity in the chaparral to improve effectiveness of fire suppression, especially in key areas near structures. These stands would continue to age, and dead material would continue to accumulate, increasing volatility of the shrubfields. Without fuelbreaks surrounding Wrightwood, firefighters would have no strategic place to defend against an oncoming fire.

Cumulative Effects

Under the No Action Alternative, the factors influencing fire behavior in the area surrounding Wrightwood would not be significantly changed; this situation would continue to put the forest and the Wrightwood community at risk as discussed under the existing condition. Past, present and foreseeable actions that reduce fire behavior and protect the community amount to approximately 0.81 percent of the analysis area (see Table and Section 3.1.1, Cumulative Effects Analysis Areas). Analysis shows that this level of activity would not significantly change fire behavior (Hall 2005).

With no action, potential wildfire behavior would not be significantly changed and would continue to put the forest and the Wrightwood community at risk.

The No Action Alternative would not be consistent with Forest Plan management direction and other regulatory direction as outlined in the beginning of this EA. Values on private land and in the National Forest would not be as well protected as they could be because fire activity that occurs in the project area could still present a risk to resources and adjacent private lands.

Alternative 2 – Modified Proposed Action

Direct and Indirect Effects

Proposed activities are expected to move the condition classes in the project area towards Condition Class 1 (Table 12 12). Treatments in the chaparral type are expected to contribute to age class diversity, break up fuel continuity, improve evacuation routes, and reduce overall fire intensity. Modeling was conducted to determine potential fire behavior characteristics after treatment. Table provides estimated potential fire behavior outputs resulting after proposed treatment has been applied for each cover type.

Table compares fire behavior outputs before treatment (Alternative 1) and after treatment (Alternative 2), using the FlamMap model. The model indicates that after treatment, approximately 45 percent of the project area would achieve low-intensity fireline criteria (see Appendix E of the Fire and Fuels Report, Hall 2005). Modeling demonstrates that canopy base height would be elevated from the existing condition, reducing the chance that a surface fire would transition into the live tree crowns.

By reducing the standing vegetation, fire behavior is reduced which enables suppression forces to better contain a fire. The proposed fuelbreak around Wrightwood would provide firefighters with a strategic place to defend against an oncoming fire.

Mastication in the shrub vegetation would leave chewed up debris on the ground. The overall benefit of reducing the standing vegetation is that crown fire is less likely. This means that aerial-delivered retardant can reach the ground, reducing intensity along control lines or slowing fire spread, which better enables suppression forces to contain the fire. The proposed fuelbreak around Wrightwood would provide firefighters with a strategic place to defend against an oncoming fire.

Table 12. Condition Class of the project area pre and post treatment

Condition Class	Pretreatment % of Project Area	Post-treatment % of Project Area
Condition Class 1	6	35
Condition Class 2	33	23
Condition Class 3	47	28
Non-forest	14	14

Table 13. Alternative 2 - Fire behavior by cover type

	Conifer/Mix		Shrubs	
	Alternative 1	Alternative 2	Alternative 1	Alternative 2
Flame Length (feet)	3.6 – 7.2	1.6 – 4.9	23.8 - 44	3.6 – 7.6
Canopy Base Height (feet)	5 – 11	20 - 47	N/A	N/A
Fire Type	Surface to Active Crown	Surface Fire	Passive to Active Crown**	Surface Fire
Fireline Intensity	Low to High	Low-Moderate	High	Low-moderate

Table 14. Comparison of Alts. 1 & 2 - Fire behavior resulting from the FlamMap model

		Alternative 1		Alternative 2	
Intensity	Flame Length	Alt. 1 Acres	Percent Project Area	Alt. 2 Acres	Percent Project Area
Low	<4 feet	2,890	37	4,293	55
Low-Moderate	4-8 Feet	2,973	38	2,070	27
Moderate	8-11 Feet	858	11	678	8
High	>11 Feet	1,067	14	747	10
Total		7,788	100%	7,788	100%

Cumulative Effects

The Wrightwood project area is located on the east side of the San Gabriel mountain range. Vegetation and topography are similar across the range; therefore, similar fuel characteristics and subsequent fire behavior would be expected.

The Wrightwood Project would have the direct effect of reducing fuels and fire behavior, including fireline intensity, canopy base height, and subsequent potential for crown fire on 2,156 acres as discussed above. This accounts for about 0.4 percent of the cumulative effects analysis area (see Section 3.1.1, Cumulative Effects Analysis Areas). Table 15 summarizes the past, present, and reasonably foreseeable actions that would contribute to the overall reduction in fire hazard potential over the analysis area.

Table 15. Summary of acres of past, present and foreseeable actions

	Acres	% of Analysis Area
Past Actions	9.1	.002
Present Actions	4,547	.81
Foreseeable Actions	415	.07
Modified Proposed Action	2,156	.4
Totals	7,127	1.28

As part of their Community Wildfire Protection Plan, the Community of Wrightwood has begun fuel reduction activities on private land. San Bernardino County Fire will be reducing fuels on private property below the Pinion Mesa area of Wrightwood including brush and dead tree removal, chipping, and haul-off. The project includes clearing a 9.1-acre parcel that will be used as a disposal site for homeowners completing defensible-space treatment around their homes.

Cal Trans has begun removing dead trees within their right-of-way along Highway 2 and along other Cal Trans-administered roads in the project area. In addition, Southern California Edison has been contracting the removal of dead trees within the community to protect power supply lines.

Wildfire has been a substantial part of the San Gabriel Mountain Range history. Based on Geographic Information System (GIS) analysis, many large wildfires, dating back to the early 1900s, have occurred within close proximity to the project area (see Appendix A of the Fire and Fuels Report (Hall 2005) and Fire Regime discussion in Section 3.3.2 above). These wildfires

have had a direct effect on fuels and fire behavior. Forest fuels consumed by wildfire are not available to burn in subsequent wildfires.

Fire suppression activities have contributed to increased fire behavior including fireline intensity and potential for crown fire over the landscape as discussed under the existing condition.

Collectively, the proposed Boundary Ridge project and the Wrightwood Project would complement the Wrightwood Community Protection Plan strategy.

Forest Service projects which are currently ongoing adjacent to the Wrightwood project area include the 947-acre Big Pines Fuels Reduction project and the 3,600 acre Lone Pine Canyon Fuels Reduction Project. These projects were designed in an effort to complement the Wrightwood Community Wildfire Protection Plan strategy.

The 415-acre Boundary Ridge Project, located directly adjacent to the project area, is currently being proposed. The goals and objectives of this project are also intended to complement the Wrightwood Community Protection Plan strategy.

Although not considered extensive on a landscape level, the cumulative effects of these treatment activities is expected to help move the treatment areas toward a Condition Class 1.

3.4 Air Quality

Conducting prescribed burning in southern California is challenging because of existing air quality problems attributed to southern California's interaction of population, industry, weather, and topography. By coordinating burning activities through local air quality management district (AQMD) smoke management plans while employing best available control measures, impacts to air quality can be minimized. Further, overall emissions and impacts from prescribed burning will be less than those from a wildfire burning across the same area when air quality effects are largely uncontrollable.

Detailed analysis is available in the Air Quality Report (Hall 2005), located in the project record on file at the Angeles National Forest Supervisor's Office in Arcadia, CA.

3.4.1 Purpose and Need Accomplishment and Issue Tracking

No identified purpose and need accomplishments or significant issues associated with air quality were identified. The following analysis of effects is summarized in Table 6**Error! Reference source not found.**.

With no action, wildfires would likely occur. Smoke from these fires would not be manageable, especially under dry conditions during summer or fall. Large amounts of smoke could remain in the local airsheds for a few days to several weeks depending on the size and intensity of the fire.

3.4.2 Affected Environment

The project area lies within the Mojave Desert Air Basin and is divided by two local air districts: Antelope Valley Air Quality Management District (AVAQMD) and the Mojave Desert Air Quality Management District (MDAQMD; see San Gabriel Air Basin & Air Quality Management District Map in Appendix D, and Hall 2005a). The project area occurs within Angeles and San Bernardino Counties. The Environmental Protection Agency (EPA) generates an annual summary of air quality index (AQI) values for counties throughout the state of California. Based on the AQI from 1994 to 2004, air quality for the area generally ranges in the good to moderate range with some measures considered unhealthy (EPA 2004, http://www.epa.gov/air/data/geosel.html; Hall 2005a)

Smoke-Sensitive Areas

Within Class I wilderness areas, the Forest Service has specific responsibilities for protection of air quality. Class I areas include National Forest and U.S. Fish and Wildlife Service wilderness areas over 5,000 acres that were in existence before August 1977, and National Park wilderness areas in excess of 6,000 acres as of August 1977. A general list of sensitive receptors, including four Class 1 wilderness areas that could be impacted by smoke in or near the project area, were considered in detail in the Wrightwood Project Air Quality Report (Hall 2005a).

3.4.3 Environmental Consequences

Alternative 1- No Action

Direct and Indirect Effects

Under this alternative, there would be no direct effects because fuel reduction and forest health treatments as proposed would not occur in the Wrightwood project area.

Impacts from dust, vehicle emissions, and other sources would not change from current conditions. However, wildfires would likely occur within the project area causing indirect effects to air quality. Smoke from these fires would not be manageable, especially under severe burning conditions during summer or fall. A large wildfire has the potential to emit large amounts of smoke that could remain in the local airsheds for a few days to several weeks depending on the size and intensity of the fire. As stands continue to mature and produce additional ground fuels, the potential for a wildfire would increase.

The community of Wrightwood and other communities within and near the project area could be affected by heavy concentrations of smoke, if a wildfire did develop. Such was the case of the catastrophic fire events in 2003, the Curve and Williams fires in 2002, the Narrows fire in 1997, and the Scout fire in 1994. Smoke from all of these fires had a direct impact to the community of Wrightwood. Wildfires can occur when weather conditions are not good for smoke dispersal. Smoke generated from a wildfire could be caught within an inversion layer, reducing visibility or generating emissions that could potentially exceed the National Ambient Air Quality Standards (NAAQS). It is well documented that extreme wildfires can significantly impact air quality (Sampson et al. 2000, p. 122). Depending on the size of the fire and weather conditions, these effects could last anywhere from one night to several days (Hall 2005a).

Cumulative Effects

Past, present and foreseeable activities within the project area that could influence air quality include three fuel reduction and forest health project decisions. Each considers additional prescribed burning and pile burning near the Wrightwood area: 1) Big Pines Fuels Reduction Project to the west 2) the Lone Pine Project to the east and 3) the Boundary Ridge Project to the east. Over the past decade, very little prescribed burning has occurred within the project area.

Three existing or completed fuels reduction and forest health-related Decisions include a prescribed burning component, all of which would impact air quality during implementation.

Other foreseeable activities that produce pollutants include, but are not limited to: use of fireplaces, dust from unsurfaced roads, wildfires, and industrial emissions.

If a wildfire occurs, there is a potential for exceeding State and National Standards, depending on the size of the wildfire and other pollution-producing activities that are occurring at the time (Hall 2005a).

Alternative 2 – Modified Proposed Action

Direct and Indirect Effects

Alternative 2 would have a direct, short-term effect on air quality in the project area. Under this alternative, approximately 1,165 acres or less would be jackpot burned and 353 acres would be handpiled and burned.

A conformity analysis (CA) was conducted for the original Proposed Action (which had a larger pollution potential than the Modified Proposed Action) to determine if burning would produce smoke within acceptable limits as per 40 CFR 51.853 (b) (1). The total project emissions for the original Proposed Action were determined to be less than the established levels set by U.S. EPA and the emissions were not considered regionally significant. The project conforms to the federally approved State Implementation Plan (Hall 2005a).

Under the Modified Proposed Action there would be some reduction in visibility while prescribed burning takes place. However, compared to a severe wildfire, smoke emissions would be controlled by air quality restrictions, and likely be of shorter duration.

Some reduction in visibility is likely within the project area when prescribed burning begins. Class 1 airsheds such as the San Gorgonio and Cucamonga Wilderness Areas and Joshua Tree National Monument, are not likely to be impacted. Residents near the burn area might receive some respiratory discomfort; however, it is expected that most impacts will be in the form of nuisance smoke and/or smell. Signing may be needed along roads to warn the public of smoky conditions (Hall 2005a).

An indirect beneficial effect of this alternative is a reduction in the emissions that would be released from potential wildfires in the area. By removing the small-diameter surface fuels with controlled, low-intensity prescribed fire, the potential of a high-intensity fire developing within the stands would be reduced.

Cumulative Effects

Past, present and reasonably foreseeable future activities and their impacts on air quality are difficult to address in terms of cumulative effects. Several large fires have occurred near the project area over the past century. However, as described under Alternative 1 in the Fire and Fuels Report, those effects are gone and cannot be viewed cumulatively (Hall 2005).

Significant cumulative effects on air quality are not anticipated due to the transitory nature of smoke and oversight by air districts.

Cumulative foreseeable activities that produce pollutants include, but are not limited to, the burning on private lands, use of fireplaces, dust from unsurfaced roads, wildfires, and so on. Because air quality is strictly regulated, the effects of each planned ongoing and foreseeable activity are typically not cumulative with other activities as long as the time between the activities is sufficient.

Smoke from prescribed burning is transitory in nature. The effects of this project from smoke are not likely to have a cumulative effect with other activities in the airshed given the oversight by the air districts. The district's burn-day determinations only allow burning when criteria are met that allow for good smoke dispersion. Daily regulation of amount of burning is managed to reduce impacts and negative effects of smoke. The number of days to accomplish prescribed burning in this project will compete with other burning in the airshed on any given day. It will be up to the Forest Service to establish burn priorities and the responsibility of the air quality management districts to manage all the burning on a given day.

If air quality is exceeding thresholds when proposed activities are scheduled to occur, Alternative 2 may result in some delays in burning as a result of this increased demand for "air space."

3.5 Rare Plants

3.5.1 Purpose and Need Accomplishment and Issue Tracking

The purpose of this section is to disclose effects on listed threatened, endangered, proposed, candidate or sensitive plant species (TEPCS) within the project area. The analysis of effects in this section is summarized in Table 6. Detailed information on each species considered is disclosed in The Wrightwood Project, BA/BE for Listed Wildlife and Plant Species (Sue, Welch, Nickerman, Sandburg 2007), which is on file in the project record.

No purpose and need accomplishments associated with rare plant species were identified. This section discusses the following significant issue:

Issue 6. Forest Service Sensitive Plant Species. Six Forest Service Sensitive Plant Species were found in the Wrightwood Project Area. These species need protective measures to limit the negative effects of the proposed project.

3.5.2 Affected Environment

Threatened, Endangered and Proposed Species (TEPC)

No threatened, endangered, or proposed plants are known to occur within the project area, nor were any such plants were found during focused surveys in spring 2004. Therefore there are no direct, indirect or cumulative effects to TEPC plants from the No Action Alternative (Alternative 1) or from the Modified Proposed Action Alternative (Alternative 2).

Forest Service Sensitive Plant Species

Fifty Forest Service Sensitive Plant Species were considered for analysis (see The Wrightwood Project, Biological Assessment and Biological Evaluation for Animals and Plants, *Sue, Welch, Nickerman, Sandburg* 2007). **The following six species were found during focused surveys in spring 2004:** crested milk-vetch, San Antonio milk-vetch, Bear Valley woollypod, Palmer's mariposa lily, lemon lily and short-joint beavertail. Only these species are carried forward for further analysis in this EA.

Six Forest Service sensitive plant species were found in the Wrightwood Project Area during focused surveys in 2004.

3.5.3 Environmental Consequences

Alternative 1- No Action

Direct and Indirect Effects

There would be no direct or indirect effects to sensitive plant species under the No Action Alternative from ground-disturbing activities. However, adverse effects to sensitive plant species

could occur if a future catastrophic wildfire were to burn the Wrightwood project area. These effects could occur through aggressive fire suppression activities (primarily through soil disturbance and compaction by mechanical equipment), and high fire intensities that would destroy individual plants. In addition to destroying individual plants, depending on fire frequency and intensity, suitable habitat could be type converted to annual grassland and become unsuitable habitat for sensitive plant species.

Alternative 2- Modified Proposed Action

Direct and Indirect Effects

Direct and indirect effects in this EA are considered for the following Forest Service Sensitive Plant Species and their habitat: crested milk-vetch, San Antonio milk-vetch, Bear Valley woollypod, Palmer's mariposa lily, lemon lily, and short-joint beavertail. For this discussion of effects, these potentially affected plant species are grouped together.

Direct Effects for Plants

- Vehicle or foot traffic may result in injury or mortality;
- Proposed vegetation removal treatments may cause direct mortality;
- Native plant species are removed and non-natives colonize treatment areas;
- Pruning and thinning may affect plant vigor;
- Plants can be injured or killed by unintentional exposure to vehicle fluids;
- Loss of habitat due to clearings for parking and equipment storage.

Indirect Effects for Plants

- Soil compaction decreases water absorption and increases water runoff, and may decrease the ability of native species to become established or survive.
- Non-native vegetation may exclude native species.
- Removal of native species may affect nurse plants or habitat.
- Pruning and thinning may affect plant vigor, which may affect nurse plants or habitat.
- Non-natives can decrease the vigor or kill native species such as oaks and conifers and lead to microsite changes.
- Non-native plant species can spread as a result of fuel breaks.
- When ground cover is modified and areas of bare soil are created, microsite conditions and habitat suitability are modified.
- Site conditions in adjacent habitats are modified by removal of native vegetation or the spread of weeds.
- Increased habitat suitability as the result of invasive/non-native plant removal or treatments to reduce soil compaction.
- Disturbed soils provide opportunities for establishment of non-natives.
- Dust and mud splatter generated by vehicles may land on vegetation adjacent to roads and parking areas and reduce plant vigor.
- An increase in illegal OHV activity due to reduced vegetation may eliminate some plants such as the short-joint beavertail.

Discussion

Fuel reduction treatments may result in trampling or complete removal of the above sensitive species. Hand pruning, any mechanical removing (masticator, bulldozer, chainsaw), control burning, or human foot traffic can all cause vegetation reduction. Foot or vehicle traffic may injure or kill plants or reduce the seed bank. Vegetation removal includes a direct effect of unintentionally removing Forest Service Sensitive Plants and the indirect effect of removing native vegetation that may act as nurse plants to listed species.

Equipment use, skidding activities, tree removal, post-project soil decompaction (subsoiling), and concentrated foot and vehicle traffic would result in compaction or short-term disturbances to the soil surface. This can disrupt germination and survival of seedlings as well as destroy mature plants. An indirect effect of soil compaction may be that native vegetation is unable to survive and non-native species become established. When soils are compacted, the ability to absorb water is decreased and runoff rates are increased. This decreases the habitat suitability for many native species and facilitates the establishment of non-natives. By limiting equipment use to designated areas, those impacts would be limited to less sensitive areas. Treatments to minimize soil compaction could include obliteration of trails, restoration of compacted areas or implementation of treatments to reduce erosion. Short term impacts would include soil disturbance. Long term impacts would include improved habitat conditions for the establishment of native vegetation.

Burning of piles may result in localized changes to vegetation and soils. These changes are not expected to result in significant overall impacts to the plant species present in the project area.

Many invasive plant species such as cheat grass (*Bromus tectorum*) and yellow-star thistle (*Centaurea solstitialis*) also respond positively to disturbance and will aggressively spread.

Any introduction, intended or accidental, of non-native plants directly affects the native flora. Some non-native plants do not spread rapidly while others are aggressive invaders. These plants are called invasive species. Invasive species can alter entire ecosystems by disrupting food chains, pollinators, increasing the frequency of fires, or simply overshadowing and smothering native plants (GAO -03-1).

The continued spread and dominance of cheat grass represents several potential impacts to native species. Cheat grass can out-compete native plant species, including rare plant species. Cheat grass can also change the character of the forest floor, covering it with a relatively dense growth of grass where none would have otherwise been present. This can also alter the soil components and productivity. Cheat grass usually dries up in early summer, leaving the forest floor covered with a dry flashy fuel that carries fire quickly.

The most significant negative indirect effect would be the possible expansion of cheat grass into disturbed areas. For example, short-joint beavertail has been observed growing with cheat grass. Ecosystems that have cheat grass as a high component of the ecosystem can experience more frequent fire return intervals that increase the presence of cheat grass. Short-joint beavertail is not well adapted to fire and an increased fire return interval would not benefit this species. Indirect effects to short-joint beavertail could include the creation of more open (where sun

scalding could affect mature plants and reduction of vegetation could affect seedling establishment (Griffith 2005). Localized soil movement may also affect individuals.

In addition to removing native vegetation, fuel reduction treatments also have the potential to remove non-native vegetation. If the cut material is properly disposed of and the fuel break is properly maintained, this removal can be beneficial. However, if the fuelbreaks are not properly maintained, this disturbance can become a highway for invasive plant species to spread. Additionally, if the cut vegetation from invasive species is not disposed of properly they may promote the spread of non-natives into previously uncontaminated areas.

Long-term vegetative changes are expected in proposed fuelbreak areas. The fuelbreak areas would be maintained to have low amounts of flammable vegetation. Generally, early-seral annual species (usually herbaceous plants) and exotic plants (such as cheat grass) would occupy such locations. If annual grasses are at a minimum, open fuelbreaks would be an advantage to Palmer's mariposa lily, crested milk-vetch, San Antonio milk-vetch and Bear Valley woollypod. If non-native plants dominate the fuelbreaks, it will be a disadvantage to the 6 specially listed species because of decreased sunlight and increased fire risk.

Forest Service Sensitive Species within the Wrightwood project area will be protected by flagging and avoidance (see Avoidance and Minimization Measures for Wildlife and Plants in Appendix C). Some vegetation will be left in place around short-joint beavertail to protect plants from extreme weather conditions (primarily sun scalding), but also to protect seedlings (Griffith 2005). In spite of the mitigation measures, it is likely some plants will be overlooked and killed during project implementation.

Lastly, illegal OHV activity could increase because of reduced vegetation resulting from this project. This would have a negative indirect effect on sensitive plant species, as plants may be killed by vehicle or foot traffic.

A decision to implement the Modified Proposed Action would approve a one-time treatment that would take place over several years. The most lasting impact of the project would be illegal OHV activity and invasive species such as cheat grass. Through minimization measures the effects of impact are expected to be reduced. Crested milk-vetch, San Antonio milk-vetch, Bear Valley woollypod, Palmer's mariposa lily, lemon lily and short-joint beavertail will be flagged and avoided. In addition, Palmer's mariposa lily will be protected through a limited operating period. There is a possibility any of these individuals will be killed during treatments.

Since the treatment is one time, crested milk-vetch, San Antonio milk-vetch, Bear Valley woollypod, Palmer's mariposa lily and lemon lily could recover if the root system is not harmed. Short-joint beavertail would not recover if the above-ground vegetative parts are removed. Since all species will be flagged and avoided, a minimum number of individuals will be killed. Some of the treatments will indirectly benefit crested milk-vetch, San Antonio milk-vetch, Bear Valley woollypod and Palmer's mariposa lily because these species will have reduced competition from mature plants. In addition, there will be a sunlight increase due to reduced vegetation.

Palmer's mariposa lily occurs from the San Bernardino to the Tehachapi Mountains and eastern San Luis Obispo County. San Antonio milk-vetch occurs in the eastern San Gabriel Mountains. Crested milk-vetch and short-joint beavertail occurs from the eastern San Gabriel to the San Bernardino Mountains. Bear Valley woollypod occurs from the eastern San Gabriel to the San Bernardino Mountains and in the Santa Rosa Mountains. The lemon lily occurs from the San Gabriel Mountains to San Diego County. For all of the species except San Antonio milk-vetch, the Wrightwood Project contains only a portion of the range. All species will be protected through minimizations measures.

Effects Determination: The Modified Proposed Action may affect individuals, but is not likely to result in a trend toward Federal listing or loss of viability for the crested milk-vetch, San Antonio milk-vetch, Bear Valley woollypod, Palmer's mariposa lily, lemon lily and short-joint beavertail. This determination is based on the intensity and the one-time duration of the project and the range of the above species.

Cumulative Effects

In addition to the Wrightwood Project and its direct and indirect effects as discussed above, other activities potentially affecting botany resources in the project area are listed below. The cumulative impacts of these activities are disclosed in the discussion that follows.

Non-federal Activities

- Various utility (e.g., electric or gas) projects including line maintenance, road maintenance, pole or line replacement.
- Increased recreation and commuter traffic from multiple private residential developments in the Santa Clarita, Antelope and Cajon Valleys.
- Special community events in Wrightwood that increase the number of tourists and forest visitors.

Federal Activities

- Special use permit holders: Large scale ski operations in the area attract thousands of skiers each winter.
- Special use permit holders: A wide variety of activities such as recreation residences, apiary sites and movie location shoots.
- Recreation activities: Off Highway Vehicle (OHV), hiking, mountain biking, camping, hunting, and snow play.
- Fuel reduction projects: Activities range from complete clearing around existing Forest Service buildings to fuel breaks many miles long with all vegetation removed.
- Road maintenance: Road clearing, scraping and vegetation removal.
- Recreation and administrative facilities (e.g., Big Pines fire station, Grassy Hollow Visitors Center, Big Pines Information Station).

Discussion

Routine activities in the area include wildfire suppression, fuels treatment activities, maintenance of plantations, road construction and maintenance, trail construction and use, construction and maintenance of utility lines, well construction, private development, construction and use of recreation and administrative facilities, and dispersed recreation.

Existing features in the project vicinity include buildings, trails, roadways, utility lines, organizational camps, recreation residences, recreation sites, Mt. High Ski area, private residences and developments. In general, the project area has been heavily influenced by human activities which have and will continue to result in disturbance to life history activities for a wide range of plant species.

It is anticipated there will be ongoing use and maintenance of the existing recreation sites, trails, roadways, utility lines, and recreation residences. Private development in the community of Wrightwood is also expected to continue. The community of Wrightwood has special events, which increases the number of tourists and forest visitors.

Mt High Ski Area is currently developing a Master Development Plan (MDP) which will include the expansion of their existing facilities. The construction of a ski school, new parking areas, and installation of a new ski lift or tow are being proposed as a part of the MDP.

As growth and development in the Wrightwood area continues, so will the concern to reduce the risk of wildfire in the area. Currently, there are fuels treatment activities on the east and west side of the project area that are being implemented. The Big Pines Fuels Reduction project on the Angeles National Forest and the Lone Pine Fuels Reduction project on the San Bernardino National Forest were both developed in response to the community of Wrightwood's concerns. Such projects are expected to continue as needed in the future.

As the urban population continues to increase, there may be other corresponding increases in the amount of recreation use occurring in the area. In addition, several new housing developments are proposed for development in the Santa Clarita and Antelope Valleys. Between 2000 and 2030, the Southern California Association of Governments (SCAG) forecasts the North Los Angeles County Subregion will grow at a rate of 4.2% but employment in that same area will only grow 2% (SCAG 2004). This area covers Santa Clarita, Palmdale and Lancaster, and many more people will be commuting over Little Tujunga Canyon road for employment in the greater Los Angeles area. Population increase will result in recreation increase over all of the ANF. As development is the shared threat by most TESP species in this area, this is most likely the greatest cumulative effect spatially.

Increased recreation such as OHV use both on and off of designated trails and roads may cause increased trail disturbance, erosion, or the introduction of non-native weeds. Illegal OHV activity away from designated trails could result in plants or bulbs being crushed. Other activities such as illegal dumping, hiking, parking, picnicking, and mountain biking can all result in plants and bulbs being crushed. In addition, increased recreation also increases the chances of horticultural collecting.

Cumulative effects as a result of the Wrightwood Project include protection of habitat from wildland fires, and habitat modification. During project implementation, there will be an increase in the level of impacts particularly those associated with disturbance. Many of these impacts will diminish upon project completion. Other project effects such as those associated with soil and vegetation will persist over time and have a more long term contribution to cumulative effects.

3.6 Wildlife

3.6.1 Purpose and Need Accomplishment and Issue Tracking

The purpose of this section is to disclose potential effects on listed threatened, endangered, proposed, candidate or sensitive wildlife species (TEPCS) within the project area. Detailed information is disclosed in The Wrightwood Project, BA/BE for Listed Wildlife and Plant Species (Sue, Welch, Nickerman, Sandburg 2007), which is on file in the project record.

No purpose and need accomplishments associated with wildlife species were identified.

Issue 2 (California Spotted Owl concerns regarding residual tree retention), which was identified during public scoping, was resolved in modifications to the proposed action and in Avoidance and Minimization Measures for Wildlife and Plants (see Appendix C in this EA), and is not analyzed in this section.

Significant issues discussed in this section:

Issue 7. Nelson's Bighorn Sheep; California Spotted Owl. Potential negative impacts to two Forest Service Sensitive Wildlife species occurring in the Wrightwood Project Area are a concern: Nelson's bighorn sheep (disturbance and displacement) and California spotted owl (disturbance to roosting birds; foraging habitat modification).

3.6.2 Threatened and Endangered Species

No U.S. Fish and Wildlife Service (USFWS) threatened, endangered or proposed wildlife species are known to occur in the project area. Additionally, the project area does not include designated critical habitat for any federally listed species. Potentially suitable habitat for the southwestern willow flycatcher does exist in the project area but will not be impacted by the proposed action. A detailed discussion of the southwestern willow flycatcher and potential effects is included in the Wrightwood Project BA/BE

3.6.3 Forest Service Sensitive Wildlife Species

The following Forest Service Sensitive wildlife species occur or have the potential to occur in the project area: California spotted owl, San Gabriel Mountain salamander, San Diego horned lizard, San Bernardino ring-neck snake, San Bernardino Mountain kingsnake, two-striped garter snake, Nelson's bighorn sheep, pallid bat, western red bat and Townsend's big-eared bat. Of these species, only the California spotted owl and Nelson's bighorn sheep are confirmed to occur in the project area. Because potential project impacts to the spotted owl and bighorn sheep were identified as significant issues, an analysis of effects is included in the EA. All other Forest Service Sensitive wildlife species with the potential to occur in the project area are analyzed in the Wrightwood Project BA/BE.

California Spotted Owl

Affected Environment

The California spotted owl (*Strix occidentalis occidentalis*) is listed as sensitive by Forest Service Region 5 and as a management indicator species (MIS) on the Angeles National Forest. There are ten owl territories within 1.5 miles of the project area; LA006, LA025, LA037, LA038, LA57, LA058, LA059, SB002, SB006, SB007 (see table below). Of the ten territories, three occur within the project boundary: LA057, LA037, LA006. Owl territory locations were selected from the CDFG California spotted owl observation ARC/INFO point coverage and database created by Gordon Gould of the California Department of Fish and Game.

Territory locations entered into this database represent a wide range of observations including single birds as well as pairs. Based on this, the designation of territory does not represent a confirmed nesting pair. For this analysis, territories are also referred to as Protected Activity Centers.

Project Area Home Range Composition

Great compositional variation exists in spotted owl habitat within home ranges (1.5-mile radius of territory as delineated in the CDFG owl territory database) that overlap proposed action treatment units. Mapping of habitats was conducted in accordance with Conservation Strategy for the California Spotted Owl Strategy (see California Spotted Owl habitat and home range maps in Appendix D). Eight of the ten territories within 1.5 miles of the treatment units have greater than 300 acres of suitable (high/highest value) habitat within the home range area. Two of the ten territories (SB002 and SB006) within 1.5 miles of the treatment units have less than 300 acres of suitable (high/highest value) habitat within the home range area. Perennial water is not present within the majority of conifer stands of proposed treatment units. Stand canopy cover in the proposed treatment areas is generally below 80 percent and additionally would not serve as suitable daytime roosting or nesting habitat due to absence of water and hardwood forest layering. Proposed treatment stands would be used primarily for foraging by California spotted owls.

Table 16. Habitat values for spotted owl within 1.5-mile radius of territory within 1.5 miles of treatment units

		Habitat Value (acres)					
Territory	1.5 mile Buffer of PAC	Highest	High	Moderate	Total	Total High + Highest	% 1.5m Buffer High + Highest
LA006	7,898	1,844	1,026	3,959	6,829	2,870	36
LA025	7,859	437	252	4,152	4,841	689	9
LA037	7,678	8	545	4,517	5,070	553	7
LA038	7,405	38	805	1,984	2,827	843	11
LA057	7,360	8	470	2,227	2,705	478	6
LA058	7,480	1,274	1,097	3,188	5,559	2,371	32
LA059	7,506	1,584	1,266	3,721	6,571	2,850	38
SB002	7,707	41	123	4,017	4,181	164	2
SB006	8,039	0	234	4,463	4,697	234	3
SB007	6,764	277	96	3,083	3,456	373	6

Environmental Consequences

Alternative 1- No Action

Direct and Indirect Effects

Wildfire is considered to be the primary risk factor to California spotted owl habitat and population persistence. Due to a disruption of natural fire cycles, many of the forests occupied by spotted owls have become overstocked with trees and are now primed for catastrophic fire, including those of southern California (USDA 2004). Many of the conifer stands within the project area have stocking levels beyond the desired condition. If left untreated, canopy closure and stand density will continue to increase until either disease, insect or fire result in mortality. Depending upon the event, this mortality could either be sporadic or it could be stand replacing. If widespread disease/insect mortality or a stand replacing wildfire occurs, suitable spotted owl habitat will be lost. This would result in the displacement of spotted owls from the impacted areas until stand conditions are regained. Although, this modification to stand condition would be considered temporary, it would still require a period of time exceeding 50 years for recovery. The No Action Alternative would have no immediate impact on the structure and composition of the spotted owl habitat available for nesting and foraging by California spotted owl.

Alternative 2 – Modified Proposed Action

Direct and Indirect Effects

Vegetation treatments are not planned to occur within the PACs. Based on this, the three spotted owl PACs located in the project area will not experience any habitat modification and residual tree retention will not be affected. Very few acres of high-value habitat (30 acres primarily located within the 1,500 ft. buffer of private lands) and no acreage of highest-value habitat (none occurs in the project area) are proposed for treatment in the Modified Proposed Action. The treatments in high-value habitat within the home range of each territory will be done with a wildlife biologist assisting to identify the trees for removal in order to try to maintain stand integrity as much as possible (USDA FS 2004c).

Low to moderate value spotted owl habitat outside of the three PACs could be modified through planned vegetation treatments. These modifications would be short term, as vegetation is expected to resprout and regenerate over time. If surveys detect nesting spotted owls within .25 miles of planned vegetation treatments, seasonal limited operating periods will be implemented according to the Conservation Strategy for the California Spotted Owl (USDA FS 2004a; see Avoidance and Minimization Measures for Wildlife and Plants, in Appendix C). This will eliminate the potential for direct effects to nesting birds. However, it is possible that vegetation treatments could result in disturbance to roosting birds. This disturbance would be temporary and limited to the duration of the treatments. It is not expected to result in site abandonment. The intent of the planned treatments is to reduce the risk of insect, disease and fire related mortality. As a result, suitable spotted owl habitat would benefit from additional protection against these threats.

Direct Effects: Potential disturbance to birds roosting in the area

Indirect Effects: Modification of foraging habitat (low to moderate value) outside of the designated PACs

Effects Determination: The Modified Proposed Action may affect individuals, but is not likely to result in a trend toward Federal listing or loss of viability for the California spotted owl.

Rationale for determination:

- The three spotted owl PACs within the project area are excluded from treatment in the Modified Proposed Action.
- Project design and proposed treatments are consistent with the Conservation Strategy for the California Spotted Owl (USDA FS 2004a). Seasonal restrictions would eliminate potential disturbance to nesting birds.
- Nest surveys will be conducted before project implementation.
- Outside of the three PACS in the project area, there would be some non-permanent modification of potential foraging habitat in low and moderate value habitats. These treatments would reduce the risk of fire, insect and disease mortality in the area and the potential loss of roosting and nesting habitat.
- By reducing competition with the overstory vegetation, enhancing tree vigor, and providing for increased tree growth, the proposed treatments are designed to improve habitat suitability over the long term.

San Gabriel Mountain Population of Nelson's Bighorn Sheep

Affected Environment

The population is listed as a Forest Service Region 5 Sensitive Species, a management indicator species (MIS) on the Angeles National Forest, and designated a fully protected population under California Fish and Game Code §4700.

Bighorn sheep are distributed from 3,000 feet elevation up to 10,000 feet elevation. Winter-spring ranges are generally below 5,400 feet elevation, on southeasterly to southern aspects. Steep slopes (greater than 80 percent) with abundant rock outcrops are preferred. Chaparral vegetation with less than 30 percent cover is preferred. Habitat requirements at lower elevations are similar to those described for winter-spring ranges. At higher elevations, ewes may use stands of conifer trees that are within 300 feet of escape terrain, that have less than 30 percent canopy cover, and more than 20 percent understory cover of shrubs, grasses, and forbs.

Visual observation and records from radio-collared individuals document bighorn sheep use in the project area. Records indicate this use consists of rams and is concentrated in the vicinity of Wright Mountain. Much of this sheep use occurs in locations where topography and vegetation

types eliminate inclusion as treatment areas for this project. However, it is anticipated that occasional bighorn sheep use might overlap some of the areas proposed for treatment.

Environmental Consequences

Alternative 1- No Action

Direct and Indirect Effects

Failure to treat vegetation in this area will lead to an increased accumulation of fuels and an increased risk of wildfire over time. Dense, mature brush provides less than optimal forage resources and may increase the risk of predation as sheep are less able to detect or escape predators. If a fire were to burn through suitable habitat, there could be beneficial effects for the bighorn sheep as vegetation resprouts. However, due to the random nature of wildfire events, effects are difficult to quantify or predict. Indirect effects would be associated with the increased fuels and risk of wildfire. No direct effects are expected.

Alternative 2 – Modified Proposed Action

Direct and Indirect Effects

The proposed action may result in temporary disturbance or displacement of sheep in the project area. In particular, sheep may be displaced by helicopter use. Displacement of sheep by helicopter use is well documented. However, the consequences of disturbing mountain sheep, such as altering use of habitat, increasing susceptibility to predation or increasing nutritional stress is not well understood. This displacement may last for the duration of helicopter activities. Other project related activities such as chainsaw operation and the use of heavy equipment may also result in disturbance to bighorn sheep in the area. Since the site is dominated by rams, disturbance from project activities would not include ewes and impacts to reproductive success are not expected. Any rams displaced during project implementation would be expected to occupy the site again once project activities are complete.

Vegetation treatments that reduce shrub density will improve bighorn sheep habitat as a result of improving visibility and escape routes. Additionally, reduced shrub density may result in an increased amount of herbaceous vegetation on the site. The reduction in cover would not adversely affect hiding and thermal cover. The proposed action will result in a more open canopy in the treated forested stands. The increase in available sunlight, precipitation, and nutrients and decreased competition with woody species, will allow for increased herbaceous production in the understory. Increased herbaceous forage availability will have a beneficial effect on bighorn sheep as well as other herbivores.

Direct Effects: Disturbance and displacement as a result of helicopter use and other project activities.

Indirect Effects: Habitat suitability will improve where shrub density is reduced and herbaceous vegetation increases.

Effects Determination: The Modified Proposed Action may affect individuals, but is not likely to result in a trend toward Federal listing or loss of viability Nelson's bighorn sheep.

Rationale for determination:

- Disturbance and displacement would be temporary
- Ewes will not be impacted by project activities
- No impacts to reproductive success are expected
- The proposed vegetation treatments will improve habitat conditions for bighorn sheep

Cumulative Effects for the California Spotted Owl and the Nelson's Bighorn Sheep

In addition to the Wrightwood Project and its direct and indirect effects discussed above, other federal and non-federal activities potentially affect the California spotted owl and Nelson's bighorn sheep in the project area. A detailed list and discussion of these activities is included in the Cumulative Effects section for Rare Plants, (see 3.5.3, Environmental Consequences), and is not repeated here to avoid duplication.

The non-federal activities listed include various utility maintenance projects; increased recreation and commuter traffic from the Santa Clarita, Antelope, and Cajon Valleys; and special community events in Wrightwood attended by increased numbers of tourists and forest visitors. Federal activities include special uses (e.g., ski areas, recreation residences, apiaries, etc.); recreation activities (e.g., off-highway vehicles (OHV), hiking, mountain biking, camping, hunting); other fuel reduction projects; road maintenance; and recreation and administrative facilities.

This section of the EA discusses the cumulative effects of these activities as they apply specifically to the California spotted owl and Nelson's bighorn sheep.

In general, the project area has been heavily influenced by human activities which have and will continue to result in disturbance to life history activities for a wide range of animal species.

Continuing urban population increases in the surrounding greater Los Angeles area may result in corresponding increases in the amount of recreation use occurring throughout the Angeles National Forest, including the Wrightwood area. Because development is the threat which is shared by most TEPS species in this area, this is most likely the greatest cumulative effect spatially.

Illegal OHV activity away from designated trails could result in additional disturbance to spotted owls or bighorn sheep in the area. This could lead to temporary displacement of individuals. Other activities associated with increased access such as illegal dumping, hiking, parking, picnicking, and mountain biking can all result in habitat degradation or disturbance to individuals.

Cumulative effects as a result of the Wrightwood Project include short term disturbance, habitat modification and an increased level of protection from tree mortality associated with

disease, insects or wildfire. During the time of project implementation, there will be an increase in the level of impacts, particularly those associated with disturbance. Many of these impacts will diminish upon project completion.

This proposal would approve a one time treatment of approximately 2,156 acres that would take place over several years. None of the treatments are expected to result in vegetation conversions. Based on this, no long-term contribution to cumulative effects is expected. Short term modifications of vegetation will result in temporary impacts to spotted owl or bighorn sheep individuals utilizing the project area. For bighorn sheep, this modification of vegetation conditions is expected to be positive and persist until the brush canopy closure increases again. For California spotted owls, vegetation treatments may have some short term impacts on the prey base.

California spotted owls are distributed throughout the San Gabriel Mountains. Nelson's bighorn sheep are distributed in groups that utilize portions of the Angeles and San Bernardino National Forests. Neither species have a distribution confined to the project area boundary. Project activities will have a finite impact on a limited number of individuals from these populations. Potential impacts will be minimized through minimizations measures (see Avoidance and Minimization Measures for Wildlife and Plants in Appendix C). Based on this, it is anticipated that the project activities will contribute to cumulative impacts, but these impacts will be greatest during and immediately following project implementation.

3.6.4 Management Indicator Species (MIS)

A management indicator species (MIS) analysis was completed for the proposed project. This analysis considered the twelve MIS for the Angeles National Forest, and identified the following as having suitable habitat present in the project area: mule deer, mountain lion, California spotted owl, and song sparrow. The MIS analysis concluded that project activities will modify habitat for mule deer, mountain lion, and California spotted owl. A detailed discussion of effects to MIS can be found in the Management Indicator Species Analysis for the Wrightwood Project (Welch 2007), which is on file in the project record.

3.7 Invasive and Non-Native Plant Species

3.7.1 Purpose and Need Accomplishment and Issue Tracking

No identified purpose and need accomplishments or significant issues associated with invasive or non-native plant species were identified. The following analysis of effects is summarized in Table 6.

3.7.2 Affected Environment

Any ground-disturbing activity can facilitate the establishment and spread of noxious or invasive species. These non-native plant species have the ability to out-compete native plant species including special status species for available water and nutrients. Once established, these invasive non-native species can eliminate native plants and special status plants from their habitats.

Within the project area, bulbous bluegrass (*Poa bulbosa*), and cheat grass (*Bromus tectorum*) have become established. Cheat grass is listed by the California Invasive Plant Council (Cal-Ipc) as a pest plant that is highly invasive.

Cheatgrass is the most widespread non-native invasive species within the project area, and thrives in disturbed areas and in areas where there is lack of duff.

Other common non-native species such as filaree and orchard grass were listed on daily field forms/flora lists. Cheat grass is the most widespread of these weedy non-native species in the Wrightwood project area. However, filaree, sweet clover, orchard grass, and bulbous bluegrass are also present. Currently, cheat grass is abundant wherever there is evidence of disturbance and in forest openings where there is a lack of duff. Throughout the Wrightwood project area, cheat grass appears to be discouraged or prevented from establishing in areas where a duff layer exists. In areas where low levels of vegetative and soil cover are maintained cheat grass could become established and dominate the site.

3.7.3 Environmental Consequences

Alternative 1 – No Action

Direct and Indirect Effects

While there would be no direct or indirect effects to invasive species from Alternative 1 (no action) from ground-disturbing activities, beneficial effects to invasive species could occur in the event of a future catastrophic fire. These effects could occur if invasive species are introduced through fire suppression activities. The most common introduction is if seeds or other vegetative parts are on vehicle wheels or undercarriages and transported to the site from another location. For example, if a truck drove through Hungry Valley Off-Highway Vehicle area before it came to the Wrightwood area, it could have yellow-star thistle seeds in the undercarriage. These seeds could become dislodged, germinate and colonize the Wrightwood area.

In addition, invasive species may benefit from high fire frequency and intensity wildfires. For example, if both fire frequency and intensity are high, many native plant species, such as manzanitas would be eliminated. However, many invasive species such as yellow-star thistle would thrive and spread in similar conditions.

Alternative 2 – Modified Proposed Action

Direct, Indirect and Cumulative Effects

Any ground-disturbing activity under this alternative could facilitate the establishment and spread of noxious or invasive weed species. (See also the discussion of effects of these species in the Rare Plants section of this EA, in subsection 3.6.3, Environmental Consequences.)

Cheat grass is the most widespread of these weedy, non-native species in the Wrightwood Project area. Cheat grass has spread across millions of acres in the west and is thought to have altered the natural fire frequency in many plant communities. It also has the ability to carry fire into areas that previously would not ordinarily burn. The presence of cheat grass is also known to greatly reduce the chance of native perennial seedlings becoming established.

The continued spread and dominance of cheat grass represents several potential impacts to native species. Cheat grass can out-compete native plant species, including rare plant species. Cheat grass can also change the character of the forest floor covering it with a relatively dense growth of grass where none would have otherwise been present. This can also alter the soil components and productivity. Cheat grass usually dries up in early summer, leaving the forest floor covered with a dry flashy fuel that carries fire quickly.

As with a catastrophic wildfire, the most common direct and indirect effect is the accidental introduction of invasive species through equipment such as vehicle undercarriages. The most common introduction is if seeds or other vegetative parts are on vehicle wheels or undercarriages and transported to the site from another location. These seeds could become dislodged, germinate and colonize the Wrightwood area.

In addition, invasive species may benefit from high fire frequency and intensity wildfires. For example, if both fire frequency and intensity are high, many native plant species, such as manzanitas would be eliminated. However, many invasive species such as yellow-star thistle would thrive and spread in similar conditions.

Unlike a catastrophic wildfire, mitigation measures are put in place to limit the introduction and spread of invasive species. Vehicle washing and mulching are example of mitigations that will limit invasive species.

Any introduction, intended or accidental, of non-native plants directly affects the native flora. Some non-native plants do not spread rapidly while others are aggressive invaders. These plants are called invasive species. Invasive species can alter entire ecosystems by disrupting food chains, pollinators, increasing the frequency of fires, or simply overshadowing and smothering native plants (GAO -03-1).

Cheat grass, yellow-star thistle and dalmation toadflax (*Linaria dalmatica ssp dalmatica*) are examples of aggressive, invasive species. If these species colonize the treatment area, fire frequency will increase because they are highly invasive and fire adapted. Invasive species grow earlier in the season and quicker then natives. The resulting is more biomass which becomes more fuel for a wildfire.

Burning of piles may result in localized changes to vegetation and soils. These changes are not expected to result in significant overall impacts to the plant species present in the project area.

Many invasive plant species such as cheat grass and yellow-star thistle also respond positively to disturbance and will aggressively spread.

3.8 Soils and Geology

3.8.1 Purpose and Need Accomplishment and Issue Tracking

No identified purpose and need accomplishments or significant issues associated with soils or geology were identified. The following analysis of effects is summarized in Table 6.

For this analysis, R5 soil standards (USDA Forest Service 1995) are used to ensure long-term soil productivity, hydrologic function and soil-buffering capacity is maintained (see Soils Report on file in the project record). These standards apply to the outlined treatment areas in the project proposal and do not apply to the watershed as a whole. Therefore, direct, indirect, and cumulative effects were analyzed at the scale of the planned treatment units.

3.8.2 Affected Environment

The project area lies at an elevation range of 5,900 to 8,500 feet, surrounding the mountain community of Wrightwood. The majority of the project area is on steep hillslopes. Most of the project occurs on slopes greater than 50 percent.

Geology

The San Gabriel Mountains were formed by the uplifting of the San Andreas, Sierra Madre, and San Gabriel faults (USDA Forest Service 1981). The two major rock types are Gneiss of Devil Canyon and Pelona Schist. Alluvial deposits and landslide material are largely Pleistocene and Holocene in age. However, active fault movement continues to stimulate these mass movement processes. For a complete listing of geology map units in the Wrightwood Project Area, see Table Water-2 in the Watershed and Soils Report.

The San Andreas Fault passes throughout the project area and is the dividing line between the geologic map unit's Gneiss of Devil's Canyon and Pelona Schist. The Punchbowl Fault is to the south and the Cajon Valley Fault is to the northeast of the project area. Landslide deposits, derived from the steep bluff slopes, occupy the lower slopes and bottom of the valley. The tributary draws have thick lenses of accumulated material, probably transported mostly by ravel and slower creep of stony top soil. Large topographic benches were observed near the ridgeline, evident of deep and probably slow moving slumping in the soil mantle and weathered rock below. Landslides, except for avalanche type, are prevalent in the Pelona Schist, particularly between the San Andreas and Punchbowl Faults (Matti and Morton, unpublished 2000).

Landslide deposits occupy the lower slopes and bottom of some portion of all the project area valleys in thick fans. Field reconnaissance along with aerial photo interpretation was used to map landslide-prone areas. The deposits in Sheep Canyon are very recent (since the 1960s), oversteep, and seepy, thus probably overburdened in regard to shear resistance. They would appear to have further slumping potential with a subsequent threat to water quality. In all the valleys, the landslide deposits should be avoided for treatment.

Soils

Soils are primarily dry and shallow with varying amounts of surface organic matter. Topsoil throughout the project area is mostly sandy loam texture. Duff is not found on steep slopes, though low-sloped areas have up to six inches of duff and pine litter. Soil depth varies from five inches on the steepest slopes to 20 inches plus in the shallow-sloped areas (see Hydrolic Soil Groups Map in Appendix D).

These shallow soils are a concern with regards to wildfire. Observations of the 2003 fires found that shallow soils over bedrock may have accelerated erosion where high-severity fire occurs. These high-severity burn areas have little groundcover to buffer erosive overland flows from high-intensity rainfall. Approximately 309 acres have this condition.

If a high-severity wildfire occurs on shallow soils over bedrock, high intensity rainfall is likely to result in erosive overland flows.

Using the erosion hazard rating, much of the project area has a high to very high potential for erosion. This correlates with the steep slopes and shallow soils. Bedrock is close to the surface, thereby decreasing soil infiltration and the soil's capacity to store water in addition to increasing runoff potential. Another factor is the flashy rainfall that occurs. Weather records at the Wrightwood, CA station (http://ncdc.noaa.gov) for the period of record (1997-2004) show an average of 21.3 inches of total precipitation and an average of 67.9 inches of snowfall, typically between the months of December and April, which amounts to about one-third of the total inches of precipitation.

Rainfall may cause accelerated erosion where steep slopes and barren cover types exist. The project has 153 acres with this condition. Based on recent field observations in the San Bernardino National Forest, a combination of steep slopes and chaparral cover type may increase the potential of debris slides if a high-severity fire burns the majority of the project area watershed. The project area currently has 542 acres of this higher risk chaparral vegetation cover on steep slopes.

Though prone to erosion, the project area soils have resilient attributes. Puddling is not a concern since the soils are well to excessively well drained (USDA Forest Service 1981). The surface textures and abundant rock fragments add soil strength while providing very good drainage.

3.8.3 Environmental Consequences

Alternative 1- No Action

Direct and Indirect Effects

There would be no change to the compacted acreage in the project area. Residual compaction in treatment units and existing fuelbreaks would continue to recover over time. Since no site-disturbing activities would occur, there would be no direct or indirect effects of soil displacement.

Potential risk due catastrophic fires in the project area for soil displacement and landslides will remain.

Cumulative Effects

The current condition would continue and without direct or indirect effects, there would be no change in cumulative effects.

Alternative 2 – Modified Proposed Action

The main direct and indirect effects to soil productivity under this alternative would be from displacement, erosion, and alterations to organic matter. Less impact from compaction is expected due to the resilient sandy loam soils. Using Region 5 soil analysis standards, these impacts would not lead to long-term detrimental effects to soil productivity if proposed project design requirements are followed. Soil hydrologic and buffering capacity should be maintained as long as 2005 Forest Plan minimum effective groundcover standards are followed. Mitigation is crucial to preserve the thin topsoil and conserve the forest floor organic mat. Units 36, 65, 71 and 154 (19 total acres) would have potential cumulative effects from proposed tractor-based yarding in areas previously disturbed by timber harvest in the 1970s. These units have additional mitigation requirements to maintain the productive landbase. Unstable soils and watershed areas at risk for landslides were removed from treatment consideration.

Direct and Indirect Effects

Soils would primarily be affected by displacement and erosion from the proposed activities. Proposed timber harvest activities would cause compaction and disturbance of the organic layer or deeper displacement along skid trails and cable corridors. Soil impacts may be compounded by compaction and surface organic matter losses (Powers 2002, Powers et al. 2005). Indirect effects of erosion may result where groundcover is reduced from the removal of the forest floor. Loss of groundcover can increase erosion potential since the forest floor buffers the beating action of raindrops and reduces the effects of compaction on soil infiltration (Jurgenson et al. 1997, Elliot et al. 1999). The predicted detrimental disturbance by treatment unit is displayed in Table 10 of the Soils Report on file in the project record (Overland 2005).

Compacted soils would recover to near pre-treatment conditions based on the 30-year recovery rate from the Region 5 cumulative effects model (USDA Forest Service 1990). The resilient soils with rocky substrata and sandy loam texture would not likely exceed the regional standard for soil porosity within the tractor-based treatment units where soil disturbance would be highest. Project mitigation is proposed to increase the recovery potential of soils (see Appendix A).

The Modified Proposed Action would result in short-term effects, such as compaction, displacement and erosion; however, with project design criteria and mitigations, soil productivity and porosity standards would be met.

Soil displacement would occur from temporary road construction, fireline construction, landing construction, and rutting of roads, as well as in major skid trails and cable corridors. Topsoil is thin and easily lost where slopes are steep and groundcover is sparse. Surface erosion may occur on trails with sustained grades over 200 feet in length and parallel to the slope (Potyondy 1981). A layer of wood chips left on the ground during mastication of the tractor-logging areas would minimize surface erosion. In addition, proposed mitigation to disperse the erosive overland flows includes waterbars and/or lop and scatter of slash vegetation across bare soil areas. Rutting of roads due to treatment activities in wet conditions is a minor concern due to the well-drained sandy loam and fine sand soil textures.

Soil organic matter that forms the forest floor includes plant, animal, and microbial residues, fresh and at all stages of decomposition, and the relatively resistant soil humus (USDA Forest Service 1995, Jurgenson et al. 1997). For analysis, the forest floor is classified into categories of duff/litter, fine wood debris (less than 3-inch diameter) and coarse wood debris (greater than 3-inch diameter). Brown et al. (2004) was reviewed to determine an optimal range of coarse woody debris (CWD) that should be left following treatment to maintain the short-, mid-, and long-term soil organic matter needs for soils and stream habitat needs.

Recommended amounts of snags, fine and coarse woody debris to be left on site at the conclusion of treatments to provide future coarse wood debris and to remain under the resistance to control in fuel loading, are shown in Table17 (Overland 2005).

Table 17. Coarse woody debris class recommendations

CWD Class	Tons/acres
Fines to 3 inches	2
3 inches and up	5 to 7

Short-term impacts of the Modified Proposed Action would maintain fines within recommended levels, but would reduce coarse woody debris below these levels. The overall long-term expectation is that coarse woody levels would increase to recommendations for these forests since a slight increase of snags killed by prescribed burning would supplement coarse wood supplies in the future.

Coarse woody debris data was obtained by reviewing the Forest Vegetation Simulator printouts (Amell 2005). Current fine litter (less than 3-inch diameter) ranges from 10 to 15 tons/acre. The proposed treatment would reduce this to 2-3 tons/acre. Coarse woody debris would drop from a range of 4 to 9 tons/acre to 1 to 2 tons/acre, below recommended thresholds.

Treatment activities would decrease canopy cover and groundcover by displacement of the duff layer in places. This would have a temporary increase in the impact of raindrops on the forest floor, with some higher erosion potential. The healthier residual overstory vegetation would continue to supply needle cast to the duff layer for restored groundcover within five years (Elliot et al. 1999).

New groundcover standards emphasize maintaining adequate cover to lower erosion potential (USDA Forest Service 2005). The process-based water erosion prediction project (WEPP) model shows lack of groundcover and slope steepness as the greatest drivers for surface erosion. The minimum standards should maintain adequate groundcover to lower the potential for erosive overland water flows from high-intensity rainstorms. Values are based on the Region 5 soil erosion hazard model (1990) and are in agreement with Disturbed WEPP modeling (see Soils Report for more detail in project file). Predicted erosion is 0.41 ton/acre for treatments with the greatest soil disturbance (also see Watershed Direct and Indirect Effects discussion in section 3.9.3 below). The project would meet long-term soil productivity standards since predicted soil losses are less than the average rate for soil formation, 1 ton/acre/year (USDA Forest Service 1995).

Cumulative Effects

The geographic scale for accessing cumulative effects on the soils resource is the treatment units within the project area. Existing compaction in the treatment areas is primarily due to the transportation system and, to a minor extent, the recovering soil porosity from previous harvests in the 1970s and past fuelbreak construction.

Units 36, 65, 71, and 154 (19 total acres) could exceed the standards for maintaining soil porosity and organic matter (see Table 10 in Watershed and Soils Report in project file) from residual compaction and displacement of log-yarding activities and road building. Of these four units, the amount of land affected by compaction from repeated entries can be minimized by designating skid trails, reusing the existing skid trail network wherever feasible, requiring falling to the lead, requiring endlining, and by the scarification or deep tillage of all primary skid trails, log decks and temporary roads (see Appendix A, Design Features). The resiliency of the soil together with these mitigations should set the stage for meeting the recommended standard for soil porosity in the long term.

3.9 Watershed

3.9.1 Purpose and Need Accomplishment and Issue Tracking

No identified purpose and need accomplishments or significant issues associated with watersheds were identified. The following analysis of effects is summarized in Table 6.

3.9.2 Affected Environment

Twelve stream channels are located in the Wrightwood project area. All streams are tributaries to Sheep Canyon Creek, which continues flowing northward out of the project area towards the Mojave River (see Watershed Boundaries Map in Appendix D). Forest mapping indicates all creeks are intermittent (seasonally flowing), though local personnel indicate that streams only flow during wet years (Andersen 2004, pers. comm.).

A landslide occurred in the headwaters of Sheep Canyon Creek in the mid-1960s. An estimated seven to ten feet of sediment was deposited on the lower reaches of Sheep Canyon Creek directly above the nearest subdivision of houses. Since the landslide, the creek has steadily down-cut toward its original streambed.

Mountain High Ski Resort currently stores about 1,400 acre-feet of water in two small reservoirs on Blue Ridge. The ski resort is currently applying for a permit to store the water for a longer period of time. Additional water storage within the project area exists at Twin Lakes, a small lake at the base of Acorn Canyon Creek and above Wrightwood. The town of Wrightwood uses groundwater for their domestic and commercial needs. Due to intermittent supply issues, the community occasionally rations and trucks in water to supplement water needs.

Wetlands

A field review of the project area in June 2004 revealed only one riparian area consisting of willow (*Salix* spp.) in a small portion of Swarthout Valley Creek below Mountain High East Ski Area. This area would be buffered with a 100-foot riparian conservation area (RCA) to protect the riparian habitat.

3.9.3 Environmental Consequences

Alternative 1- No Action

Direct and Indirect Effects

In the short term, sediment would continue to build up into the stream channels at the existing condition rates. Stream flow in wet years would continue to wash the sediment downstream to the alluvial fans and landslide runout toward Wrightwood and the Mojave River. In the longer term, vegetation would continue to die back from the effects of drought and bark beetles. This would decrease the deposition of surface cover from needle cast and the loss of roots would cause a weakening of the soil structure in places. The chance of a wildfire in the project area would

increase. If a wildfire were to occur and was followed by significant precipitation, upland erosion and sedimentation into stream channels would greatly increase. Sediment would be stored in stream channels until runoff generated from storms washes it downstream to the town of Wrightwood. No groundwater would be affected. Ash from a wildfire can have a temporary impact on downstream turbidity.

No action could increase the chance of a severe wildfire. If a wildfire were to occur followed by significant precipitation, upland erosion and sedimentation into stream channels would greatly increase.
Fine sediment washed from hillslopes could cause landslide debris and mudflows.

Cumulative Effects

There would be no cumulative effects from the No Action Alternative, with the exception of increased wildfire severity and the subsequent sedimentation in channels. Wildfire has been conspicuously absent from the project area. In the last 30 years, wildfires have burned about 225 acres, but much of the project area has missed several fire intervals (http://frap.cdf.ca.gov/data/frapgisdata/select.asp).

The most pronounced effect of fire-bared slopes is rilling from intense rain events, as occurred in the recent (November 2003) Old/Grand Prix Fire and subsequent Christmas Day 2003 rainstorm (USDA Forest Service, unpublished, 2004). Rilling not only transports fine sediment, but exacerbates runoff yield and peaks through overland flow. Fines washed from hillslopes through rills and sheet wash caused severe overburdening of the channels and numerous debris torrents and failures of fill and lower side slopes within first-order and second-order draws through the fire area. Pelona Schist landslide debris can also form mudflows when saturated by intense rainfall or snowmelt (Matti and Morton, unpublished, 2000).

Alternative 2 – Modified Proposed Action

Direct and Indirect Effects

The Modified Proposed Action was designed to meet Forest Plan standards and guides. New Forest Plan standards for riparian buffers and effective groundcover were integrated into the project design. The Modified Proposed Action meets requirements of the Clean Water Act for nonpoint sources of stream sediment. Compliance is assured through implementation of Best Management Practices (BMPs) established for National Forests in California (USDA Forest Service, Pacific Southwest Region 2000). No municipal watersheds would be impacted. Short-term sediment increases may result, but would not have an appreciable increase to the amount of sediment already stored in the stream channels.

Three models were used to model possible sediment: WEPP modules, Disturbed WEPP and Road Batch (USDA Forest Service 2002), in addition to the Region 5 Erosion Hazard Rating Model (1990). A temporary increase in erosion is predicted to result from treatment activities. An increase from 0.04 tons/acre/year to 0.41 tons/acre/year may occur if all treatments occur in one

year. Before fire suppression, low-intensity fire throughout the watershed would likely produce 4.11 tons/acre/year. The impact of the Modified Proposed Action would result in 10 percent of this historical low-intensity burning.

The Modified Proposed Action could cause a temporary increase in water yield and some erosion. However, no municipal watersheds would be impacted and erosion would be within acceptable thresholds. Over the long-term water yield and erosion levels would decrease.

Implementation of Best Management Practices and project design criteria would minimize the amount of upland erosion and sedimentation of the stream channels (see Appendix A). A 100-foot equipment exclusion zone would be established on all creeks in the project area and a 50-foot equipment exclusion zone would be established on all ephemeral channels to act as a sediment filter. The 100-foot buffer would avoid impacts to the identified wetland in Swarthout Valley Creek.

Overland flow may increase in response to loss of groundcover with implementation. The presence of high-intensity rainfall during late summer and fall can exceed the infiltration capacity of the soils without a litter/duff cover. Upon bare soil, raindrop impact can be a severe source of initial erosion. Soil infiltration would also decrease from treatment-related compaction, and the evapotranspiration rate of the treatment area would decrease from removal of a portion of the vegetation resulting in more water in the soil profile. This would cause a temporary increase in groundwater tables that is typically manifested in emergent or increased area of hillside seeps, or baseflow in channels.

Cumulative Effects

The cumulative impact from the proposed activities and other past, present and ongoing activities would not exceed watershed thresholds. The Modified Proposed Action was refined based on modeling results to avoid disturbance over the threshold of concern. The analysis indicates that near-threshold conditions exist after the project implementation in five of twelve subwatersheds due to the presence of a combination of existing conditions and the extent of the proposed action The Modified Proposed Action has a minor cumulative impact in Flume, Acorn, and Heath Canyons, whereas in Buford, Government and Sawmill Canyons the cumulative impacts could be much greater (see Table Water 7 in resource report, on file in the project record).

The typically thin soil mantle on the steep slopes of the project would provide relatively rapid downward percolation of precipitation water into the underlying rock. Ground cover prevents overland flow and surface rilling, but the soils are susceptible when bare of cover. Compacted areas and areas disturbed of cover, and loss of overhead canopy will contribute to increased surface runoff from the project area, and reduced infiltration into the soil and percolation to storage, and other surface flow locations. Nonetheless, it is expected the amount and timing of recharge of the valley fills from the mountain slopes will not be measurably altered by project implementation.

3.10 Recreation and Scenery

3.10.1 Purpose and Need Accomplishment and Issue Tracking

No identified purpose and need accomplishments or significant issues associated with recreation or scenery resources were identified. The following analysis of effects is summarized in Table 6.

3.10.2 Affected Environment

The Wrightwood area provides an array of recreational opportunities to the metropolis of Los Angeles. The area is accessed by the Angeles Crest Scenic Byway (Highway 2), along the north side of the project area, and the Lone Pine Canyon Road in the southeast corner of the project area. These are Sensitivity Level 1 travel routes that provide primary viewsheds into the project area with short duration of views. The Pacific Crest National Scenic Trail (PCNST) winds along the south portion of the project area, providing an opportunity for hiking. The PCNST trail corridor and the other trail corridors described below are also Sensitivity Level 1 travel routes, providing primary viewsheds of the project area with long duration of views. The PCNST is closed to motorized and mechanized use.

The Blue Ridge and Acorn Trails are popular mountain bike trails in the area. The Blue Ridge Road (3N06.2) 3N39B and 3N39 create a network of OHV trails in the area.

The Sheep Mountain Wilderness Area lies directly south of the project area. Developed recreation facilities in the project area include Mountain High East and Mountain High West Ski Areas, and Blue Ridge and Guffy Campgrounds. These facilities are primary viewpoints for the project area.

3.10.3 Environmental Consequences

Alternative 1- No Action

Direct and Indirect Effects

Scenic Resources

Under the No Action Alternative, the crowded, overstocked conditions of the forest would continue. A landscape-level wildfire would dramatically change the scenic characteristics and recreational setting of the project area. Continuation of overstocked conditions could induce a rapid spread of insects, causing additional mortality in the stand. Together, these elements would maintain the uncharacteristic vegetative mosaic across the landscape. If the vegetation is consumed by intensive fire or widespread insect infestations, the desired landscape character would be lost.

With no action, trees would likely continue dying from insect infestations and the chance of severe wildfire would increase. These events would likely negatively affect the quality of the scenery and recreational experiences.

Recreation Resources

Insect infestation or wildfire could negatively affect the recreation setting quality. As the quality of the recreational setting decreases, recreation use patterns may decline or shift to other areas.

Cumulative Effects

Past wildfires have changed the forested setting and sense of place for homeowners and recreationists in areas adjacent to the project area. Implementation of this alternative would perpetuate the risk of fire in the Wrightwood area. If a wildfire were to occur, residents and visitors of Wrightwood would experience a change in the forested setting and sense of place.

Alternative 2 – Modified Proposed Action

Direct and Indirect Effects

Scenic Resources

Direct effects to scenic resources from the use of cable-logging-removal systems include effects to potential views into the cable corridor from the various trails along the Blue Ridge including the Pacific Crest National Scenic Trail (PCNST). Views of the cable system from the Angeles Crest Scenic Byway and the community of Wrightwood would be in the middleground, and are not expected to be apparent to the average forest visitor (Spencer 2005).

Direct effects to scenic resources from the use of ground-based logging removal methods would include visible evidence of slash on the ground and soil disturbance due to machinery operation. These effects would be evident for one or two growing seasons. The scenic integrity objective (SIO) (see Figure 3 in resource report for scenic integrity objectives) is expected to be low during implementation and would change to high within three years of project completion (Spencer 2005).

Evidence of timber removal by helicopter is not easily noticeable on the landscape. The SIO of high would be maintained in areas of helicopter timber removal.

Fuelbreaks would be created in approximately 484 acres of high SIO. These fuelbreaks would meet the high SIO through implementation and adherence to the Design Criteria specified in the Recreation and Visual Resources Report. However, the potential for a permanent drop of one SIO level is possible in a few areas of the project. In order for the project to be implemented, approval by the Forest Supervisor is required to allow for such a deviation (Spencer 2005). But overall, most, if not all, treatment areas should meet their scenic integrity objectives within 3 years of the project's completion, provided that the project area is allowed at least two undisturbed growing seasons to recover.

The Modified Proposed Action would cause short-term effects to scenic and recreation resources while activities take place, but over time, these effects would diminish. Some views from the Pacific Crest Trail would change.

The removal of dead, diseased, and dying trees would improve the existing landscape characteristics

from an unhealthy decadent landscape to a healthy vegetative mosaic. Thinning and removal of live trees and reducing the shrub/understory component would open up the stands to a park-like vegetative mosaic that is characteristic of pre-fire-suppression efforts. Large trees 30 inches in diameter would be retained. The activities would create additional visual depth into the forest by decreasing the density of vegetation. These treatments would meet the scenic integrity objectives as assigned (Spencer 2005).

The shrub component in these areas would be heavily reduced, creating a strong contrast in the landscape immediately after mastication has occurred. Within one to two growing seasons, the cut shrubs would resprout. This would create a variety of age classes for the shrubs providing a two-story shrub component. With implementation of scenic quality prescriptions, (see Appendix A) the moderate SIO would be met. After two growing seasons, when shrubs and grasses have reestablished, it is likely that the high SIO would be met (Spencer 2005).

Jackpot burning would be done in a random pattern creating a mosaic of burned areas across the landscape. Jackpot burning would increase the diversity of texture, color, vegetative size classes, and distribution across the landscape. Grasses would resprout in one to two growing seasons. High and moderate SIOs would be met (Spencer 2005).

With implementation of the scenic quality prescriptions, the thinning of conifer stands and chaparral shrubs, jackpot burning and hand-line construction would meet moderate and high SIO's as outlined in the Forest Plan. The mechanical fuelbreaks would meet high to moderate SIO's, provided that the scenic quality prescriptions are applied and properly implemented. With implementation of the scenic quality prescriptions, the fuelbreaks would meet high to moderate SIO's in middleground areas, and moderate SIO in foreground areas (Spencer 2005).

Recreation Resources

The Blue Ridge Road is the logging haul route for the majority of timber removal on the south side of the project area, and it is the primary access route for off-highway vehicle (OHV) users and campers going to Blue Ridge and Guffy Campgrounds. During mechanical operations, areas could be temporarily closed for public safety and to avoid conflicts with logging traffic and recreationists. Temporary closures would decrease the amount of recreational visitor days (RVDs) at the campgrounds and trails along Blue Ridge for approximately three summer seasons (Spencer 2005).

Temporary road construction to access landings would cross the PCNST three times and change the recreation setting from roaded natural to roaded modified.

The fuelbreak is next to the Blue Ridge and Guffy Campgrounds. Establishment of this fuelbreak would change the recreational setting of the trails and campgrounds by greatly reducing the canopy and shrub cover. Areas that are currently roaded natural ROS class would become roaded modified (Spencer 2005).

Proposed fuelbreaks would greatly reduce shrub and canopy cover next to campgrounds, may temporarily divert hikers off trails during their construction, and would be evident to trail users hiking in the project area.

Hikers on the Pacific Crest National Scenic Trail

and other trails may be diverted off of the trail for safety reasons during construction of fuelbreaks and helicopter removal of trees. After the project is complete, signs of the activities would be evident to the trail users going through the project area. The open vegetative characteristics of the fuelbreak would make the PCNST more visible to OHV riders on the roads, potentially attracting OHV riders to ride on the PCNST. There may be a potential increase in illegal OHV use of temporary roads constructed for implementation of this project.

Trail users and visitors to the Guffy or Blue Ridge campgrounds would experience short-term effects of noise, smells, smoke, and traffic from equipment operations and jackpot burning. Changes to the recreational setting from jackpot burning would occur in the short-term (Spencer 2005).

Cumulative Effects

Implementation of the Modified Proposed Action would add to the effects of other fuels reduction projects near the project area by increasing the amount of altered vegetation along the Lone Pine Canyon Road and PCNST. Trail users on the PCNST may experience several temporary closures due to implementation of all these projects.

Together, these projects would create changes to the existing landscape viewed by residents and from Sensitivity Level 1 highways and trails over approximately 7,700 acres. Forest Plan direction has assigned SIO's of high and moderate to these areas. The proposed fuelbreaks for the Wrightwood project would require careful mitigation and implementation in accordance to the scenic quality prescriptions listed in this project's Recreation and Visual Resources Report, in order to meet high a SIO (Spencer 2005).

The Modified Proposed Action combined with other fuel reduction projects would result in short-term effects of noise, smells, smoke, and traffic associated with mechanical machinery to recreationists and residents. Hikers on the PCNST would experience temporary closures in multiple areas and a change to the recreational setting along the trail as it passes through the various projects. There is a potential for an increase in OHV use on logging facilities such as skid trails, fuelbreaks, cable lines, etc. This would lead to increased erosion, potential conflicts among recreationists and additional visual impacts to the landscape.

The majority of effects to recreationists would be short-term in duration and within the parameters of the Forest Plan. The recreational setting along the PCNST would be changed from roaded natural to roaded modified, changing the recreational experience (Spencer 2005).

3.11 Heritage Resources

3.11.1 Purpose and Need Accomplishment and Issue Tracking

No identified purpose and need accomplishments or significant issues associated with heritage resources were identified. The following analysis of effects is summarized in Table 6.

3.11.2 Affected Environment

A heritage resource analysis was conducted for the Wrightwood Project to determine if cultural or heritage properties were present in the area of potential effect (APE), and if such properties would be affected by project actions.

Fourteen heritage resource sites are known to be within the APE. Two of these resources could not be relocated. Two of the identified sites, historic roads, would likely be used in the implementation of project activities. One of the sites is the current highway. The second site is a Forest Service road. The other sites would either be avoided by project activities or would be treated as provided for by the Regional Programmatic Agreement and Interim Protocol.

3.11.3 Environmental Consequences

Alternative 1- No Action

Direct and Indirect Effects

This alternative would not cause any direct environmental consequences to heritage resources, as no activities would occur that are likely to affect such resources or their attributes. Indirect effects could occur under the No Action Alternative as there are known sites in the area that could be affected by wildfire.

With no action, there would not be any direct effects on known heritage resources. However, if a severe wildfire occurred, indirect effects could include loss of heritage features.

Cumulative Effects

Past wildfires have affected heritage resources by consuming prehistoric and historic structures, features and fabrics. Heritage resources within the identified project area have features and fabric that could be lost from the continued effects of high-intensity wildfire.

Alternative 2 – Modified Proposed Action

Direct and Indirect Effects

The use of standard resource protection measures would be applied to all sites within the area of potential effect. For mechanical treatments, the Forest's heritage resource manager (HRM) shall approve the use of tracked equipment to remove brush or woody material from within specifically identified areas of heritage site boundaries under prescribed measures designed to prevent or minimize effects. This would apply to a historic trail. Work along the trail would be monitored,

and no direct skidding across the trail would occur. Vegetative or other protective padding may be used in conjunction with the HRM's authorization of certain equipment types within (and across) site boundaries. For prescribed fire treatments, no sites at risk from low-intensity fires were identified. As such, no direct effects to the known sites are anticipated.

Indirect effects could be considered beneficial, as impacts from wildfires that may affect heritage resources would be reduced. No other indirect effects (e.g. erosion) are likely to occur to known heritage resources as a result of this project. There is the potential that sites (unanticipated discoveries) do exist that are currently obscured by vegetative cover. Unanticipated discoveries would be mitigated using the terms of the Interim Protocol. Monitoring has been recommended for those areas of heavy vegetative cover that are considered to be of medium to high risk for the occurrence of heritage resources.

The Modified Proposed Action would not have any direct effects on known heritage sites as they would be protected from project activities. Indirect and cumulative effects of treatments could be beneficial as the risk of severe wildfire is reduced.

Cumulative Effects

In the past, heritage sites have been lost to wildfires (i.e., the Curve and Williams fires on the San Gabriel River Ranger District, Angeles National Forest). Sites within the current project area would be adversely affected by high-intensity wildfire. Under the Modified Proposed Action Alternative, fewer sites would be lost from wildfire due to the removal of hazardous fuels. Known sites would receive protection from project activities.

Decreasing the risk of high-intensity wildfire by fuels reduction would help to protect known heritage sites in the project area.

3.12 Social and Economic Resources

3.12.1 Purpose and Need Accomplishment and Issue Tracking

No identified purpose and need accomplishments or significant issues associated with social or economic resources were identified. The following analysis of effects is summarized in Table 6.

This socio-economic analysis covers a variety of topics including Environmental Justice, social issues, predicted costs of operations, predicted wildfire costs, and financial efficiency. The majority of the project activities would occur within Los Angeles County.

3.12.2 Affected Environment

The Wrightwood Project is located mostly within Los Angeles County. The county encompasses 4,061 square miles, and has a population of 9,519,383. From 1970 to 2002, the population grew by 2,725,480 people, a 39% increase.

Population growth has many implications associated with wildfire risk. As the population of Los Angeles County increased so has the further expansion of residential areas into the wildland-urban interface. This increased expansion is associated with increased property values. However, this same population increase is also associated with increased rate of human-caused wildfires. Hence, increased population growth and human-caused wildfire increases potential losses from wildfire. Development in the wildland urban interface comes with many benefits such as spectacular views, wildlife viewing, and solitude. While the rewards may be numerous, the increased risk of wildland fires, flooding, erosion, and loss of property is real.

This wildland-urban interface area has always been a major focus for fire management in Los Angeles County. Hazardous fuels reduction to reduce wildland fire hazards and education about fire safety and fire ecology are high priorities. Fuels reduction and fire education are aimed at reversing trends of increased human-caused ignitions, losses of homes, and damage to natural and cultural resources. Another goal is to provide defensible space for communities and developed areas where firefighters may have a chance to protect life and property during a wildfire. The strategy encompasses historic wildfire frequency and Santa Ana wind corridors combined with scientific validation.

3.12.3 Environmental Consequences

Alternative 2 – Modified Proposed Action

Direct and Indirect Effects

The social and economic effects are the direct and indirect impacts of the project (the Modified Proposed Action) on the residents of Los Angeles County and the residents of the community of Wrightwood. While there are no logging industries within Los Angeles County, there are large construction and agricultural sectors in the county's economy that would perform the work. No new jobs would be created locally; therefore, the direct impacts to be analyzed include the

number of existing jobs and income that would be supported by the project. The indirect impact to be analyzed is the impact of the proposed project on the residents of Wrightwood.

Social Impacts

The residents of Wrightwood would be impacted directly by the project activities. The removal of merchantable and submerchantable timber from the treatment units would require industrial logging equipment. The project would require heavy equipment to operate within and around the city. During this time, residents would hear heavy equipment, including heavy lift helicopters and the whistles of the cable-yarding operations, and would notice increased heavy truck traffic in and around the community (North 2005).

The Modified Proposed Action would cause short-term disturbance to residents of Wrightwood while the project is being completed. Effects would include noise from trucks and helicopters, increased traffic on roads, and smoke from prescribed burning.

Environmental Justice

Executive Order (EO) 12898, Federal Actions to Address Environmental Justice in Minority Populations and Low-Income Populations, requires each federal agency to make the achievement of environmental justice part of its mission by identifying and addressing disproportionately high and adverse human health or environmental effects of its programs, policies, and activities on minority and low income populations. The Order further stipulates that the agencies conduct their programs and activities in a manner that does not have the effect of excluding persons from participation in, denying persons the benefits of, or subjecting persons to discrimination because of their race, color, or national origin. However, EO 12898 provides no guidelines on how to determine concentrations of minority or low-income populations.

The Modified Proposed Action would not disproportionately affect minority or low-income populations. Rather it would benefit the community by reducing potential damage to property and human health.

Vegetation treatment and other measures designed to reduce the risk of wildfire would not disproportionately affect minority or low-income communities. Furthermore, the treatments are intended to benefit the community. While local communities would be affected by the proposed actions in the short-run, these actions are intended to reduce the risk of large-scale fires and potential damage to property and human health. Proposed vegetation treatment areas adjacent to private property would only be treated in cooperation with affected property owners. The Forest Service has held a series of public meetings in the local area to get input from the public and identify local concerns with the proposed actions and alternatives. No additional outreach or analysis has been completed as there would be no disproportionate negative effect on such communities due to any of the alternatives (North 2005).

Economic Impacts

The Modified Proposed Action would have insignificant economic impacts to the residents of Los Angeles County. An estimated 75.9 jobs would be supported by the timber harvest and fuels reduction work, for a total estimated value of $1,678,697. The jobs are defined as one person-year of employment. These jobs reflect less then 0.0014 percent of the total jobs in the agriculture, forestry, and fisheries sector of the economy (see resource report in project file).

Finance

The costs associated with the project would include the removal of merchantable and submerchantable conifer and hardwood timber and brush, removal and disposal of fuels, treatment of fuels on site, temporary road construction and road maintenance. The merchantable timber has very little economic value. The nearest mill is 255 miles away in Terra Bella, California. The cost of logging and transportation exceeds the delivered log prices. The hardwood trees are suitable for firewood use only. Therefore, recovery costs of sale merchantability of material is not considered in this analysis.

The unmerchantable material and fuels generated by this project would be chipped into trucks, and hauled to the Puente Hills landfill for disposal. The costs for this treatment include removal, chipping, hauling, and disposal.

Road maintenance and temporary road construction is necessary to accommodate heavy equipment and provide access to the project. Approximately 15 miles of existing open National Forest System roads would receive some level of maintenance. Approximately 2.6 miles of temporary road would need to be constructed. Normally these costs are offset by revenue generated from the sale of merchantable timber; however, since the timber from this project has little economic value, the cost of road maintenance and temporary road construction would be included in the overall project cost (see Table 18).

Additional costs to the government would include conducting an environmental analysis, treatment unit marking and preparation, and contract preparation and administration. All costs associated with planning and implementing the project are summarized in Table 18 (North 2005).

Table 18. Total project costs with disposal of merchantable timber

Cost/Benefit Description	Quantity	Unit of Measure	Unit Cost	Total Cost
NEPA Analysis	1	project	$300,000	$300,000
Contract Administration	11.8	Months	$15,000	$177,000
Sale Preparation	2867	Acres	$180.00	$516,060
Merchantable and Submerchantable Timber Removal and Disposal	30,002	CCF	$306.14	$9,184,812
Fuel treatment- Removal and Disposal	2,842	Tons	$107.84	$306,481
Fuel treatment – On-Site Treatment	2,356	Acres	$544.82	$1,283,596
Road Maintenance/Temp Constr.	26.2	Miles	$10,038.17	$263,000
			Total Project Costs	**$12,030,949**

(North 2005)

Wildfires in southern California are costly natural disasters. Potential economic losses from wildfire in the Wrightwood area would far exceed the costs of completing the project. In general, short-term costs of the operation are more than recovered by reduced wildfire losses.

The costs of wildfire suppression on public lands have risen in recent years as more land has burned. More than $1 billion was spent in 2000 and 2002 by federal agencies (National Park Service, Fish and Wildlife Service, Bureau of Indian Affairs, Bureau of Land Management, and Forest Service) fighting fires on public lands (Dombeck et al. 2004). The existing condition in the project area is associated with serious wildfire risk: without fuels reduction, the area is at risk from wildfire.

3.13 Transportation System

3.13.1 Purpose and Need Accomplishment and Issue Tracking

No identified purpose and need accomplishments or significant issues were identified for transportation resources. The following analysis of effects is summarized in Table 6.

3.13.2 Affected Environment

Access to the project area from Los Angeles is currently via State Highway 15, State Highway 138, and State Highway 2 through Wrightwood. Primary access within the project area is National Forest System road 3N06 and 4N21, and an unclassified road running north from Lone Pine Canyon Road. Roads 3N06 and 4N21 are main access roads for administration and recreation and are maintained at Level 3 for passenger car travel.

The project area has 15.02 miles of open roads, with an open road density of 1.95 miles per square mile. There are approximately six miles of existing roads in the project area closed to public motorized travel. The project roads are categorized as National Forest System Roads (NFSR), proposed temporary roads and unclassified roads (usually abandoned roads on National Forest System land but not maintained by the Forest Service).

Roads in the Wrightwood project area are primarily used for recreation, with highest use in summer. Other road use is for agency administration, and resource management and protection. During years of normal snowfall, roads are generally closed by snow from December through March.

Road maintenance improvement is necessary on about 15 miles of NFS Roads in the project area to provide access for timber harvest and mastication equipment and log hauling while protecting soil and water resources. Best Management Practices (BMPs) would be implemented in road maintenance to reduce loss of road fines and reduce sediment delivery to streams (USDA Forest Service, 2000). Road maintenance would include minor earth work (cut and fill slope reshaping), prism or surface reshaping, installing or reshaping drain dips and cross drains, cross drain culvert replacement, catch basin reshaping, roadside brushing, gravel spot-surfacing, seeding, blading, ditch cleaning, culvert cleaning, and dust abatement. Drainage features would be maintained during operations and restored or improved when operations are complete.

Approximately 2.6 miles of temporary road construction would be needed for yarding equipment access and log hauling. About 4.9 miles of existing closed roads would be opened, improved, and used for proposed treatment activities. Temporary roads and unclassified roads which are currently closed and are proposed for use, would be decommissioned, revegetated, rehabilitated, and closed to motorized travel after operations are complete. In an effort to meet Forest Plan SIO's, careful mitigation and implementation in accordance to the scenic quality prescriptions must be applied during the rehabilitation of temporary roads and unclassified roads where they cross or directly impact sensitivity level 1 travel routes. Road closures would include recontouring where effective, and use of earth barriers, large trees, logs or large rocks. Road closures may include signs describing restrictions.

Road density or travel management status of the existing classified roads would not change.

Logging systems for harvest units were selected based on percent slope, access or distance to roads, slope profile, and resource needs. Appropriate logging systems were selected to protect soil, water, and other resources, and with mitigation during implementation, would meet Best Management Practices (BMPs).

3.13.3 Environmental Consequences

Alternative 1- No Action

Direct and Indirect Effects

With no activities proposed under this alternative, no direct effects to the transportation system would occur. An indirect effect of the No Action Alternative would be that no potential timber sale revenue would be generated for additional road maintenance. With limited maintenance and no road improvements, continued road deterioration would be expected.

Cumulative Effects

With no equipment operating and no products transported, no cumulative effects on the transportation system are anticipated.

Alternative 2 – Modified Proposed Action

Direct and Indirect Effects

Roads

Approximately 2.6 miles of temporary road would be constructed. Nearly all proposed temporary roads would be located on or near ridge tops on less than 35 percent side slopes. It is estimated that clearing for temporary road construction would affect 2.2 acres per mile for a total of approximately 6 acres disturbed (Table 19). Temporary roads would be decommissioned and rehabilitated after operations are complete.

About 4.9 miles of existing closed roads would be opened and used for yarding and hauling operations. This would affect about 3 acres per mile. Total closed road clearing would be approximately 15 acres for all roads proposed to be opened. The closed roads would again be closed and rehabilitated after operations are complete. Approximately 15 miles of existing open National Forest System roads would receive some level of maintenance. This includes clearing brush from cut and fill slopes, surface blading and shaping, and reconstruction of drainage features. It is estimated that these activities would affect 3 acres per mile.

Table 19. Estimated disturbed acres from temporary road construction and closed road improvements

Road Activity	Acres Affected
Temporary Road Clearing	6
Closed Road Clearing	15
Existing Road Maintenance	15
Total Affected Area	36

Tractor Skidding

Tractors, skidders, or forwarders would be used on slopes of 35 percent or less to transport logs to landings. Harvesters or feller bunchers could be used with ground-based systems. Ground-based equipment would be restricted to designated trails spaced about 100 feet apart. Equipment operations could cause vegetation and soil disturbance or compaction (detrimental soil conditions) on approximately 12 percent of harvest areas (Table 20). Four tractor-landing locations are proposed for the Wrightwood Project. Average landing size would be about 1/3-acre, but would vary from ¼ to ½-acre, depending on volume and size of material yarded to the site. Landings would be rehabilitated by means of slash disposal, recontouring and drainage restoration, scarification where soils are compacted, and seeding with a Forest-approved seed mix after operations are complete.

Table 20. Estimated disturbed acres from yarding or mastication

Yarding	% of Area Affected	Acres Affected
Tractor Skidding	12	47
Skyline Yarding	5	30
Helicopter Yarding	3	23
Mastication	15	107
Total		207

Skyline Yarding

Skyline yarding systems would be used on slopes over 35 percent within 1,500 feet or less of existing roads or proposed temporary roads. Approximately 39 skyline landings are proposed for this project. Landings would be located along existing or proposed temporary roads at each skyline corridor or set, about 150 feet apart. Landings would generally be within existing road-clearing limits, with some additional opening required to deck logs and pile slash when whole-tree yarding. Where volume is concentrated, landing areas may be as large as ½-acre for material handling. Typically, skyline logging results in approximately five percent of the harvest unit with disturbed soil or vegetation. Vegetation and detrimental soil disturbance would occur in the center of skyline corridors and at landings.

Helicopter Yarding

Areas proposed for helicopter yarding are generally more than 1,500 feet from existing roads or on terrain not economical or suitable for temporary road construction due to adverse effects on other resources. Eight helicopter-landing locations are proposed for the Wrightwood Project. Average landing size would be about ½-acre but would vary from ¼ to 1 acre, depending on volume and size of material yarded to the site. Typically, helicopter-yarding (landings) would affect or disturb one to three percent of harvest areas with detrimental soil conditions. A central service landing would be needed.

Mastication

Mastication equipment includes front-mounted or knuckle-boom-mounted grinders on rubber tired or tracked equipment. The front-mounted grinders cover 100 percent of the treatment area,

and the knuckle-boom grinders cover approximately 25 percent of the area. However, this equipment only drives over a piece of ground once, resulting in little or no compaction. Soil disturbance is minimized by the masticated material covering the exposed soil. Approximately 15 percent of the treatment area will have exposed soils.

Indirect effects of road maintenance, temporary road construction, and logging systems include the increased risk of noxious weed establishment and adverse effects to soil and water. Skid trails and landings would be cross-drained or recontoured where needed and seeded to establish cover for soil and water protection and to reduce risk of noxious weeds establishing on the sites. All harvest equipment operating off roads would be cleaned and inspected before moving into the project area to reduce risk of spreading noxious weed seeds onto disturbed areas. This noxious weed management requirement and BMPs for road maintenance would reduce risk of adverse indirect effects on soil and water. Road maintenance associated with proposed activities would reduce erosion and sedimentation from roads, and benefit forest users.

Cumulative Effects

Cumulative effects of yarding, processing whole trees, and hauling is determined for the project area. Cumulative effects of the transportation system from past, ongoing, and reasonably foreseeable future actions would include future or continued road maintenance. Road maintenance is scheduled according to need and maintenance level for each road as funding becomes available and each is prioritized for safety. To protect and improve soil, water, and other resources conditions, BMPs would be included in road maintenance improvements as part of the timber sale, service, or stewardship contract.

Total affected area or potential area of detrimental soil conditions is shown in Table 21. Existing roads and proposed treatment activity areas would total about 273 acres or 5.52 percent of the 4,939-acre project area. (See also Section 3.8, Soils and Geology for further discussion of impacts to soils.)

Table 21. Acres and percent of cumulative cleared area

Activity or Feature	Acres Affected	% of Project Area Affected
Yarding and Mastication	207	4.19
Temporary Road Construction	6	.12
Closed Road Improvements	15	.30
Existing System Roads	45	.91
Total Area Affected	273	5.52

Cumulative soil compaction and soil disturbance effects from proposed activities, previous harvest, and recreation use would be minimized by using existing roads, landings, and skid trails where possible, and by again closing the existing closed roads after operations are complete. The closed roads, landings, and skid trails would be rehabilitated by ripping or scarifying, reseeding, mulching and replanting in or near sensitivity level 1 travel routes. Treatment of the past logging operations sites would restore compacted soils and improve soil conditions.

4. Consultation and Coordination

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This section includes a list of preparers of the environmental document. The following individuals were primarily responsible for developing and reviewing the environmental analysis.

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Appendix A - Stand Prescriptions and Design Criteria

Stand Prescriptions

The following combinations of treatments define specific prescriptions for each stand. See Table 2 in this EA for the amount of acres of each prescription, and see the Modified Proposed Action Details Map 2 in the Appendix D for stand locations of each prescription.

CT/PCT/HP/PRUNE: This occurs within the proposed fuelbreak. Commercially thin (CT) trees between 9 inches DBH and 18 inches DBH and precommercially thin (PCT) trees less than 9 inches DBH to an average 20-foot crown spacing. Remove from site all boles, limbs and tops greater than 6 inches in diameter. Hand pile and burn (HP) remaining slash residue down to about two tons per acre. Prune trees up to 10 feet or no more than one-half the height of the tree.

CT/PCT/LS/HP: Commercially thin trees between 9 inches DBH and 18 inches DBH and precommercially thin trees less than 9 inches DBH to an uneven-aged distribution resulting in approximately 45 to 73 trees per acre. Remove from site all boles, limbs and tops greater than 6 inches in diameter. Lop and scatter (LS) remaining slash residue to within 24 inches of the ground. Hand pile and burn slash residue down to about five tons per acre or less.

CT/PCT/LS/JB: Commercially thin trees between 9 inches DBH and 18 inches DBH and precommercially thin trees less than 9 inches DBH to an uneven-aged distribution resulting in approximately 45 to 73 trees per acre. Remove from site all boles, limbs and tops greater than 6 inches in diameter. Lop and scatter remaining slash residue to within 24 inches of the ground. Jackpot burn (JP) slash residue down to about 5 five tons per acre or less.

CT/PCT/LS/MAS: Commercially thin trees between 9 inches DBH and 18 inches DBH and precommercially thin trees less than 9 inches DBH to an uneven-aged distribution resulting in approximately 45 to 73 trees per acre. Remove from site all boles, limbs and tops greater than 6 inches in diameter. Lop and scatter remaining slash residue to within 24 inches of the ground. Masticate (MAS) brush.

CT/PCT/MAS/PRUNE: This occurs within the proposed fuelbreak. Commercially thin trees between 9 inches DBH and 18 inches DBH and precommercially thin trees less than 9 inches DBH to an average 20-foot crown spacing.

Treatment Definitions

Commercial Thin (CT) - The cutting of trees that would produce a commercial sawtimber product

Precommercial Thin (PCT) – The cutting of trees that are of a diameter that would not produce a commercial sawtimber product

Handpile and burn slash residue (HP) – A type of prescribed fire where cut material (small trees and shrubs) is arranged in piles to be burned later

Jackpot Burn (JB) - A type of prescribed fire where emphasis is placed on burning concentrations of activity generated fuels

Lop and Scatter (LS) - To chop branches, tops, and small trees after felling into lengths so that the slash will lie close to the ground, then spreading the slash more or less evenly over the ground

Masticate (MAS) – Crushing, chopping, grinding, or chewing up of small trees and shrubs. This material is generally small (less than 3 ft long) and distributed on site

Prune - Cutting low branches from trees and shrubs to reduce ladder fuels.

Remove from site all boles, limbs and tops greater than 6 inches in diameter. Masticate brush. Prune trees up to 10 feet or no more than one-half the height of the tree.

HP/PRUNE: This occurs within the proposed fuelbreak. Handpile and burn all brush. Prune trees up to 10 feet or no more than one-half the height of the tree.

MAS: Masticate (chop and shred) brush down to approximately 15 percent ground cover.

MAS/PRUNE: This occurs within the proposed fuelbreak. Masticate brush down to approximately 15 percent ground cover. Prune trees up to 10 feet or no more than one-half the height of the tree.

PCT/HP/PRUNE: This occurs within the proposed fuelbreak. Precommercially thin trees less than 9 inches DBH to an average 20-foot crown spacing. Remove from site all boles, limbs and tops greater than 6 inches in diameter. Handpile and burn remaining slash residue down to about two tons per acre. Prune trees up to 10 feet or no more than one-half the height of the tree.

PCT/LS/HP: Precommercially thin trees less than 9 inches DBH to an uneven-aged distribution resulting in approximately 45 to 73 trees per acre. Remove from site all boles, limbs and tops greater than 6 inches in diameter. Lop and scatter remaining slash residue to within 24 inches of the ground. Handpile and burn slash residue down to about five tons per acre or less.

PCT/LS/HP/PRUNE: Precommercially thin trees less than 9 inches DBH to an uneven-aged distribution resulting in approximately 45 to 73 trees per acre. Remove from site all boles, limbs and tops greater than 6 inches in diameter. Lop and scatter remaining slash residue to within 24 inches of the ground. Handpile and burn remaining slash residue down to about two tons per acre. Prune trees up to 10 feet or no more than one-half the height of the tree.

PCT/LS/JB: Precommercially thin trees less than 9 inches DBH to an uneven-aged distribution resulting in approximately 45 to 73 trees per acre. Remove from site all boles, limbs and tops greater than 6 inches in diameter. Lop and scatter remaining slash residue to within 24 inches of the ground. Jackpot burn slash residue down to about five tons per acre or less.

PCT/LS/MAS: Precommercially thin trees less than 9 inches DBH to an uneven-aged distribution resulting in approximately 45 to 73 trees per acre. Remove from site all boles, limbs and tops down to five tons per acre or less. Lop and scatter remaining slash residue to within 24 inches of the ground. Masticate brush to approximately 15 percent ground cover.

PCT/MAS/PRUNE: This occurs within the proposed fuelbreak. Precommercially thin trees less than 9 inches DBH to an average 20-foot crown spacing. Remove from site all boles, limbs and tops greater than 6 inches in diameter. Masticate slash and masticate brush to approximately 15 percent ground cover. Prune trees up to 10 feet or no more than one-half the height of the tree.

Design Criteria/Project Prescriptions

The following design criteria would be applied projectwide:

Fuelbreaks

- Cut tree boles, limbs, and tops less than 6 inches diameter would be removed if possible.
- Shrub cover would be reduced to 15 percent or less.
- During thinning, species would be retained in the following descending order of preference: single-leaf pinyon pine, Joshua tree, bigcone Douglas-fir, sugar pine, Coulter pine, black oak, Jeffrey pine, ponderosa pine, incense cedar, white fir, and canyon live oak. Consult with Forest Botanist prior to removing any single-leaf pinyon pines or Joshua trees.
- Fuelbreaks would be constructed up to 300 feet in width.
- Treatments by ground-based equipment would not occur on slopes over 60 percent.

Thinning Forests

- Residual concentrations of slash (limb wood, tops, broken pieces and shrubs) would be treated by jackpot burn, hand pile and burn, chipping, or masticating. These actions or other actions such as firewood gathering to clean up the fuel would take place after completion of the thin and removal operations.
- A prescribed burn plan would be developed and approved prior to initiating any burning operation. A burn plan generally includes unit description, specific prescribed burn objectives, public notification procedures, coordination with other resource specialists, hazard analysis, contingency plans, firing procedures, risk assessment, mitigation measures, estimated fire behavior, acceptable weather variables, and prescribed burn organization.
- Prescribed burning (jackpot burning and hand pile and burning) would be accomplished by applying low-intensity fire using aerial or hand-firing methods. Burning would generally be done in the fall, winter and early spring, consistent with other mitigations in Appendix C, and may take up to five years to complete.
- Landing areas would be designated for concentrating material removed from the site. Landings would serve as collection points for removal and could be used for processing operations such as chipping. These sites may vary in size from one-quarter acre to five acres.
- As much of the cut material would be whole-tree yarded to landings as is operationally feasible.
- Material removed from the site to landings would be disposed of through a variety of methods including utilization for wood products, firewood cutting, chipping, piling and burning, or incinerating.
- Landings would be rehabilitated after use as needed to reduce negative impacts to other resource values.

- Landing piles would be dirt free to facilitate burning or chipping.
- Where mastication occurs, chipped debris would not exceed two inches over 75 percent of treated area.
- Trees would be removed by aerial-based logging systems such as a cable system or helicopter, or by a ground system.
- Sporax (sodium tetraborate decahydrate) would be applied to all cut conifer stumps of live trees and trees greater than 8 inches in diameter if cut by machine and greater than 12 inches in diameter if cut by chainsaw that have died within the last year to prevent infection by annosus root disease.
- Mortality from prescribed burning would not exceed 10 percent in residual conifer stands.
- Handpiles would range up to 12 feet in diameter and 8 feet high, and would be located away from residual trees to prevent crown and bole scorch.
- Fire control handlines would be constructed as needed to facilitate jackpot burning. Handlines would vary from 6 to 20 feet depending on vegetation and topography.
- Within 50 feet of all forest roads, residues resulting from treatments would be completely disposed of. Complete disposal of residues resulting from treatments would occur up to 400 feet from main travel routes and recreation areas.
- During thinning, species would be retained in the following descending order of preference: single-leaf pinyon pine, Joshua tree, bigcone Douglas-fir, sugar pine, Coulter pine, black oak, Jeffrey pine, ponderosa pine, incense cedar, white fir, and canyon live oak. Consult with Forest Botanist prior to removing any single-leaf pinyon pines or Joshua trees.

Thin Chaparral Shrubs

- Masticating chaparral shrub stands may be spread out over several years so that in any one year the chaparral treated would not exceed 20 percent of the chaparral cover in the area.
- All vegetation treatments would be spread out over several years so that no more than 20 percent of the vegetation in the watershed would be treated in any given year.
- Treatments by ground-based equipment would not occur on slopes over 60 percent.

Air Quality

- Visual smoke observations will be monitored on site and at receptor areas during burn implementation to insure that smoke dispersion remains within identified parameters as stated in the smoke management plan.
- Employ safety signing, lights or other devices along traffic routes, which may be impacted by smoke as stated in the smoke management plan.
- Watering roads to control dust will be ongoing throughout the fuel treatment project while heavy equipment is in use and unpaved roads are used for hauling.

Watershed/Soils

- Layout foresters will create no-treatment zones along portions of the intermittent Riparian Conservation Areas (RCAs) with over-steepened banks and in isolated steep areas greater than 45 percent in the ground-based treatment zones.
- Construct erosion control measures such as waterbarring, lop and scatter of limbs on skid trails, landings, cable corridors, firelines, and temporary roads.
- Where possible, temporary roads will be constructed with an outsloping design.
- Where feasible, locate temporary roads outside of riparian areas. If riparian areas must be crossed, design and locate temporary roads in compliance with Best Management Practices (e.g., Stream Crossings on Temporary Roads, Practice 2-16). Consult with the Forest Biologist when flagging temporary road crossings in riparian areas to determine the best road locations, necessary mitigations, and additional wildlife and plant surveys needed.
- Temporary roads and landings will be restored to a more natural hydrologic flow at the conclusion of the project. Restoration may require ripping of temporary roads, main skid trails, landings, construction of barricades, and placement of slash and coarse woody debris (CWD) on temporary roads, skid trails, cable corridors, and landings. Seeding of landings and temporary roads with native weed free seed mixes may be necessary.
- Units 36, 65, 71, 154: Limit the number of trips over the same skidding path to less than three passes. Compacted areas such as skid trails, cable corridors, landings, firelines, and temporary roads would be reclaimed by waterbarring, scarifying, or subsoiling to a depth of 4 to 8 inches.
- Unit 33: Treatment will take place in one year. All associated temporary roads and landings with this unit will be decommissioned the same year.

Protection of Wildlife Species/Habitats

Snags

- **S14:** Where available and within the capability of the site retain a minimum of six downed logs per acre (minimum 12 inches diameter and 120 total linear feet) and 10 to 15 hard snags per five acres (minimum 16 inches diameter at breast height and 40 feet tall, or next largest available). Exception allowed in Wildland/Urban Interface Defense Zones, fuelbreaks, and where they pose a safety hazard.
- **S17:** In areas outside of Wildland/Urban Interface Defense Zones and fuelbreaks, retain soft snags and acorn storage trees unless they are a safety hazard, fire threat, or impediment operability.

Coarse Woody Debris

- Where available and within the capability of the site retain the number of snags/down logs per acre in the following table for present and future coarse woody debris (CWD) needs (about 5 to 7 tons/acre each for snags and downed logs). For example, retain 1 to 2

snags/down logs at the 30-inch diameter class or 4 to 6 snags/down logs at the 20-inch diameter class or 7 to 10 snags/down logs at the 16-inch diameter class to meet this CWD standard (Table A-1).

Table A-1. Coarse woody debris standards

Average DBH	Number of snags/downed logs
16	7 to 10
18	5 to 7
20	4 to 6
22	3 to 4
24	2 to 3
26	2 to 3
28	2 to 3
30	2 to 3
Greater than 30	1 to 2

Riparian Habitat

- Riparian Conservation Areas (RCA) with a width of 98 feet from bankfull stage will be established along all streams within the project. Self propelled skidding equipment is prohibited in the RCAs. Retain all snags and downed logs unless they are identified as a threat to life, property, or sustainability of the RCA.
- **S47:** When designing new projects in riparian areas, apply the Five-Step Screening Process for Riparian Conservation Areas as described in the Forest Plan in Appendix E – Five-Step Project Screening Process for Riparian Conservation Areas.
- Remove trees (including fuelwood) only when an assessment determines that present and future woody debris needs are or would be met and other riparian management objectives are not adversely affected, except for health and safety or community protection needs. Minimum effective ground cover in RCAs shall be based on calculated Erosion Hazard Rating (EHR) rating (Table A-2).

Table A-2. Minimum effective ground cover based on erosion hazard rating (FSH 2509.22-2005-1)

EHR	Minimum Effective Ground Cover
Low (4-5)	40 percent
Moderate (6-8)	50 percent
High (9-10)	60 percent
Very High (11-13)	70 percent

- **S17:** In areas outside of Wildland/Urban Interface Defense Zones and fuelbreaks, retain soft snags and acorn storage trees unless they are a safety hazard, fire threat, or impediment operability.

- Best Management Practices and all necessary management activities will be applied to these areas that will prevent detrimental changes to water quality, aquatic flora and fauna, and/or hydrophytic vegetation within these areas, and adverse riparian area changes in water temperature, chemistry, sedimentation, and channel blockages, and riparian-dependent resources.
- Where feasible, locate temporary roads outside of riparian areas. If riparian areas must be crossed, design and locate temporary roads in compliance with Best Management Practices (e.g., Stream Crossings on Temporary Roads, Practice 2-16). Consult with the Forest Biologist when flagging temporary road crossings in riparian areas to determine the best road locations, necessary mitigations, and additional wildlife and plant surveys needed.

Upland Habitats

- Do not use heavy equipment within 30 feet of downed logs, rocky outcrops (surface expressions of bedrock or small boulder piles), and brush piles.
- Avoid altering habitat within 30 feet of rocky outcrops or downed logs (e.g., leave logs in place, do not remove or disturb vegetation, duff, etc.).
- Avoid falling trees or skidding across rocky outcrops or downed logs.
- Do not place log decks within 50 feet of rocky outcrops. Prior to removal of logs from log decks, check the log piles for sensitive reptile species.
- Where possible, brush piles should be left as habitat. If brush piles need to be removed, they should be removed as soon as possible after piling in order to minimize colonization by wildlife. Prior to removing brush piles, disturb the piles of brush and pull them apart slightly to encourage animals to move out of the piles.
- **S17:** In areas outside of Wildland/Urban Interface Defense Zones and fuelbreaks, retain soft snags and acorn storage trees unless they are a safety hazard or fire threat, or if they impede operability.
- When possible, limit activities associated with tree removal immediately after rains and during times of high humidity (reptiles and amphibian are especially active at this time).
- To minimize effects to breeding birds, restrict vegetation treatments and disturbance events such as prescribed burns, mastication, and disking to the nonbreeding season when feasible. Breeding season is typically March 15 through August 15. If vegetation treatments are planned for implementation during the breeding season, a biologist will survey the treatment area prior to commencement of activities. If active nests are detected, the biologist will recommend the appropriate buffer needed to minimize impacts to nesting birds. In general, this buffer will include a 10-foot radius of untreated vegetation around the nest, but may vary depending on topography and vegetation
- Maintain existing isolated stands of native conifers, oaks, and other hardwoods scattered within the chaparral vegetation types, as well as single-leaf pinyon pine and Joshua trees (see

additional minimization and avoidance measures for single-leaf pinyon pine and Joshua trees in Appendix C of this EA).

- Minimize mechanical disturbance of soils to reduce the impact of habitat manipulation on small mammals.

Threatened, Endangered, and Sensitive Species Habitats

- **S11:** When occupied or suitable habitat for a threatened, endangered, proposed, candidate or sensitive (TEPCS) species is present on an ongoing or proposed project site, consider species guidance documents (see Forest Plan, Appendix H) to develop project-specific or activity-specific design criteria. This guidance is intended to provide a range of possible conservation measures that may be selectively applied during site-specific planning to avoid, minimize or mitigate negative long-term effects on threatened, endangered, proposed, candidate or sensitive species and habitat. Involve appropriate resource specialists in the identification of relevant design criteria.
- **S12:** When implementing new projects in areas that provide for threatened, endangered, proposed, and candidate species, use design criteria and conservation practices (see Forest Plan, Appendix H) so that discretionary uses and facilities promote the conservation and recovery of these species and their habitats. Accept short-term impacts where long-term effects would provide a net benefit for the species and its habitat where needed to achieve multiple-use objectives.
- **S18:** Protect known active and inactive raptor nest areas. Extent of protection will be based on proposed management activities, human activities existing at the onset of nesting initiation, species, topography, vegetative cover, and other factors. When appropriate, a no-disturbance buffer around active nest sites will be required from nest-site selection to fledging.
- **S19:** Protect all spotted owl territories identified in the Statewide California Department of Fish and Game database (numbered owl sites) and new sites that meet the state criteria by maintaining or enhancing habitat conditions over the long-term to the greatest extent practicable while protecting life and property. Use management guidelines in the species conservation strategy (or subsequent species guidance document; see Forest Plan, Appendix H) to further evaluate protection needs for projects, uses and activities.
- **S20:** Maintain a limited operating period (LOP) prohibiting activities within approximately .25 miles of a California spotted owl nest site, or activity center where nest site is unknown, during the breeding season (February 1 through August 15), unless surveys confirm that the owls are not nesting. Follow the USDA Forest Service (1993, 1994 or subsequent) protocol to determine whether owls are nesting. The LOP does not apply to existing road and trail use and maintenance, use of existing developed recreation sites, or existing special-uses, such as recreation residence tracts. When evaluating the need to implement a limited operating period, site- and project-specific factors need to be considered (use species management

strategy or subsequent guidance; see Forest Plan, Part 3 Design Criteria, Appendix H (USDA Forest Service 2005c)).

- **S24:** Mitigate impacts of on-going uses and management activities on threatened, endangered, proposed, and candidate species.

NOTE: See Appendix B of this EA for California spotted owl habitat treatment guidelines based on the Conservation Strategy guidelines.

Protection of Rare Plant Species/Habitats

- Known occurrences of sensitive species will be flagged and avoided. These areas may be buffered to prevent indirect impacts such as soil movement into the occurrences. For certain species such as Palmer's mariposa lily (*Calochortus palmeri var. palmeri*) the avoidance may be flag and avoid or a limited operating period to avoid vegetative and reproductive stages. For other species, proposed treatments may be changed from masticating to hand pruning. For example, treatment areas with short-joint beavertail (*Opuntia basilaris var. brachyclada*) will need to be hand pruned and not masticated. Some vegetation surrounding short-joint beavertail should be left in place to act as protection from herbivory, OHV activity, sun, drought and other environmental conditions. Surrounding mature vegetation protecting cactus seedlings is also called nurse plants.
- In areas where *Opuntia basilaris* var. *brachyclada* is avoided, some vegetation should be left in place to protect plants from extreme weather conditions (primarily sun scalding, but also to protect seedlings).
- Burn piles will not be located on any TEPCS or watch list plant occurrences and will have at least a 24-foot buffer from any occurrences.
- All equipment will be cleaned before entering the project area to prevent introduction or spread of non-native invasive plants. Follow the guidelines in Appendix A of the BE/BA.
- All plant material (e.g., straw, mulch, seeds, etc.) used for erosion control and/or road maintenance must be certified weed-free. A Forest Service botanist or biologist must approve seed mixes prior to application. Where possible, local or onsite seed sources would be utilized.
- Gravel used for road maintenance must be certified from weed free-sources. Gravel sources will be inspected for the presence/absence of noxious weeds prior to utilization of gravel in the project area as appropriate.

Visual Quality Prescriptions

Unit Design and Layout:

- Prior to implementation, a landscape architect would be consulted during final design of the fuel break(s), and before layout and marking begin throughout the course of the project.

- In order to better blend into the surrounding natural landscape, avoid straight lines and geometric shapes whenever possible (including fuel breaks). Create free-form/undulated vegetative shapes that mimic natural patterns (where possible, incorporate existing single-leaf pinyon pine and Joshua trees per mitigations listed elsewhere in Appendices A and C of this EA). Fuel breaks should have free-form shapes that reflect natural open-space patterns in the landscape by following the topographic form of the land and the contours as well as natural lines of hills, ridges, drainages, and rock outcrops.
- To prevent harsh boundaries, fuel break edges will be feathered (usually done by hand) to provide a visual transition into the neighboring/adjoining denser vegetation.
- Use proper firing techniques (retardants, control lines, etc.) to protect designed and feathered edges, whenever doing any prescribed burning.
- Burned slash would be scattered on control lines to reduce the color contrast of the exposed soil.
- No boundary paint would be used parallel to system roads or trails. Trees would be marked on the backside from trails.
- Immediate foreground (300 feet) of Sensitivity Level 1 road and trail corridors, developed recreation sites, and dwellings on private land (Angeles Crest Scenic Byway, Lone Pine Canyon Road, Pacific Crest National Scenic Trail, Blue Ridge Road 3N06.2, Acorn Trail, and OHV trails 3N39B, 3N06.2 and 3N39, Blue Ridge and Guffy Campgrounds are all Sensitivity Level 1 areas):
    - Burn areas: Slash would be removed within 150 feet from sensitive areas. Slash would be piled and burned at 150 to 200 feet (C-6.7).
    - After burning is complete, burn sites that are visible from the road, trail, developed site, or private dwelling would be covered with natural duff or wood chips (mulch) to minimize visibility of the burned area. Note: Any outside source of mulch used throughout the project area must be approved by the Forest Botanist or Landscape Architect prior to being applied.
    - Areas without burning: Slash would be removed within 150 feet from sensitive areas. In the 150- to 200-foot zone, slash would be lopped and scattered to 18 inches or less in depth (C-6.7).
    - Masticated brush slash would not exceed 6 inches in depth.
    - Stumps would be cut within 4 inches of the uphill side of the stump using B6.412 (provision B6.412 allows to determine stump height AT8-contract CA standard height is 12 inches).
    - Tree prune heights would not exceed 6 feet or half the tree height, whichever is shorter.
    - Clumps of trees and/or shrubs are necessary on fuel breaks for aesthetic purposes, but should be appropriately spaced to prevent running crown fires within the break. Shrub islands of various shapes and size would be left in a

random distribution to provide a natural appearance, while meeting fuel reduction objectives throughout the project area (where possible, incorporate existing single-leaf pinyon pine and Joshua trees per mitigations listed elsewhere in Appendices A and C of this EA). Note: To provide better screening and provide easier fire mitigation, design longest section of each island to follow natural contour of land.

- Where possible, angle roads leading to landings so that they are not located perpendicular to Sensitivity Level 1 corridors, in efforts to eliminate direct views into log landings from public travel routes whenever possible.
- No skid roads would be located parallel to system roads within 100 feet where practical.

Trails:

- Signs would be posted advising trail users when project activities are going to take place.
- Vegetative clearing limits would be minimized within 40 feet above and below trail prisms to help screen the trail.
- Trails would be temporarily closed when project activities are taking place within the trail corridor, for the safety of recreationists.
- Project activities would not be performed on weekends in the trail corridor.
- Any damage to the trail from implementation of project activities would be rehabilitated.
- Pacific Crest National Scenic Trail (PCNST):
  - Where temporary roads cross the PCNST, the cut-and-fill prism of the trail will be restored to its original profile and planting/revegetation efforts will be made to restore both sides of the trail within 40 feet to their original vegetative state upon the project's completion. Note: Plant selection for restoration efforts must be approved by the Forest Botanist or Landscape Architect.
  - Signs and natural appearing barriers will be placed on and around the PCNST to deter OHV use on the trail and on the closed temporary roads.
  - Logging operations will not take place during the last two weeks of May and the first week of June of each logging season. This would eliminate effects on approximately 200 through-hikers on the trail.
  - Interpretive signs will be placed in key locations to provide information to trail users about reducing the risk of fire and other project objectives.

Temporary Road Construction

- New temporary road construction would be designed to meet the prescribed VQO. The location of the roads should fit the landscape by minimizing the amount of cut and fill slopes, using topography to screen new roads from sensitive areas. A landscape architect would be consulted for planning the design of alignments and reseeding of cut and fill slopes.

- Amount and size of cut and fill slopes from along road beds would be reduced and graded to conform to adjacent terrain. This can be accomplished by the use of slope rounding and warping slopes. Disturbed sites would be prepared to provide a seedbed for reestablishment of desirable vegetation.
- Vegetative clearing limits would be minimized above and below the road prism to help screen the road.

Ski Areas

- The Mountain High Resort will be advised of the project implementation schedule prior to initiation of project activities that will be done in and around the special-use permit boundary.

Heritage Prescriptions

- The use of standard resource protection measures, as defined in the Regional PA and Interim Protocol, would be applied to all sites within the APE.
- For mechanical treatments, the Forest's heritage resource manager (HRM) shall approve the use of tracked equipment to remove brush or woody material from within specifically identified areas of heritage site boundaries under prescribed measures designed to prevent or minimize effects. This would apply to a historic trail. Work along the trail would be monitored, and no direct skidding across the trail would occur.
- Vegetative or other protective padding may be used in conjunction with the HRM's authorization of certain equipment types within (and across) site boundaries.
- Unanticipated discoveries would be mitigated using the terms of the Interim Protocol. Monitoring has been recommended for those areas of heavy vegetative cover that are considered to be of medium to high risk for the occurrence of heritage resources

Appendix B - Conservation Strategy for the California Spotted Owl on the National Forests of Southern California – Guidelines for Applying Fuels and Forest Health Treatments

Wildland Urban Interface Defense Zone (intensive fuel treatment zone) and the Central Zone of Shaded Fuelbreak (0 to 1500 ft from private/land developed areas); in Pine/Mixed Conifer Forest, Bigcone Douglas-fir/Oak Woodland, Riparian Forest/Woodland, and Redwood Forest in Chaparral Matrix

- Within PACs, strive to limit the width of the defense zone/fuelbreak to 300 feet unless absolutely necessary to provide an adequate defensible space. If necessary, compensate for using the narrow width by treating more heavily outside the PAC.
- In PACs and HRCs, treat forest stands to meet fuels management objectives to protect life and property. Remove grass, shrubs, small trees, and ladder fuels to distances specified by standards for defense zones, while reducing forest canopies to no less than 40 percent live crown cover if available.
- Within ¼ mile of nest or activity center, conduct fuels treatments outside of the nesting season unless the territory is unoccupied.
- Where PACs and HRCs intersect a defense zone or fuelbreak, mitigate by remapping the PAC to add an equal acreage of suitable nesting and roosting habitat (if available) outside of the defense zone/fuelbreak.
- Within PACs and HRCs, retain the largest trees within the treatment area, including all live trees greater than 24 inches DBH unless they are at unnaturally high densities. Exceptions allowed for operability.
- Try to avoid treatments within the Nest Stand. Exceptions would include sites where fuels within the Nest Stand pose an unmitigatable threat to the defense zone or fuelbreak. In those cases, the treatment for the Nest Stand would be developed in a coordinated effort between a silviculturist, biologist, and fuels specialist.
- Where treatments in Nest Stands cannot be avoided, 1) avoid habitat disturbance within 200 feet of the nest tree; but 2) conduct limited ladder fuel treatment within the 200-foot zone around nest trees if the biologist and fuels specialist determine that it would be beneficial, including hand line construction, tree pruning, and cutting small trees; 3) if necessary, treat more heavily outside the nest stand to compensate for protecting the nest tree; and 4) tree felling outside the 200 ft zone should be done directionally away from the nest tree and the 200 ft zone.
- Within the 0 to 300 ft treatment zone, no standing dead trees or downed logs will be left unless they can be left without threatening the fuels reduction objectives. Between 300 feet and the limit of the defense zone (maximum of 1,500 feet), strive to retain at least 5–10 snags per 5 acres and 6 logs per acre.

- Retain all woodrat nests in PACs and HCRs in the zone between 300 ft and the limit of the defense zone/fuelbreak. Retain woodrat nests within the 0-300 ft zone where they do not threaten the integrity of the fuelbreak or defense zone.

Wildland Urban Interface Threat Zone or the Outer Zone of Shaded Fuelbreaks (300 feet to 1.5 miles from private land/developed areas); in Pine/Mixed Conifer Forest, Bigcone Douglas-fir/Oak Woodland, Riparian Forest/Woodland, and Redwood Forest in Chaparral Matrix

- Within PACs, retain existing overstory and midstory canopy cover except where reduction is needed to bring fire to the ground in support of defense zone.
- Within HRCs meet fuel loading goals while retaining a minimum of 50 percent canopy cover except where 1) reduction is needed to bring fire to the ground in support of the defense zone or central zone of fuelbreak; or 2) the canopy has been drastically altered by concentrations of dead trees, and removal of dead trees would reduce the canopy closure below 50 percent.
- Retain the largest trees within PACs and HRCs, including all live trees greater than 24 inches DBH unless they are at unnaturally high densities. Exceptions allowed for operability.
- Avoid treatments within the Nest Stand.
- Within PACs and HRCs, retain at least 9 down logs per acre of the largest logs available.
- Within PACs and HRCs, retain 4 to 8 of the largest snags available per acre, or at least 20 $feet^2$ basal area per acre of snags greater than 15 inches DBH and 20 feet tall.
- When conducting mechanical fuels treatments, retain woodrat nests in PACs and HCRs.

Areas Outside of Defense and Threat Zone and Fuelbreaks in Pine and Mixed Conifer Forest

- Use an indirect fuels treatment strategy to protect PACs. Focus treatments in areas between PACs to reduce threats to the PACs from wildfire.
- Leave PACs untreated except where fuel conditions within the PAC pose a high level of risk for catastrophic crown fire.
- Where treatment within a PAC is necessary to protect it from fire, the treatment prescription would be developed by a biologist in coordination with a silviculturist and fuels specialist.
- Where treatments have to occur in PACs and HRCs, retain existing canopy closure in the PAC and 40 to 50 percent canopy closure in the HRC. In PACs, use understory treatments to remove ladder fuels rather than altering canopy closure.
- Avoid treatments within the nest stand.
- Retain the largest trees within PACs and HRCs, including all live trees greater than 24 inches DBH, unless they are at unnaturally high densities. Exceptions allowed for operability.
- Within PACs and HRCs, retain 4 to 8 of the largest snags available per acre, or at least 20 $feet^2$ basal area per acre of snags greater than 15 inches DBH and 20 feet tall.
- Within PACs and HRCs, retain at least 9 down logs per acre of the largest logs available, ideally at least 12 inches in diameter and at least 20 feet long (at least 180 lineal feet of logs).

- During mechanical fuel treatment activities, retain all woodrat nests in spotted owl habitat; avoid disturbing/destroying them. Exceptions allowed for operability.
- Conduct analysis to identify key geographic areas where fuels treatments can be strategically placed to reduce the risk of stand-replacing fire in PAC clusters. Utilize thinning, small group selection, and prescribed burning in these strategic locations.
- Within forest areas within 1.5 miles of a spotted owl nest, utilize vegetation treatments such as thinning, small group selection, and prescribed burning to reduce surface and ladder fuels, especially in overly dense stands, to promote forest health in foraging habitat.
- Outside of PACs, manage spotted owl habitat for large trees, a diversity of tree species (including hardwoods), multi-storied stands, high canopy cover, small openings or gaps that will encourage shrub and herbaceous cover as well as reproduction of shade-intolerant species such as pines and oaks, and decadence in the form of downed logs and snags.

Areas Outside of Defense and Threat Zone and Fuelbreaks in Bigcone Douglas-fir/Oak Woodland, Riparian Forest/Woodland, and Redwood Forest in Chaparral Matrix

- Treatments can range from prescribed burning of surrounding chaparral, to firing chaparral from edge of stands, to no treatment.
- Where possible, burn surrounding chaparral in segments, narrow strips, or with cool, irregular backing fire on the edges of the stand to retain 25 to 50 percent of the suitable woodrat habitat (mature chaparral) adjacent to the owl habitat. A fuels specialist and wildlife biologist will work together to determine a prescription to ensure a broad enough treatment area to protect the stand while still providing a continuous source of woodrats.
- Low-intensity fire burning out from the edges of the stands may help protect the stands from high intensity crown fires.

Appendix C – Mitigation Measures

Avoidance and Minimization Measures for Wildlife and Plants

All applicable Angeles National Forest Land Management Plan (Forest Plan) standards and guidelines will be followed. Forest Plan standards that relate to impacts to wildlife and plants are listed below.

Forest Plan Standards for the Protection of Wildlife Species/Habitats

S11: When occupied or suitable habitat for a threatened, endangered, proposed, candidate or sensitive (TEPCS) species is present on an ongoing or proposed project site, consider species guidance documents (see Forest Plan, Appendix H) to develop project-specific or activity-specific design criteria. This guidance is intended to provide a range of possible conservation measures that may be selectively applied during site-specific planning to avoid, minimize or mitigate negative long-term effects on threatened, endangered, proposed, candidate or sensitive species and habitat. Involve appropriate resource specialists in the identification of relevant design criteria.

S12: When implementing new projects in areas that provide for threatened, endangered, proposed, and candidate species, use design criteria and conservation practices (see Forest Plan, Appendix H) so that discretionary uses and facilities promote the conservation and recovery of these species and their habitats. Accept short-term impacts where long-term effects would provide a net benefit for the species and its habitat where needed to achieve multiple-use objectives.

S14: Where available and within the capability of the site retain a minimum of six downed logs per acre (minimum 12 inches diameter and 120 total linear feet) and 10 to 15 hard snags per five acres (minimum 16 inches diameter at breast height and 40 feet tall, or next largest available). Exception allowed in Wildland/Urban Interface Defense Zones, fuelbreaks, and where they pose a safety hazard.

S17: In areas outside of Wildland/Urban Interface Defense Zones and fuelbreaks, retain soft snags and acorn storage trees unless they are a safety hazard, fire threat, or would impede operability.

S18: Protect known active and inactive raptor nest areas. Extent of protection will be based on proposed management activities, human activities existing at the onset of nesting initiation, species, topography, vegetative cover, and other factors. When appropriate, a no-disturbance buffer around active nest sites will be required from nest-site selection to fledging.

S19: Protect all spotted owl territories identified in the Statewide California Department of Fish and Game database (numbered owl sites) and new sites that meet the state criteria by maintaining or enhancing habitat conditions over the long-term to the greatest extent practicable while protecting life and property. Use management guidelines in the species conservation strategy (or subsequent species guidance document; see Forest Plan, Appendix H) to further evaluate protection needs for projects, uses and activities.

S20: Maintain a limited operating period (LOP) prohibiting activities within approximately .25 miles of a California spotted owl nest site, or activity center where nest site is unknown, during the breeding season (February 1 through August 15), unless surveys confirm that the owls are not nesting. Follow the USDA Forest Service (1993, 1994 or subsequent) protocol to determine whether owls are nesting. The LOP does not apply to existing road and trail use and maintenance, use of existing developed recreation sites, or existing special-uses, such as recreation residence tracts. When evaluating the need to implement a limited operating period, site- and project-

specific factors need to be considered (use species management strategy or subsequent guidance; see Forest Plan, Part 3 Design Criteria, Appendix H (USDA Forest Service 2005c)).

S24: Mitigate impacts of on-going uses and management activities on threatened, endangered, proposed, and candidate species.

S47: When designing new projects in riparian areas, apply the Five-Step Screening Process for Riparian Conservation Areas as described in the Forest Plan in Appendix E – Five-Step Project Screening Process for Riparian Conservation Areas.

Additional Minimization and Avoidance Measures

1. Best Management Practices and all necessary management activities will be applied to these areas that will prevent detrimental changes to water quality, aquatic flora and fauna, and/or hydrophytic vegetation within these areas, and adverse riparian area changes in water temperature, chemistry, sedimentation, and channel blockages, and riparian-dependent resources.

2. Where feasible, locate temporary roads outside of riparian areas. If riparian areas must be crossed, design and locate temporary roads in compliance with Best Management Practices (e.g., Stream Crossings on Temporary Roads, Practice 2-16). Consult with the Forest Biologist when flagging temporary road crossings in riparian areas to determine the best road locations, necessary mitigations, and additional wildlife and plant surveys needed.

3. Avoid falling trees or skidding across rocky outcrops or downed logs.

4. Where possible, brush piles should be left as habitat. If brush piles need to be removed, they should be removed as soon as possible after piling in order to minimize colonization by wildlife. Prior to removing brush piles, disturb the piles of brush and pull them apart slightly to encourage animals to move out of the piles.

5. To minimize effects to breeding birds, restrict vegetation treatments and disturbance events such as prescribed burns, mastication, and disking to the nonbreeding season when feasible. Breeding season is typically March 15 through August 15. If vegetation treatments are planned for implementation during the breeding season, a biologist will survey the treatment area prior to commencement of activities. If active nests are detected, the biologist will recommend the appropriate buffer needed to minimize impacts to nesting birds. In general, this buffer will include a 10-foot radius of untreated vegetation around the nest, but may vary depending on topography and vegetation.

6. Maintain existing isolated stands of native conifers, oaks, and other hardwoods scattered within the chaparral vegetation types (see also item 7 below).

7. Existing stands of single leaf pinyon (*Pinus monophylla*) and Joshua trees (*Yucca brevifolia*) should be retained where possible. Incorporate these stands into the project design (e.g., fuelbreak designs), to meet visual resource objectives as well as to mitigate impacts to botanical resources (see Visual Quality Prescriptions in Appendix A of this EA). Consult with Forest Botanist prior to removing any single-leaf pinyon (*Pinus monophylla*) and Joshua trees (*Yucca brevifolia*).

8. Known occurrences of sensitive species will be flagged and avoided. These areas may be buffered to prevent indirect impacts such as soil movement into the occurrences. For certain species such as Palmer's mariposa lily (*Calochortus palmeri var. palmeri*) the avoidance may be flag and avoid or a limited operating period to avoid vegetative and reproductive stages. For other species, proposed treatments may be changed from masticating to hand pruning. For example, treatment areas with short-joint beavertail (*Opuntia basilaris var. brachyclada*) will need to be hand pruned and not masticated. Some vegetation surrounding short-joint beavertail

should be left in place to act as protection from herbivory, OHV activity, sun, drought and other environmental conditions. Surrounding mature vegetation protecting cactus seedlings is also called nurse plants.

9. In areas where *Opuntia basilaris* var. *brachyclada* is avoided, some vegetation should be left in place to protect plants from extreme weather conditions (primarily sun scalding, but also to protect seedlings).

10. Minimize mechanical disturbance of soils to reduce the impact of habitat manipulation on small mammals, reptiles and amphibians.

11. Burn piles will not be located on any TEPCS or watch list plant occurrences and will have at least a 24 foot buffer from any occurrences.

12. All equipment will be cleaned before entering the project area to prevent introduction or spread of non native invasive plants. Follow the guidelines included in Appendix A of the BE/BA.

13. All plant material (e.g., straw, mulch, seeds, etc.) used for erosion control and/or road maintenance must be certified weed-free. A Forest Service botanist or biologist must approve seed mixes prior to application. Where possible, local or on-site seed sources would be utilized.

14. Gravel used for road maintenance must be certified from weed free-sources. Gravel sources will be inspected for the presence/absence of noxious weeds prior to utilization of gravel in the project area as appropriate.

15. Consult with the Forest Botanist when locating helicopter landing pads and temporary roads, or when modifying the proposed action, to determine the need for new botanical surveys.

16. Proposed activities will be consistent with the Conservation Strategy for the California Spotted Owl (*Strix occidentalis occidentalis*) on the National Forests of Southern California (USDA 2004a). Before treatment activities commence in suitable habitat or within .25 miles of suitable habitat or critical nest stands of protected activity centers (PACS), protocol surveys will be conducted to verify the occurrence and reproductive status of any California spotted owls in the area. If breeding activity is confirmed, activities that may impact reproductive success (helicopters, chainsaws, heavy equipment operation, etc.) will not be conducted from February 1 to August 15 within ¼ mile.

17. Vegetation treatments and log/snag retention in suitable California spotted owl habitat will be consistent with the Conservation Strategy for the California Spotted Owl (USDA 2004a). A biologist will coordinate and monitor implementation of prescriptions in owl habitat.

18. Following treatments, natural appearing barriers (e.g., large rocks, soil berms, untreated vegetation) will be placed at all access points to fuelbreaks, temporary roads, trails (including skid trails), and other open areas created by the project to deter illegal OHV access.

19. To minimize potential disturbance to bighorn sheep, helicopter use (including flight paths) will not be permitted between April 1 - July 1. From July 1 through December 1, helicopter use will be permitted but not within one mile of Wright Mountain.

Appendix D – Project Maps

(Project maps are filed separately.)