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Keola Fuels and Forest Health Project

High Sierra Ranger District, Sierra National Forest
Fresno County, California

Sections 14, 15, 16, 21, 22, 23, Township 8 South, Range 25 East, Mount Diablo Meridian

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CHAPTER 1: PURPOSE AND NEED FOR ACTION

Introduction

The High Sierra Ranger District (Ranger District), Sierra National Forest completed an environmental analysis with an interdisciplinary team for the Keola Fuels and Forest Health Project (Keola Project). The project is being proposed under the Healthy Forest Restoration Act[1] of 2003 ((P.L. 108-148) authority and involves a variety of fuels and forest health activities on approximately 550 acres of National Forest System lands. The project area covers approximately 1,400 acres and is located in a portion of the Huntington Basin, west and southwest of Huntington Lake. The project area is located entirely in Fresno County in portions of Sections 14, 15, 16, 21, 22, 23, Township 8 South, Range 25 East, Mount Diablo Meridian, all of which are within the wildland urban interface (WUI). Elevation ranges between 6,400 and 7,300 feet.

Background

The Huntington Basin Landscape Plan (Landscape Plan) was completed in May 2010 (USFS 2010). This Landscape Plan is intended to be the link between the Sierra National Forest Land Management Plan (Forest Plan) and project level analysis. The Landscape Plan defines the desired condition and identifies opportunities for change from a landscape perspective for the Huntington Basin. The Keola project is identified in the Landscape Plan as one of the first projects to be planned and implemented.

The project area includes numerous homes and facilities: Camp Keola Organization Camp, Lakeview Summer Home Tract that includes 6 cabins, Lakeview Cottages, Dowville Summer Home Tract with 94 cabins, Huntington Lake Resort, Dowville Picnic day-use area, two boat launches with approximately 86 slips total, and several private inholdings, power distribution lines, and water systems.

Past logging practices in the area and long-term fire suppression have changed the make-up of the stands from mixed conifer to almost pure stands of high density true fir (mainly white fir [*Abies concolor*]) with heavy dead and down fuel loading.

Since 1911, only one large wildfire has burned within the Huntington Basin. The 1994 Big Creek fire burned roughly 137 acres of mixed conifer/white fir at the west end of the basin within the Keola Project area. Within the Keola Project boundary the Big Creek fire burned at a low fire intensity; however, more than half the fire area burned at moderate and high fire intensities (USFS 1995). Wildfire exclusion has increased risk for large severe wildland fires in many ecosystems (Busenberg 2004, Agee and Skinner 2005). Damaged homes related to wildland fires became nationally recognized in 1985 (Cohn 2008). Since 2000, several documents have been published providing direction and/or guidance on hazardous fuels around communities, including the National Fire Plan (2000), Federal Wildland Fire Management Policy (updated 2001), 10-Year Comprehensive Strategy (2001), Healthy Forests Initiative (2002), Healthy Forest Restoration Act of 2003 and Protecting People and Natural Resources, A Cohesive Fuels Treatment Strategy (USDA/USDI 2006). The

[1] A copy of this act is available at http://frwebgate.access.gpo.gov/cgi-bin/getdoc.cgi?dbname=108_cong_bills&docid=f:h1904enr.txt.pdf

community in the Huntington Basin (known as “Lakeshore, CA”) is listed as a community that is within the vicinity of federal lands that is at high risk from wildfire (Federal Register 2001).

Huntington Basin is a designated recreation area (Huntington Lake Recreation Area) and is the most widely used area for recreation in the High Sierra Ranger District. The Huntington Basin sees well over 200,000 visitor-days each year. It is estimated that on a busy summer weekend, there are as many as 12,000 to 15,000 persons participating in some form of recreation in the Huntington Basin. Huntington Lake is considered one of the premier high elevation lakes for boating events. In addition, Huntington Lake is a part of Southern California Edison’s Big Creek Hydroelectric Project.

Despite the amount of visitors, development, and recreation opportunities in the basin, Huntington Basin has the unique quality that from the Huntington Lake itself, the basin appears heavily forested and relatively undeveloped. According to the Sierra National Forest Land and Resource Management Plan (Forest Plan) the following sensitive viewpoints in the Huntington Basin include but are not limited to: Huntington Lake Recreation Area (views from recreation residences tracts and resorts, private residences, and recreation facilities); Huntington Lake; Huntington Lake Road (M2710); and Sierra Heritage National Forest Scenic Byway (Highway 168 and Kaiser Pass Road).

Forest health is an important consideration in the management of this high recreation use and visually sensitive area. A general definition of a healthy forest is one that has the ability to rebound from disturbance and maintain important forest structures after the disturbance (Kolb et al. 1995).

Existing Condition

Figure 1. Existing fir stand within the project area

Changes in mixed conifer stands from fire tolerant Jeffrey pine (*Pinus jeffreyi*) to fire intolerant white fir have changed the way fires burn within the basin. Shade tolerant firs are much more susceptible to damage from wildfires, are smaller in diameter and grow in much denser stands (figure 1). In the absence of light intensity surface fires due to fire suppression since 1910, dense thickets of fir coupled with heavy dead and down fuel loading have created fuel ladders and increased the fire hazard. Because of fire suppression, fuel loading has built up over several decades, leaving some areas with large amounts of heavy down woody debris. The decrease of low intensity surface fires in the last century has led to a shift away from small groups of trees killed by fire to individual trees that die from other factors. This has led to a build up of dead and down material that can cause higher intensity fires (figure 2).

In several areas within the project area, past logging practices removed the larger pine, leaving large decadent true fir. One of these areas contains structures and facilities.

Figure 2. Photo within project area with dense fir stand and heavy level of dead and down fuels.

Forest Health Protection Report SS09-15 "Forest Health Survey of Huntington Lake Basin Recreation Area" (2009) identifies multiple forest health issues in the Keola Area. Forest health issues identified include tree stress related to high densities, annosum root disease (*Heterobasidion annosum)* "S" type[2], dwarf mistletoe (*Arceuthobium* spp.), and bark beetles (including *Dendroctonus* spp. and *Scolytes* spp.). Stand density is used to display effects of growth on the potential for insect mortality and tree stress (Oliver 1995, Oliver and Uzoh 1997). As stand density index (SDI) increases beyond 35 percent of maximum, insect mortality is possible (Oliver 1995, Oliver and Uzoh 1997). When SDI increases beyond approximately 60 percent of maximum, insect mortality is imminent (Oliver 1995, Oliver and Uzoh 1997). Many stands within the project area are above 35 percent and several stands are approaching, at, or in a few cases are above 60 percent of their estimated maximum SDI. Although stand conditions have not yet produced catastrophic effects in the basin, continued tree growth and reduced resilience increase the risk of mass mortality.

Due to the poor stand health and hazardous fuel conditions within the project area, the scenic stability[3] for the area is low, because known scenery attribute conditions and ecosystem stressors (e.g., high severity fire risk, high insect/disease mortality risk) seriously threaten the scenic quality of the area.

Goals and Desired Condition

Section 4.2 of the Forest Plan (USFS 1991) provides general goals and objectives while section 4.3 of the Forest Plan provides general future conditions for the Forest addressing a variety of resources. Appendix A in the Sierra Nevada Forest Plan Amendment Record of Decision (SNFPA; USFS 2004) provides management goals and strategies for specific areas of concern, and appendix B provides desired conditions for various land allocations. The Huntington Lake Basin Landscape Plan, chapter 6, provides desired conditions for important resources in the area including fuels, visuals, and biology. The Forest Health Protection Report SS09-15 "Forest Health Survey of Huntington Lake Basin Recreation Area" (2009) provides recommendations on forest health issues for the area. These documents are the primary basis of defining the desired conditions for the Keola Project.

[2] *Heterobasidion annosum* (annosum root disease or fomes) is a fungus that causes root disease "S" type is specific to annosum root disease that infects true fir.
[3] Scenic stability is the degree to which the valued scenic character and it scenery attributes can be sustained through time and ecological progression.

The desired conditions in the planning documents generally complement each other. According to the Landscape Plan, the desired conditions for the Huntington Basin are to put forests in a state that is resilient and able to respond to change. The stands within the project area are more resilient to drought cycles that are common in California. The stand densities are below bark beetle thresholds, helping to prevent and mitigate mortality should outbreaks occur. Prevention and restoration of root disease centers and heavily infected mistletoe individuals help improve survival for the next generation of trees (USFS FHP Report 2009).

The Landscape Plan also states aesthetically, the optimal desired scenic character for the Huntington Basin would display a more open, park-like setting with diverse forest canopy and vegetative mosaic while providing a screen of the existing structures at key viewing areas.

The Keola project is entirely within the WUI defense zone land allocation. According to SNFPA (USFS 2004), the desired condition within this zone is to maintain vegetation that will reduce fire spread and fire intensity sufficiently for suppression forces to succeed in protecting human life and property.

While implementing actions to meet these desired conditions, the desired condition for cultural resources is to ensure the project will meet historic preservation goals and Forest Plan objectives through compliance with the National Historic Preservation Act (including compliance with the appropriate programmatic agreements between the Forest Service and the State Historic Preservation Officer). The desired conditions for Riparian Conservation Areas are the same as those noted in SNFPA (USFS 2004; pp 42-43) including: to minimize new introductions of invasive species; have desired habitat conditions in both species composition and structural diversity; and have in-stream flows that keep sediment regimes as close as possible to those with which aquatic and riparian biota evolved. Because the project area is in a high recreation use area, impacts to air quality should be minimized, especially during high recreation use times.

Purpose and Need for Action

The needs for the project are to:

- Reduce the risk to life and property from an unusually severe wildland fire event (i.e., 95th percentile fire weather conditions[4]) within the Keola Project area (measurement indicators: flame length,[5] rate of spread,[6] fire type[7]).

[4] Fire weather percentile is defined as the weather conditions that occur for a given percent of fire season or another defined length of time. 95th percentile weather occurs during five percent of the defined period of time. For fire season, this weather is generally considered "very high" with hotter temperatures, drier air and higher winds. Refer to the fire and fuels specialist report in the planning record for a complete list of environmental variables such as temperature, wind, relative humidity and fuel moistures.

[5] Flame length is a measurement of the average distance from the base of the flame to its highest point and is an indicator of the relative ease with which a fire can be successfully attacked by suppression resources.

[6] Rate of spread is the forward movement of the flaming front as measured in chains per hour (one chain equals 66 feet).

[7] Fire type is the description of the most likely type of fire to occur under 95th percentile weather conditions. The terms used here to describe "fire type" arranged in order of increasing intensity are "surface, conditional, passive, active". Surface fire would not initiate crowning. Conditional crown fire describes the situation where surface fuels are not present in sufficient amounts to initiate crowning but canopy fuels are sufficient to sustain an independent crown fire. Passive fire would result in crowning because of heavy fuel loading at the surface. Active crown fire would result in sustained crowning runs after initiation without support from surface fire.

- Improve effectiveness of fire suppression operations and firefighter safety within the project area (measurement indicators: flame length, rate of spread, fire type).
- Improve a stand's ability to withstand the drought cycles that are common in California without mortality above endemic levels and reduce the risk potential for insect- and disease-driven mortality within the project area (measurement indicator: bark beetle risk thresholds, management of mistletoe and annosum root disease).
- Maintain the valued scenic character and its scenery attributes through time and ecological progression within the project area (measurement indicator: scenic stability).

This would be achieved by treating vegetation within the project area on National Forest System lands. The project is designed to respond to goals and desired conditions identified in the Forest Plan as amended, and recommendations provided in the FHP Report Number SS09-15 (USFS 2009).

The purposes of the project are to:

- Include cost-efficiency in designing treatments to maximize acres treated (Sierra Nevada Forest Plan Amendment Record of Decision [SNFPA ROD], p. 34).
- Maintain the visual quality objective (VQO) of retention as seen from the Huntington Basin key viewsheds (Forest Plan, VQO map).
- Minimize adverse impacts from activities from this project to key cultural resources and key aquatic and terrestrial wildlife and plant species within the project area.
- Adhere to particulate matter standards set by the San Joaquin Valley Unified Air Pollution Control District (SJVUAPCD).

Proposed Action

A detailed description of the proposed action can be found in chapter 2 under Alternative 2, Proposed Action.

Decision Framework

The Sierra National Forest, Forest Supervisor is the responsible official for this project. The Forest Supervisor will decide whether to approve the proposed action, approve an alternative or a modification to the proposed action, or take no action related to this project at this time.

Public Involvement

The Ranger District began listing the Keola Project in the Schedule of Proposed Actions (SOPA) beginning in October 2010 (fourth quarter). A web link to the SOPA can be found on the Forest projects web page at: http://www.fs.fed.us/sopa/forest-level.php?110515.

In compliance with the Healthy Forest Restoration Act, two collaboration meetings were held for the Huntington Basin: the first occurred on August 28, 2010 (18 attendees) and the second occurred on October 16, 2010 (15 attendees). Meetings were widely attended by the recreational residence permit holders in the area. Several comments from these meetings are incorporated into the proposed action design.

In compliance with Section 106 of the National Historic Preservation Act, letters to initiate consultation with Native American tribes were mailed November 30, 2010. Similar letters were also sent to individual tribal members and non tribal organizations.

On December 20, 2010, 38 scoping letters, along with the proposed action treatment map, were mailed to potentially interested individuals, organizations, and agencies. They included special use holders (recreation residences, resorts, organization camp, Southern California Edison), Hwy 168 Fire Safe Council, and private landowners. Environmental organizations were also sent scoping notices (i.e., Sierra Club, Tehipite Chapter, John Muir Project, Sierra Forest Legacy, Californians for Alternatives to Toxics). The scoping letter, scoping document (that included a description of the proposed action), and the proposed action treatment map were posted on the Forest website soon after at http://www.fs.fed.us/r5/sierra/projects/keola/index.shtml[8]. In addition, a legal notice for this project was published in the *Fresno Bee* December 20, 2010. The legal notice and scoping letter requested public comments be submitted by the end of the 30-day public comment period, January 20, 2011.

A public meeting was scheduled (invitations were included in the Native American consultation letter, scoping letter and legal notice) and held on January 4, 2011 from 4:00 to 6:00 pm. There were no attendees at this meeting.

Reviewing the comments from the public (two letters), Native American tribe, and internal resource specialists' concerns (see Issue section below), the responsible official approved the list of issues to be addressed in the analysis.

Issues

Based on internal and external comments received during scoping, the following key issues are the focus of the analysis:

- Concern that the project will negatively affect stand characteristics (e.g. stand density, canopy cover, large snag density[9]) when compared to no action over time.
- Concern how this project will affect large snag density now and in the future and how this will negatively affect various wildlife species and the ecology within the project area.
- Concern how stand characteristics for each alternative will affect management indicator species, including California spotted owls.
- Concern how fire severity (based on modeling of the alternatives) will potentially impact various wildlife species within the project area, including cavity nesting species and California spotted owl.
- Concern how the alternatives will affect fisher rest sites within the project area related to snag and downs logs.
- Concern over the economic costs for the project (including administrative costs).

Based on the purpose and need for this project and the issues, this document addresses the effects from this project on the following resources: fuels (wildfire and fire suppression

[8] This project information is no longer at this URL. The project website can be found by going to: http://www.fs.usda.gov/goto/Sierra/Projects and searching for the Keola Fuels and Forest Health Project link
[9] A large snag is defined as dead trees at least 15 inches

predictions at 95th percentile fire weather conditions), vegetation (i.e., stand health and resiliency related to insect and disease, stand characteristics), visuals (i.e., scenic stability, visual quality objectives), terrestrial wildlife (i.e., large snag dependent species, California spotted owl, fisher, management indicator species), and economic costs (including administrative costs). Other resources (e.g., special status plant species, invasive plants, aquatic wildlife, hydrology, soils, heritage resources) were analyzed and documented in specialist reports in compliance with various laws and regulations but are not fully discussed in this document (design features have been included in the action alternatives to reduce potential adverse effects). The full analysis for this project is located in the fire and fuels, vegetation and silviculture, scenery resource, wildlife biological assessment and biological evaluation (BA/BE), management indicator species, migratory bird, economics, water resource, soils resource, archaeological reconnaissance report, air quality, aquatic species BA/BE, and botany BA/BE and noxious weed risk assessment specialist reports found in the project planning record located at the High Sierra Ranger District office, 29688 Auberry Road, Prather, CA 93651. These reports are referred to in chapter 3 of this EA and are incorporated by reference.

CHAPTER 2: ALTERNATIVES, INCLUDING THE PROPOSED ACTION

This chapter describes and compares the alternatives considered for the Keola Project. It includes a description of each alternative and a map of each action alternative considered. At the end of this chapter, the alternatives considered in detail are summarized in a table along with the associated environmental impacts for each so they can be readily compared. The information used to compare the alternatives is based upon the design of the alternative and potential effects.

The Healthy Forest Restoration Act only requires one alternative be addressed in the analysis, if all treatments are in WUI and the alternative supports the local Community Wildfire Protection Plan. Although on May 26, 2011, the 9th Circuit ruled that the need for a non-commercial funding alternative is no longer required, this alternative, along with the no action alternative are analyzed in detail.

Alternatives Considered in Detail

Alternative 1: No Action

This alternative would result in none of the proposed management activities being implemented at this time. In general, conditions would remain as described in Chapter 3 for the no action alternative. The analysis of the no action alternative provides reviewers a baseline to compare the magnitude of environmental effects of the action alternatives and the potential long-term impacts from not implementing the project.

Alternative 2: The Proposed Action

The proposed action includes approximately 550 acres of manual, mechanical, and prescribed fire treatment methods and approximately 1.5 miles of temporary road construction. Estimated volume of timber removed would be 1.1 million board feet (MMBF). Treatment areas are entirely within the WUI defense zone on National Forest System lands. The WUI defense zone would be modified from the SNFPA ROD (2004) because the structures in Camp Keola, the Lakeview Cottages, Huntington Lake Resort and the Dowville Day-use Picnic Area were not included in the original WUI urban core or defense zones for the Sierra National Forest. Actual WUI boundaries will be modified at a later date. This project anticipates, at a minimum, treatment units would be located in WUI core or WUI defense zones to adequately protect the health and safety of the public and the structures in the project area.

Table 1 provides a summary of treatments proposed by unit.[10] Figure 3 is a map of the proposed action showing a summary of treatment areas and activities, and location of temporary roads. As noted in figure 3 and table 1, there may be multiple treatments within a treatment unit.

Vegetation Treatment Prescriptions and Methods

Many of the treatment units have multiple treatment prescriptions; therefore, the treatment acres overlap. The following treatment activities are generally noted in the order in which the expected treatments would occur.

[10] A unit is an designated area where specific treatment methods would occur. For this project, they vary in size from 4 to 108 acres.

Table 1. Summary of activities by treatment unit for the proposed action alternative.[11]

Treatment Unit #	Total Acres	No Treatment	Single Tree Selection	Thin from Below	Sanitation	Sporax® stumps	Precommercial Thin	Masticate	Hand Pile	Tractor Pile	Burn Piles	Broadcast Burn	Site Preparation Tractor	Planting	Release	Temporary Roads (miles)
42	30	5		25		25	25			25	25			0.5	1.5	0.1
43	21						21		21		21				1.0	
44	20	2		18		18	18			18	18			0.5	0.7	0.2
45	26	5	21			21	21	21							4.0	
47	27											27				
48	26			25		25	25					26	1.0	1.0	2.5	
50	87	5	82			82	82			82	82			3.0	6.5	0.5
51	13	4		9		9	9			9	9				2.0	
52	20	1		1		19	19	19						1.0	3.0	0.1
53	22											22				
54	9			9		9				9	9					0.1
55	30											30				
56	4											4				
57	26											26				
59	33	2		31		31	31			31	31			1.0	2.0	
60	31			8	23	31	31		23	8	31			2.5	4.0	0.1
65	108	2		106		106	106			106	106			1.0	1.5	0.3
115	4											4				
126	13			13		13	13			13	13			0.5	1.0	0.1
total	550	26	103	245	23	389	401	40	44	301	345	139	1.0	11.0	29.7	1.5

[11] All measurements are in acres except temporary road measurements are in miles.

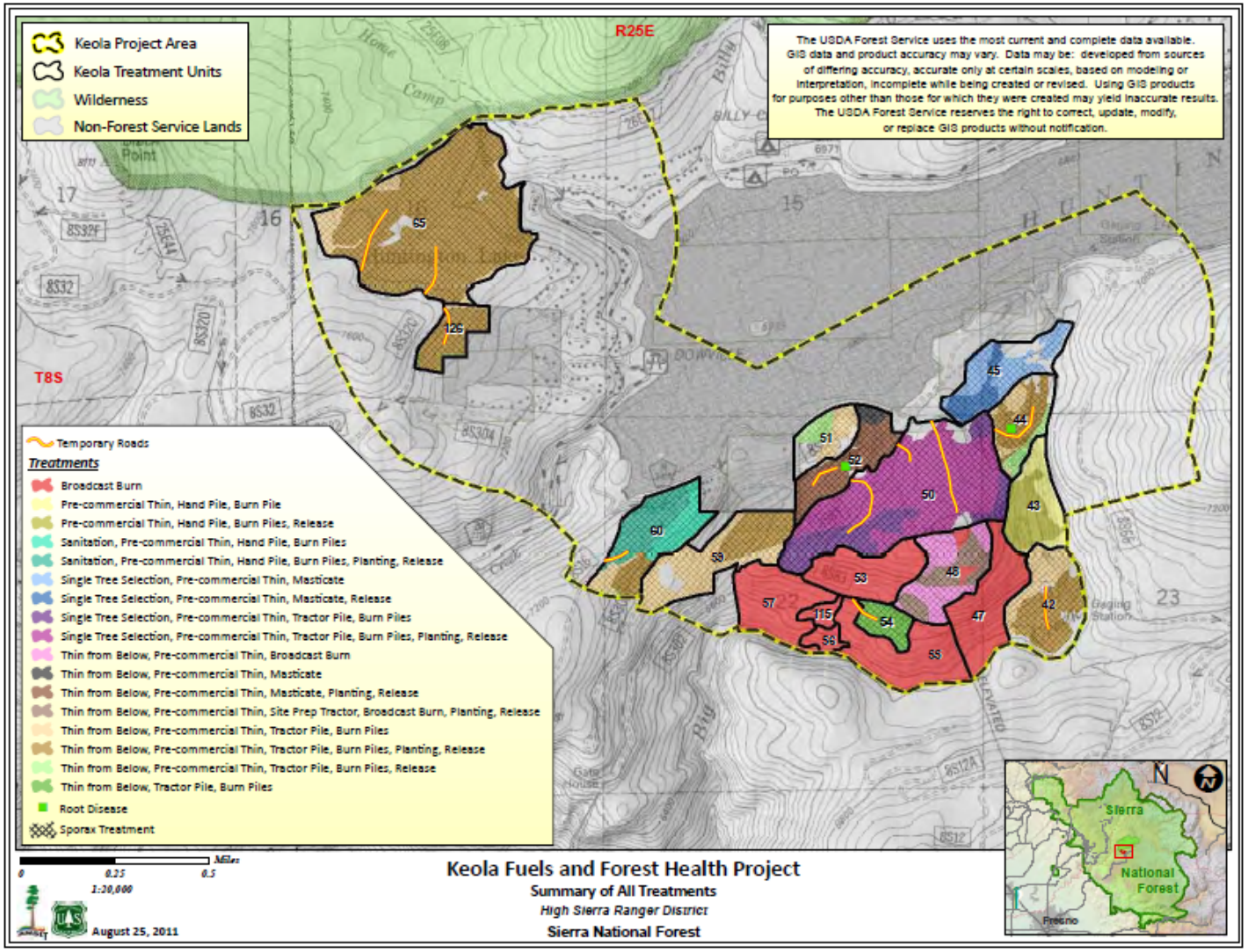

Figure 3. Alternative 2, Proposed Action Treatment Map.

Stand Prescriptions

Commercial Harvest Treatments

Commercial harvest treatments are the mechanical cutting (e.g., mechanical harvesters, chainsaws) of conifer trees a minimum of 10-inch diameter at breast height [dbh][12]) with ground based equipment (tracked and/or rubber-tired). The trees would be harvested by cutting off 6-inch tops and the majority of limbs, cutting the tree into log lengths on site, skidding logs to designated landings, piling the logs at the landings, and removing logs to the mill with logging trucks.

All cut, true fir stumps greater than 15 inches dbh would be treated with an EPA registered borax fungicide, such as Sporax,® for the prevention of the spread of annosum root disease. For areas within 300 feet of structures (e.g., cabins), all cut, true fir stumps greater than 3 inches dbh would be treated. Sporax® would be applied by hand, in an approved granular form within one hour of stump creation. The fungicide would not be applied when it is raining. All Forest Service policies and practices, and California regulations relating to pesticide use would be followed including developing a spill plan for the Sporax® use.

No trees greater than 30-inch dbh or snags greater than 15-inch dbh would be removed unless severely weakened by disease near structures or improvements or the tree/snag could pose a safety hazard to fire suppression forces should a wildfire occur in the area (e.g., hazard tree risk ranking system is defined in appendix E of the vegetation and silviculture specialist report[13], including those trees that would likely die within the next ten years).

Priority tree species to retain during this activity are: disease-free sugar pine (*Pinus lambertiana*), California juniper (*Juniperus californica*), California black oak (*Quercus kelloggii*), western white pine (*Pinus monticola*), and quaking aspen (*Populus tremuloides*); the tallest trees; and those trees with the largest crowns and straightest boles that are free of damage from insects, disease and physical or mechanical causes.

Variable spacing would be encouraged for the development of historic vegetative conditions and quality wildlife habitat.

Target basal area range for each treatment unit proposed for commercial harvest is summarized in table 2. In any given clump of trees, basal area reduction would not be greater than the removal of one third of the existing basal area.

Table 2. Comparison of target basal area range and existing basal area for treatment units proposed for commercial harvest for alternative 2.[14]

Treatment unit #	Target Basal Area Range (ft^2/ac)	Existing Average Basal Area (ft^2/ac)
42	160-180	198
44	160-180	211
45	190-210	236

[12] Diameter at breast height is a common measurement of tree diameter and is measured 4.5 feet from the ground on the uphill side of the tree.
[13] Appendix E, Huntington Lake Risk Tree Management Strategy is on file in the project planning record at the High Sierra District Office and is incorporated by reference in this document.
[14] Targets are developed using desired conditions for vegetation and fuels from the Forest Plan, as well as taking into consideration the existing basal area.

Treatment unit #	Target Basal Area Range (ft^2/ac)	Existing Average Basal Area (ft^2/ac)
48	120-140	165
50	160-180	204
51	80-100	115
52	150-170	228
54	180-200	322
59	160-180	222
60	120-140	169
65	160-180	230
126	120-140	158

There are three commercial treatment prescriptions proposed:

Thin-from-Below

The thin-from-below prescription would be for relatively even-aged stands. Thin treatment units under the following criteria until the target basal area range is reached (table 2):

- Priority for removal would be based on the following canopy classes: suppressed, intermediate, co-dominate trees.
- Among trees of the same canopy class, priority for removal based on tree species is: white fir, red fir (*Abies magnifica*), lodgepole pine (*Pinus contorta*), and Jeffrey pine. Where there is a red fir mistletoe infested overstory, red fir would become the first species priority for removal.
- Among trees of the same canopy class priority and trees species priority, trees would be given priority based on the health of the tree. The following are indicators of poor tree health: trees with less than 15 percent live crown; trees with signs of mistletoe; visible conks;[15] visible signs of rot; bark beetle activity (e.g., boring material on the bark or base of the tree); and a minimum of two live trees deep surrounding a known annosum root disease pocket. If there is a tree of extremely poor health of a species of a lower removal priority (e.g., Jeffrey pine with mistletoe and a 5 percent live canopy) adjacent to a tree of good health in a higher priority species or class (e.g., white fir), the tree of extremely poor health would be the priority tree for removal.
- If all other priority levels are the same, trees would be chosen based on which tree has the lower percentage of live crown.
- If there is a quaking aspen stand within the treatment unit, the conifer basal area along the edges of the aspen stand would be lower than the remaining unit to provide additional habitat for the aspen stand. This would not be a group select, but a heavier thin.

The thin-from-below prescription is proposed for approximately 254 acres in the project area.

Single Tree Selection

The single tree selection prescription would be for relatively mixed story stands. Treatment would involve the removal of suppressed, intermediate, and co-dominant trees within each size class of trees until the target range basal area level is reached (table 2). Priority trees for

[15] Conks are fungi fruiting bodies

removal would be the same as the thin-from-below criteria. The criteria for retaining understory trees would ensure that the understory trees retained would not be ladder fuel to the taller and larger nearby trees. The objective would be to create single story groups of near equal age/size. Approximately 103 acres are proposed for single tree selection treatments.

Sanitation

The sanitation prescription would involve the removal of live trees which pose forest health issues, including trees which are hazard trees or are likely to die in the next ten years. This treatment prescription is within 300 feet of structures. The following criteria for removal would include:

- Potential hazard trees as defined in appendix D of the vegetation and silviculture specialist report would be designated for harvest by certified timber cruisers.
- Trees in the understory of the same species as trees infected with mistletoe in the overstory.
- Other criteria for removal would be those trees that show the poor health indicators, tree condition class, and tree species priority noted in the thin from below treatment prescription.

The retained basal area would not go below the target basal area level (table 2) unless there is a pocket of hazard trees in an area. If a particular tree has a unique personal value to the special use holder, the tree would not be removed unless it is determined to be a hazard tree.

Approximately 23 acres are proposed under this prescription, entirely located in unit 60.

Precommercial Thin

The precommercial thin prescription is the cutting of young trees less than 10 inches dbh with chainsaws. These small sized trees would be left at a variable spacing ranging from 16 to 20 feet, excluding the overstory canopy, if applicable. Pine species would be the priority tree species to retain. In addition, the most well formed and healthiest trees would be priority leave-trees. The precommercial thinning criteria would ensure the retained small sized trees would not act as a fuel ladder to taller and larger sized trees. Approximately 401 acres are proposed for precommercial thinning within the project area.

Fuels Prescription

Activity Fuels and Natural Fuels Treatment Methods

Where the level of dead and down woody debris is above the fuels objectives (10 tons per acre) due to the amount of fuels generated from the commercial and precommercial thinning activities and the natural fuels that existed prior to treatment, one of the following treatment methods could occur:

Mastication

Down fuels would be masticated (mowed/shredded) with mechanical equipment (typically tracked with a cutting head mounted on an articulating arm). The equipment is able to reach slopes greater than 35 percent slope with the articulating head. The debris would be shredded into small pieces that would be left on site or later burned. Approximately 40 acres are proposed for mastication (units 45 and 52).

Hand or Tractor Pile

Dead and down material would be manually hand piled. Hand piling of slash three inches in diameter or larger would occur in portions of unit 60 and all of unit 43. In unit 60 and 300 feet from structures the material would be hand piled or be removed to a disposal site for burning. Tractor piling could occur in this area under special circumstances and agreed to by the Forest Landscape Architect. The disposal site has been used in the past and would be located off of road 7S05 approximately 1.5 miles from the project. In unit 60, the slash generated from the project would be removed and/or piled outside the special use permit boundaries. Tractor piles of the dead and down material would be created using a brush rake or grapple attached to a tractor (or similar machinery). Hand piling would total approximately 44 acres; tractor piling would occur in approximately 301 acres within the project area.

All piles would have a good base to keep the pile from toppling and would have enough distance between piles to prevent premature ignition during burning. Piles would be located so that burning would cause minimal damage to standing green trees. Depending on the size of the residual trees, this would be construed to be at least 20 feet from the bole of any live tree.

If the green conifer slash must be piled, slash piles would be located in open, sunny locations outside of the dripline of leave (residual) trees and kraft paper may be used to protect an ignition point from wet weather. Slash piling would occur from July 1 through October 31 to enhance the drying of created slash and reduce the build-up of detrimental insect populations (except when restricted by a limited operating period [LOP][16]).

Prescribed Fire

Two prescribed fire methods would be used: burn piles and broadcast burn. Burning could only be initiated on “burn days” designated by the State Air Quality Control Board when satisfactory wind dispersion conditions prevail (Forest Plan [LMP], Standard 218, p. 4-25).

Burn Piles

Piles generated from hand (manual) and mechanical equipment would be burned. Piles are typically ignited with drip torches. Fire would be allowed to creep between piles while maintaining a burn intensity that would minimize tree bole scorch height or mortality of the retained trees. The burn piles would total the sum of the tractor and hand piles (approximately 345 acres).

Broadcast Burn

Broadcast burning would include burning the understory of treatment units with tree canopy overstory (i.e., underburning) and burning blocks of shrub covered treatment units with no overstory. Typically these burns occur in the spring or fall when fuel moistures are low enough to carry the fire and burns at cooler temperatures to protect overstory vegetation (where applicable). Where there are no existing control lines (e.g., roads, natural barriers such as wet drainages), firelines would be constructed. On slopes less than 35 percent, firelines would be tractor constructed and on slopes greater than 35 percent, handline would be constructed. Both types of lines would involve scraping down to mineral soil and constructing waterbars for erosion control. Ignition typically would occur with drip torches,

[16] Limited operating period (LOP) is a period of time where limited treatment activities can occur within a given area

but a helitorch[17] could be used in the shrub treatment units. Broadcast burning totals approximately 139 acres.

Reforestation[18] Prescriptions

Reforestation involves tractor site preparation prior to planting (where applicable), planting, and release of the seedlings.

Tractor Site Preparation

Heavy equipment would be used to scrape slash, brush, and other debris from an area where planting is proposed, and pile the material for burning. The area proposed for tractor site preparation is in an area where piling for hazardous fuels treatment is not proposed. This involves approximately one acre of treatment in treatment unit 48.

Planting

Pockets of openings (half to one acre in size) within treatment units would be planted with conifer tree seedlings that are endemic to the forest type. Species planted could include Jeffrey pine, sugar pine, white fir, and red fir. The species mix would be consistent with the project fire regimes of more frequent wildfire (higher percentage of pine). Seedling species selection would consider those openings where the adjacent overstory is heavily infected with mistletoe (i.e., the tree seedlings planted would not be of the same species as the heavily infected mistletoe trees).Where the annosum root disease pockets are treated, pine species would be planted in those openings (pines are resistant to the annosum root disease that infect true fir).

Multiple species of tree seedlings would be planted together and the tree best adapted to the site would survive or selected during pre-commercial thinning activities (which could occur at a later date as a separate project and separate NEPA decision). A total of 11 acres are proposed for planting within the project area.

Plant seedlings would be distributed to special use holders to plant within their lots. Education and guidance would be provided by the Forest Service for proper species mix and planting spots to assure that seedlings do not become fire hazards in the future.

Release

Release treatments would occur after planting or in natural stands with clumps of tree seedlings and/or saplings. These areas vary in size from 0.2 to 4 acres in size. Release treatments involve removing vegetation that is competing with the seedlings or saplings, or have re-invaded the site preparation treatment area. Vegetation would be removed by hand (manual) with hand-cutting tools. This would involve hand grubbing or scalping to mineral soil a five-foot radius around each seedling/sapling. Release treatments could involve up to two entries over the project implementation period (ten years). Approximately 30 acres are proposed for release.

[17] Helitorch is an aerial ignition device slung from or mounted on a helicopter that dispenses ignited globs of gelled gasoline for broadcast burning.
[18] Reforestation is the process of restoring tree cover to areas where trees once existed.

Roads and Landings

No new or reconstructed Forest System roads are proposed for this project. Approximately 1.5 miles of temporary roads are proposed for construction. The temporary roads would be restored to a near natural condition after project activities have been completed. Temporary roads are generally short segments of approximately 0.1 mile in length with the longest segment approximately 0.2 mile.

There would be approximately 6.3 miles of pre-haul road maintenance. Road maintenance activities would include: roadside brushing; installing or maintaining waterbars or rolling dips; grading; rocking; cleaning ditches and culverts; and removing small trees and limbs that interfere with traffic and/or visible sight distance around curves. Water would be used for dust abatement on roads during timber hauling activities. The water drafting site will be located on Sheep Thief Creek at the intersection of the Stump Springs Road (7S05) and Huntington Lake Road. If other sites are used, they will comply with the design features for the project. Other methods of dust abatement, such as SC-290 oil, may be considered as an alternative to using water as long as the use is in compliance with the design features.

Landings would be included in the commercial treatment units located at the end of the temporary road segments or adjacent to Forest System roads.

Implementation Schedule

The project is proposed for implementation over a ten year period, beginning in 2012. The schedule of activities would likely occur in the following order:

1. Temporary road construction and pre-haul road maintenance.
2. Commercial harvest treatments.
3. Precommercial thinning treatments.
4. Fuel reduction treatments.
5. Reforestation treatments.

Non-significant Project Level Forest Plan Amendment

Figure 4. Severely diseased tree within the project area.

The proposed action requires a non-significant Forest Plan amendment. There are large live overstory trees in portions of stand 60 (23 acres) adjacent to structures: these trees have indicators of severe disease leading to mortality or instability (figure 4 is an example of a tree that would likely fit this category). These severely diseased trees are proposed for removal using the sanitation prescription in the proposed action; they presently do not meet the definition of a hazard tree. The 2004 Sierra Nevada Forest Plan Amendment, standard and guideline 6 would be modified to state, ”For all mechanical thinning treatments, design projects to retain all live conifers 30 inches dbh or larger. Exceptions are allowed to meet needs for equipment operability

and to allow the removal of live diseased trees within Keola Project treatment unit 60 greater than 30 inches dbh based on the mortality risk predictors developed by the Forest Service silviculturist, entomologist and pathologist.[19]" It is anticipated all of these trees greater than 30 inches dbh would be severely diseased and slow growing firs with obvious signs of poor crown vigor (e.g., yellow needles, ragged crowns, thin and wispy crowns, high mistletoe infection, and high percentage of dead foliage). While not currently hazardous, these predictors strongly indicate tree mortality in the next ten years. This Forest Plan amendment is non-significant because it is anticipated less than 20 trees would be involved.

Alternative 3: Non-Commercial Funding Alternative

This alternative was developed in compliance with the Memorandum and Order, dated November 4, 2009, from District Court Judge Morrison C. England, Jr. that requires a detailed consideration of a noncommercial funding alternative is included for all fuel reduction projects in National Forests located in the Sierra Nevada. As noted earlier, recent court proceedings (May 26, 2011) removed this requirement, but this alternative was retained in the analysis.

This alternative's sole purpose is to achieve the fuels reduction element in the purpose and need and where all the proposed treatments are solely directed at reducing hazardous fuels. Therefore, there would be no forest health activities such as single tree selection, sanitation, or reforestation prescriptions. This alternative also does not propose the removal of severely diseased trees greater than 30 inches in treatment unit 60; therefore, no non-significant Forest Plan amendment is proposed. Estimated volume of timber removed from implementing this alternative is 0.155 MMBF.

Alternative 3 still includes approximately 550 acres of manual, mechanical, and prescribed fire treatment methods and approximately 1.5 miles of temporary road construction. Figure 5 is a map for alternative 3 showing a summary of treatment areas and activities, and location of temporary roads. Table 3 provides a summary of treatment methods proposed by unit. Similar to the proposed action, there may be multiple treatments within a treatment unit. Because the stands would be less open than alternative 2, measures may be necessary to minimize damage to the residual stands from mechanical equipment (e.g., restrict size of equipment, hand pile).

Stand Prescriptions

Commercial Harvest and Precommercial Thin Treatments

This prescription is intended to achieve the fuels reduction element for the needs for the project. As with alternative 2, the commercial harvest treatment is the mechanical cutting of conifer trees a minimum of 10-inch dbh with ground based equipment. All treatment units proposed for commercial harvest in alternative 3 would be thin-from-below (as described in alternative 2) at a maximum 12-inch dbh except for unit 54. To meet the hazardous fuels objectives, unit 54 would be a thin-from-below but would have a dbh limit of 16 inches. Commercial thin would involve approximately 389 acres. All cut, true fir stumps greater than 15 inches dbh would be treated with Sporax® (i.e., unit 52 and live hazardous trees) and for

[19] The "bolded" portion is the proposed amendment to the standard and guideline.

areas within 300 feet of structures, all cut, true fir stumps greater than 3 inches dbh would be treated with Sporax.® Sporax® treatment would total approximately 36 acres.

Hazard tree and precommercial thin prescriptions would be the same as alternative 2. Precommercial thinning would be approximately 410 acres.

Fuels Prescription

Fuels prescriptions (i.e., mastication [40 acres], hand [44 acres] or tractor pile [301 acres], pile burning [345 acres], broadcast burning [139 acres]) would be identical to those described in alternative 2.

Roads and Landings

As with alternative 2, approximately 1.5 miles of temporary roads are proposed for construction and would be restored to a near natural condition after project activities have been completed. Road maintenance and landing locations would be the same as alternative 2.

Implementation Schedule

The implementation schedule would be the same as alternative 2 but there would be no reforestation activities.

Table 3.Summary of treatment activities by treatment unit for the non-commercial funding alternative.

Treatment Unit #	Total Acres	No Treatment	Thin from Below	Sporax® stumps	Precommercial Thin	Masticate	Hand Pile	Tractor Pile	Burn Piles	Broadcast Burn	Temporary Roads (miles)
42	30	5	25		25			25	25		0.1
43	21				21		21		21		
44	20	2	18		18			18	18		0.2
45	26	5	21		21	21					
47	27									27	
48	26		25		25					26	
50	87	5	82		82			82	82		0.5
51	13	4	9		9			9	9		
52	20	1	19		19	19					0.1
53	22									22	
54	9		9	9				9	9		0.1
55	30									30	
56	4									4	
57	26									26	
59	33	2	31		31			31	31		
60	31		31	23.5	31		23	8	31		0.1
65	108	2	106	3.0	106			106	106		0.3
115	4									4	
126	13		13		13			13	13		0.1
total	550	26	389	35.5	401	40	44	301	345	139	1.5

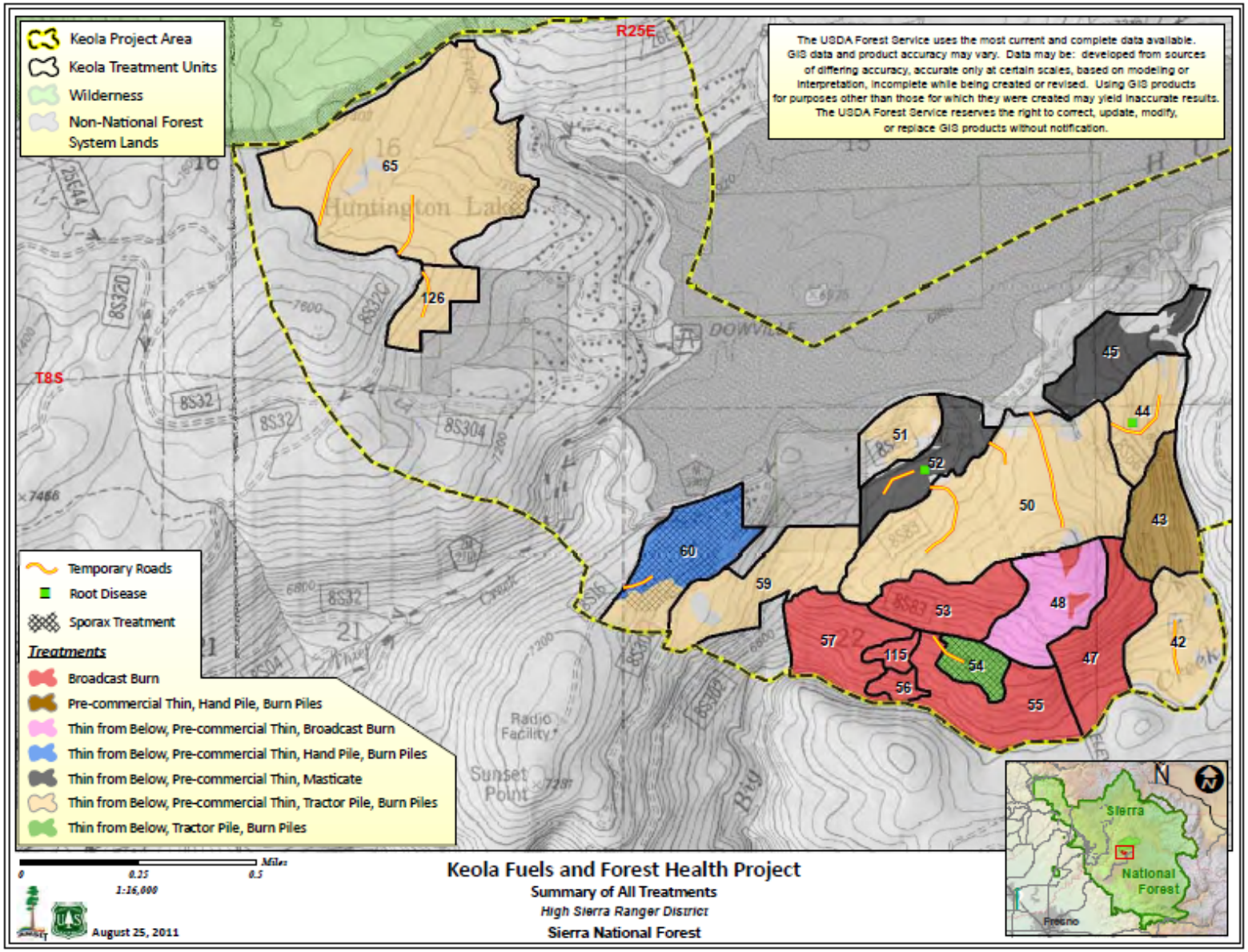

Figure 5. Alternative 3, Noncommercial Funding Treatment Map.

Design Features

To minimize adverse impacts to resources in the project area from this project, the following design features are incorporated into the project. They are broken into resource groups but many of these features can reduce impacts to other resources. All design features pertain to both alternatives 2 and 3 (unless noted otherwise). Those design features that are based on Forest Plan standard and guidelines are referenced as such.

Visuals Resources

VIS-1 To provide visual screening, maintain a vegetation buffer between the lakeshore and forest road 8S66 or a 25-foot vegetation buffer, whichever is greater. The vegetation buffer would remain untreated except hazardous trees would be removed.

VIS-2 Forest Landscape Architect would be consulted during implementation of the precommercial thinning activities in units 60 and 65 to ensure proper visual screening around the recreation cabins, Huntington Lake Resort, and Camp Keola.

VIS-3 Construct temporary roads in a manner that closely duplicates the existing contour lines, with a minimum degree of landform alteration limiting the amount of earthwork. Avoid excessive cut and fill slopes for road construction. Avoid straight linear road construction. Design and construct temporary roads so that they will not be highly visible from key viewing points (i.e., **cabins, Huntington Lake Resort, Camp Keola, residences, recreation facilities, Huntington Lake, Huntington Lake Road, Sierra Heritage Scenic Byway**) or the main arterial roads. Use BMPs and avoid rock outcrops or sensitive areas. Upon completion, where the road access is no longer necessary to implement the project, the temporary roads will be closed and restored using native seed/vegetation.

VIS-4 Where feasible, locate burn piles in areas where they would not be highly visible from the key viewing points noted under VIS-3. Piles within 300 feet of these key viewing points should burn with more than 90 percent consumption. If 90 percent consumption is not reached (and the remaining fuels still meet the fuels objectives), the remnant slash will be scattered throughout the site. Efforts will be made to burn these piles within three years.

VIS-5 Restrict landing to existing openings when possible. Minimize landing sizes and locate landings where they would not be highly visible from the key viewing points noted under VIS-3.Do not locate landings perpendicular to main arterial roads when possible to eliminate direct views into landings from these roads.

VIS-6 Tree stumps that are highly visible (i.e., within view of a 300-foot distance) from the key viewing points noted under VIS-3, will be cut to a maximum of 6-inch heights or as low as possible from the uphill side. Tree stumps that are highly visible within unit 60 (i.e., within view) from the cabins and Camp Keola will be flush cut to a maximum of 3-inch heights or as low as possible from the uphill side so that the tree stumps are not visually evident.

VIS-7 In those areas where skid trails are highly visible from the key viewing points noted under VIS-3, the skid trails will be rehabilitated so that they are not visually evident from the key viewing points within three years.

VIS-8 Firelines will follow natural contours whenever possible. Underburns will be conducted to produce low intensity fire to minimize mortality to the overstory. While meeting the fuels objectives in the broadcast burn units of shrub species, retain islands of unburned vegetation in those areas to increase visual interest and attract wildlife. The edges of the islands will be feathered and undulated to create a near-natural appearance.

VIS-9 Tree marking (painting) and flagging should be done in a manner that screens these indicators from view of the key viewing points noted under VIS-3.

Wildlife

General Wildlife

WLD-1 The District biologist will be consulted prior to any marking for removal of severely diseased trees greater than 30-inch dbh.

WLD-2 To avoid attracting opportunistic predators such as coyotes, domestic and feral dogs and cats, opossums, skunks and raccoons, all food and trash must be appropriately stored in closed containers and removed from the project site at the end of each day.

WLD-3 Where feasible and still meet safety and fuels objectives, retain an average of four (in mixed conifer) to six (in red fir forest type) of the largest snags (greater than 15-inch dbh) per acre across the project area (SNFPA ROD standard and guideline11, pp. 51-52).

WLD-4 Slash / brush piles shall be ignited using a pattern that allows animals to escape the fire. For example, piles will be lit at one end or an area will be left unignited which will serve as an escape route.

Special Status Terrestrial Wildlife

WLD-5 Mechanical treatments may be conducted to meet fuels objectives in protected activity centers (PACs) located in WUI defense zones. Mechanical treatments should be designed to maintain habitat structure and function of the PAC (SNFPA ROD standard and guideline 72, p. 60).

WLD-6 Within all PACs, prioritize maintaining canopy cover over restoration treatments. Conduct restoration treatments described in the vegetation treatment prescription when they are consistent with maintaining PAC objectives of canopy cover and protecting the nest site buffer.

WLD-7 Conduct surveys in compliance with the Pacific Southwest Region's survey protocols during the planning process when vegetation treatments are likely to reduce habitat quality are proposed in suitable northern goshawk nesting habitat that is not within an existing California spotted owl or northern goshawk PAC. Suitable northern goshawk nesting habitat is defined based on the survey protocol (SNFPA ROD standard and guideline 33, p. 54).

WLD-8 Mechanical treatments are prohibited within a 500-foot radius buffer around a spotted owl activity center within the designated PAC for treatments in WUI defense zones. Prescribed burning is allowed within the 500-foot radius buffer. Hand treatments, including handline construction, tree pruning, and cutting of small trees (less than 6 inches dbh), may be conducted prior to burning as needed

to protect important elements of owl habitat. Treatments in the remainder of the PAC use the forest-wide standards and guidelines for mechanical thinning (SNFPA ROD standard and guideline 73, p. 60).

WLD-9 Maintain a limited operating period (LOP) for California spotted owls, prohibiting vegetation treatments within approximately 0.25 mile of the activity center during the breeding season (March 1 through August 15), unless surveys confirm that California spotted owls are not nesting (SNFPA ROD standard and guideline 75, p. 60). Prior to implementing activities within or adjacent to a California spotted owl PAC and the location of the nest site or activity center is uncertain, conduct surveys to establish or confirm the location of the nest or activity center.

The LOP may be waived for vegetation treatments of limited scope and duration, when a biological evaluation determines that such activities are unlikely to result in breeding disturbance considering their intensity, duration, timing and specific location. Where a biological evaluation concludes that a nest site would be shielded from planned activities by topographic features that would minimize disturbance, the LOP buffer distance may be modified (SNFPA ROD standard and guideline 77, p. 60).

WLD-10 Breeding season limited operating period restrictions may be waived, where necessary, to allow for use of early season prescribed fire in up to 5 percent of California spotted owl PACs per year on a forest (SNFPA ROD standard and guideline 78, p. 61).

WLD-11 Conduct vegetation treatments in no more than 5 percent per year and 10 percent per decade of the acres in California spotted owl PACs in the 11 Sierra Nevada National Forests. Monitor the number of PACs treated at a bioregional scale (SNFPA ROD standard and guideline 80, p. 61).

WLD-12 Apply a limited operating period (LOP), prohibiting vegetation treatments and road construction within 0.25 mile of an active great gray owl nest stand, during the nesting period (typically March 1 to August 15). The LOP may be waived for vegetation treatments of limited scope and duration, when a biological evaluation determines that such projects are unlikely to result in breeding disturbance considering their intensity, duration, timing and specific location. Where a biological evaluation concludes that a nest site would be shielded from planned activities by topographic features that would minimize disturbance, the LOP buffer distance may be reduced (SNFPA ROD standard and guideline 83, p. 61).

WLD-13 Protect fisher den site buffers (700 acres) from disturbance with a limited operating period (LOP) from March 1 through June 30 for vegetation treatments as long as habitat remains suitable or until another Regionally-approved management strategy is implemented. The LOP may be waived for individual activities of limited scope and duration, when a biological evaluation documents that such projects are unlikely to result in breeding disturbance considering their intensity, duration, timing, and specific location (SNFPA ROD standard and guideline 85, p. 61).

- Proposed treatments of low intensity and duration such as planting, hand release, hand thinning, and hand piling can occur during the LOP.

WLD-14 Avoid fuel treatments in fisher den site buffers to the extent possible. If areas within den site buffers must be treated to achieve fuels objectives for the urban wildland intermix zone, limit treatments to mechanical clearing of fuels. Treat ladder and surface fuels to achieve fuels objectives. Use piling or mastication to treat surface fuels during initial treatment. Burning of piled debris is allowed. Prescribed fire may be used to treat fuels if no other reasonable alternative exists (SNFPA ROD standard and guideline 86, p. 61).

WLD-15 In the Southern Sierra Fisher Conservation Area, design measures prior to vegetation treatments to protect important habitat structures for fisher as identified by the wildlife biologist, such as large diameter snags and oaks, patches of dense large trees typically 0.25 to 2 acres, large trees with cavities for nesting, clumps of small understory trees, and coarse woody material. For example, use firing patterns, place fire lines around snags and large logs, and implement other prescribed burning techniques to minimize effects to these attributes. Use mechanical treatments over prescribed fire, when appropriate, to minimize effects on preferred fisher habitat elements (SNFPA ROD standard and guideline 90, p. 62).

WLD-16 Retain all oaks unless they are a hazard to operations or public.

WLD-17 Protect marten den site buffers from disturbance from vegetation treatments with a limited operating period (LOP) from May 1 through July 31 as long as habitat remains suitable or until another Regionally-approved management strategy is implemented. The LOP may be waived for individual projects of limited scope and duration, when a biological evaluation documents that such projects are unlikely to result in breeding disturbance considering their intensity, duration, timing, and specific location (SNFPA ROD standard and guideline 88, p. 61).

General Special Status[20] Terrestrial and Aquatic Wildlife

WLD-18 Avoid establishing landings or staging areas within special status species occupied suitable habitats and riparian areas.

WLD-19 If any newly listed or unknown occurrence of special status species is found within the affected project area during project preparation or implementation, work will stop in the area and the District biologist will be contacted immediately to determine appropriate action. Additional species protection measures may be required.

WLD-20 Within Streamside Management Zones (SMZ) associated with special status, suitable or occupied aquatic/riparian species habitat, the following protection measures will be implemented. (Prior to applying these protection measures, review species specific areas since extended protection zones may need to be applied beyond the SMZ boundaries.)

a. Tractor ground skidding, landing construction, tractor slash piling, skid trail construction, and end-lining are prohibited.

b. Stream bank trees and trees within riparian vegetation of occupied or suitable special status habitat are not to be removed from the site (i.e.,

[20] Special status species are federally listed (threatened, endangered, candidate) and Forest Service sensitive species.

drop and leave on site) unless field reviewed and approved by the Aquatic Biologist.

c. Removal of trees within a SMZ can occur if work can be accomplished from an existing Forest System road, and no soil disturbance occurs while implementing activities. If soil is disturbed during tree removal, project activities in the SMZ must stop immediately and rehabilitation work will be completed after consultation with the District Aquatic Biologist and Hydrologist. If any of these guidelines cannot be achieved, fall and leave in place.

Aquatic Wildlife

WLD-21 Design prescribed fire treatments to minimize disturbance of ground cover and riparian vegetation in Riparian Conservation Areas (RCA). In burn plans for project areas that include, or are adjacent to RCAs, identify measures to minimize the spread of fire into riparian vegetation (SNFPA ROD standard and guideline 111, p. 64).

WLD-22 Report any discovery of amphibians (frogs or salamanders) or reptiles (turtles) during project preparation or implementation to the District Fisheries/Aquatic biologist.

WLD-23 Stream drafting will follow the following guidelines:

a. Water drafting candidate sites should be selected by the Sale Administrator and approved by the Hydrologist and Aquatic Biologist.

b. Water drafting sites should be at least 500 feet to 0.6 miles away from occupied aquatic species habitat (as determined by the Aquatic Biologist) (SNFPA ROD standard and guideline 92, 96, 103, 101, 110; BMP 2-21).

Stream drafting requirements noted below will be monitored by the District Hydrologist or Aquatic Biologist:

a. Drafting sites shall be visually surveyed for frogs and their eggs before drafting begins.

b. Use a screened intake device and pumps with low entry velocity and suction strainers with screen less than 2 millimeter (1/8 inch) in size to minimize removal of aquatic species, including juvenile fish, amphibian egg masses and tadpoles, from aquatic habitats (SNFPA ROD Standard 110).

c. The suction strainer shall be inserted close to the substrate in the deepest water available and placed in a canvas bucket to avoid substrate and aquatic species disturbance.

d. Allow no drafting unless immediate downstream discharge from drafting site is maintained at 1.5 cubic feet per second or greater (SNFPA ROD standard and guideline 43; BMP 2-21).

e. Permit water drafting to remove no more than 50 percent of any stream's ambient discharge that is over 1.5 cubic feet per second (SNFPA ROD standard and guideline 43; BMP 2-21).

WLD-24 Where treatments are proposed in habitat for special status aquatic species, only use water for dust abatement within RCAs.

WLD-25 Protect any seeps, springs, bogs, fens, and/or wet areas that may be found during project implementation that are not already identified on project analysis maps. Treat these areas as perennial areas with 300-foot RCA and 100-foot no equipment buffer. Manage activities, within RCA/SMZ areas, according to the following protection measures:

a. Within canyons (e.g., adjacent perennial stream), maintain highest relative canopy density to contribute to maintaining water temperature (SNFPA ROD standard and guideline 96, p. 63).

b. Locate refueling sites and oil and fuel storage outside of RCA/SMZ areas, except at designated administrative sites and sites covered by special use permit. Refueling may be allowed within RCA/SMZ areas when there are no other alternatives (locations must be approved by the District Hydrologist). Ensure that spill plans are reviewed and up-to date (SNFPA ROD standard and guideline 99, p. 63).

c. Maintain all non-hazardous snags and downed logs within RCA/SMZ areas to contribute to current and future large woody debris, except for areas within 300 feet of a public and firefighter safety zone (SNFPA ROD standard and guideline108, p. 64).

d. When broadcast burning in RCA/SMZ areas, stop ignition within 100 feet of the stream or aquatic feature and allow fire to back down into the area (SNFPA ROD standard and guideline 111, p. 64).

e. Do not allow mechanical equipment within 100 feet of meadows, perennial streams, or other special aquatic features (SNFPA ROD standard and guideline113, p. 64). Do not allow mechanical equipment within the SMZs.

f. All hand piles will be located a minimum of:

    1. Perennial streams: 100 feet from streambanks.
    2. Seasonal streams: 50 feet from streambanks.

g. To protect bank stability, do not cut stream bank trees (tree with drip line extending to or over stream bank). Do not cut or otherwise treat any riparian dependant vegetation unless approved by the District Aquatic Biologist. Along perennial streams and wet meadows, leave 50 feet closest to the edge of the aquatic feature untreated (SNFPA ROD standard and guideline113, p. 64).

h. Avoid locating skid trails or landings in hydrologic or topographic depressions to minimize the concentration of water. Designate any temporary roads or crossings needed within RCA/SMZ areas. Restore temporary road areas before the winter season or if the temporary road(s) will be used beyond one field season, construct temporary erosion control structures (e.g., waterbars) for the winter season (SNFPA ROD standard and guideline 113, p. 64).

WLD-26 Follow and monitor all Best Management Practices (BMPs), noted in appendix A, related to Sporax® application procedures. If Sporax® is to be applied within a

SMZ, the District Fisheries/Aquatic biologist will need to be consulted prior to application.

Botany (Forest Service Sensitive Plant Species)

BOT-1. Identify, flag, and avoid areas with sensitive plants prior to performing mechanical treatments. Temporary roads, skid trails, tractor lines, landings and other heavy equipment activity will be located away from sensitive plant occurrences with a minimum of a 50-foot buffer.

BOT-2. An adaptive management strategy will be utilized in areas where sensitive species and invasives co-occur in the prescribed fire units. A test area will be permitted to be treated with prescribed fire and will be monitored the following year. If monitoring shows that there are no detrimental impacts to invasive spread or to the sensitive species, it shall be allowed throughout the planned units. If monitoring results show adverse impacts to invasive weed spread or to sensitive species, prescribed fire will be prohibited within 100 feet of the sensitive or invasive plant occurrence.

BOT-3. Pile burning will not be conducted in sensitive plant occurrences.

BOT-4. All seeps, springs and riparian areas identified as having suitable habitat for sensitive plant species shall be excluded from project associated activities with a 25-foot buffer. If these areas are identified during implementation as critical treatment or access areas, pre-implementation surveys will occur during the appropriate phonological identification period (usually late summer, early fall).

BOT-5. Extend design features to any newly discovered populations of sensitive or special interest plants (after completion of the Biological Evaluation or Environmental Assessment) found before or during project implementation.

BOT-6. The contract administrator or project manager will consult with Forest botanical staff prior to project implementation to ensure appropriate buffers and flagging is in place.

Invasive Plants

WEED-1. All off-road equipment used on this project would be washed before moving into the project area to ensure that the equipment is free of soil, seeds, vegetative material, or other debris that could contain or hold seeds of noxious weeds. For contracts, use equipment cleaning contract provisions WO-C/CT 6.36. When working in known weed infested areas, equipment would be cleaned before moving to other areas which do not contain noxious weeds.

WEED-2. All earth-moving equipment, gravel, fill, or other materials used for road maintenance and culvert construction are required to be weed-free. Use onsite sand, gravel, rock, or organic matter when possible. Otherwise, obtain weed-free materials from gravel pits and fill sources that have been surveyed and approved by a Forest botanist, noxious weed coordinator, or ecologist or the interagency mineral materials group headed up by Yosemite National Park.

WEED-3. Use weed-free mulches, and seed sources. All activities that require seeding or planting must utilize locally collected native seed sources as per the Region 5 Native Plant Policy. Any seeding and planting must be pre-approved by a Forest Service botanist.

WEED-4. Fuel piling and pile burning would be prohibited in areas with weed infestations.

WEED-5. Prior to project implementation, all known noxious weed populations within treatment units except cheat grass would be treated (i.e., manually pulled) before plants flower, or flagged and avoided. A Forest Service botanist will be consulted prior to project implementation for a species specific prescription if new infestations of invasive species are detected during implementation.
Areas identified as having infestations of intermediate wheatgrass will be pretreated each year prior to project implementation by removing and bagging seedheads for offsite disposal, or by mowing to prevent seed production.

WEED-6. Monitoring of invasive plant occurrences will continue for at least three years post-project implementation. If invasive plant occurrences are found to be expanding beyond pretreatment levels as a result of project activities, or if new occurrences are identified, eradication efforts will be undertaken.

WEED-7. Staging areas for equipment, materials, or crews or landings will be placed outside of areas with weed infestations.

WEED-8. When use of landings and staging areas is completed, native vegetation would be reestablished through planting native seeds to minimize weed establishment and infestation on landings and staging areas within 100 feet of noxious weed infestations if determined necessary by Forest Service botanist.

Soils

SOIL-1. Limit mechanical piling and skidding operations to slopes less than 35 percent (LMP standard and guideline 125, p. 4-20). Any treatment units over 35 percent slopes will have to be grapple or hand piled.

SOIL-2. Avoid mixing or removing soils below the A horizon in treatment areas (excluding roads, skid trails, and landings). On slopes less than 35 percent, maintain an average effective ground cover of 50 percent. On slopes greater than 50 percent, maintain an average effective ground cover of 70 percent (LMP standard and guideline 130, p. 4-21).

SOIL-3. During mechanical treatments, leave a 100-foot wide buffer of 100 percent soil cover (or the existing cover if less than 100 percent) below large rock outcrops. These areas have a potential to generate runoff that can cause accelerated erosion on soils down slope. During prescribed burns, employ firing patterns to minimize impacts on soil cover in these areas.

SOIL-4. Apply appropriate erosion prevention measures on all ground disturbing activities prior to fall storms (October 1) and immediately upon completion of activity begun after November 1 (LMP standard and guideline127, p. 4-21).

SOIL-5. For treatments in areas greater than 300 feet from structures, retain an average of five well distributed logs per acre. Each log will be a minimum of 12 inches in diameter and 10 feet long.

Water Resources

HYD-1 Implement Riparian Conservation Areas (RCAs)[21] adjacent to streams and other aquatic features according to the following standards noted in table 4:

Table 4. RCA and SMZ widths based on aquatic feature (SNFPA ROD), standard and guideline 91, p. 62).

Aquatic Feature	RCA Width
Perennial Streams	300 feet each side, as measured from the bank full edge
Seasonally Flowing Streams	150 feet each side, as measured from the bank full edge
Streams in Inner Gorge[1]	Top of the inner gorge
Special Aquatic Features[2] and perennial streams with riparian vegetation extending more than 150 feet from the stream, or seasonally flowing streams with riparian conditions extending more than 50 feet from the stream	300 feet from the edge of the feature or the edge of the riparian vegetation, whichever is greater
Other hydrologic or topographic depression	None

[1] Inner gorge is defined by stream adjacent slopes greater than 70 percent
[2] Special aquatic features include: lakes, wet meadows, bogs, fens, wetlands, vernal pools, and springs
(Sierra Nevada Forest Plan Amendment Record of Decision (SNFPA ROD), Standard 91, page 62)

HYD-2 Stream Class is used to determine the width of the SMZ, which is a zone managed primarily to protect and maintain water quality, site productivity, channel stability, wildlife habitat, and riparian vegetation.[22] The SMZs are nested within the RCAs. These widths are defined as:

- Class I - 100 feet plus 3 feet for each percent side slope above 30 percent.
- Class II - 75 feet plus 3 feet for each percent side slope above 30 percent.
- Class III - 50 feet plus 3 feet for each percent side slope above 30 percent.
- Class IV - 25 feet plus 3 feet for each percent side slope above 30 percent.
- Class V - No special protection required

HYD-3 Best Management Practices **(**BMP) are a range of management practices used by the Forest Service to protect water quality. Implement appropriate BMPs (which are identified in the water resource report and appendix A of this document) (LMP standard and guideline 124, p. 4-20).

Private Land and Special Uses

PVT-1 In areas where work is being completed near special use permit structures, provide permit holders the ability to comment on the completeness of the work before the contract is closed. A recreational residence representative for each tract will serve as a contact to the district.

PVT-2 During the implementation of this project, special use improvements (e.g., water systems) will be protected from project activities to reduce potential damage to

[21] Riparian Conservation Areas are a key component of the Aquatic Management Strategy and are designed to establish management zones around aquatic features.
[22] Streamside Management Zones (SMZs) are based on direction in the Sierra National Forest Land Management Plan and are intended to manage project activities within RCAs (LMP standard and guideline 70, page 4-17). Stream Classes are established in the Soil and Water Conservation Handbook (FSH2509.22), Sierra NF Supplement 1 (1989).

the physical improvements and the function of those improvements. Any damage to or function of the improvements will be the responsibility of the contractor.

PVT-3 The Forest Service will provide additional information to special use permit holders (e.g., recreation cabin, resorts, camps) and private residents in Huntington Basin regarding proper hazardous fuel treatments to reduce wildfire risk while preventing erosion or other resource concerns.

PVT-4 Advanced notification will be provided to potentially impacted special use holders prior to implementation (e.g., cabin, resort, camp owners; SCE), including potential activities that could directly impact the improvement (e.g., power distribution lines).

PVT-5 Pile burning near structures would occur during the low-use recreation season (May 15 through Labor Day Weekend).

PVT-6 Prior to implementing the project near private lands, landlines will be flagged to ensure that trespass is avoided.

PVT-7 Ensure legal access on existing roads through private lands has been acquired before project implementation.

Cultural/Heritage Resources

Project implementation would comply with the stipulations of the *First Amended Regional Programmatic Agreement Among the USDA Forest Service, Pacific Southwest Region, California State Historic Preservation Officer, and Advisory Council on Historic Preservation Regarding the Process for Compliance with Section 106 of the National Historic Preservation Act for Undertakings on the National Forests of the Pacific Southwest Region* (Regional Programmatic Agreement), dated 2001. This project meets Stipulations III.C.(2) and III.D.(3), Undertakings Where Management Measures Are Necessary for the Protection of Historic Properties.

CR-1 Prior to initiating ground disturbing activities, contact the District Archaeologist to ensure appropriate protection measures for cultural resource sites are in place and understood.

CR-2 Avoid historic properties with ground disturbing activities (i.e., the use of ground-based mechanical equipment, planting, piling, fire-line construction, temp road construction, etc.), in accordance with the Standard Protection Measures (Attachment B) of the Regional Programmatic Agreement. Typical implementation of the Standard Protection Measures is the practice of “flag-and-avoid” (Measure I.B.).

CR-3 Allow certain non-ground disturbing activities within historic property boundaries: Certain proposed activities lack the potential to adversely affect the character of historic properties. Implementation of these activities would help reduce the isolation of a site from its surroundings and is consistent with the Regional Programmatic Agreement:

a. Archaeological resources may not be resources at risk of effects from underburning (in accordance with the provisions of the Regional Programmatic Agreement *Interim Protocol for Non-Intensive Inventory Strategies for Hazardous Fuels and Vegetation Reduction Projects*). The

standard resource protection measures of the Interim Protocol would be applied only to those historic properties defined as "at-risk" from the use of prescribed fire treatments.

b. Mechanical shredding of fuels inside of site boundaries with an articulated boom shredder/harvester would not affect the archaeological materials, provided the tracked or wheeled equipment stays outside of the delineated site boundary and the machine head does not contact the ground surface or site features (Interim protocol, Measure V.B.11.). Removal of fuels by hand (manual thinning with chainsaws) would not affect archaeological materials (Attachment A, II.C.).

c. Chemical applications for disease prevention (i.e., Sporax®) would not affect historic properties where the application meets the intent of the Regional Programmatic Agreement Stipulation III.E, specifically Attachment A, II.E, application of pesticides that do not have the potential to affect access to or use of resources by Native Americans.

CR-4 Non-Archaeological Cultural Resources: Traditional cultural properties, locations of contemporary Native American gathering, and other such cultural resources identified through consultation with Native American tribes and individuals would be protected through avoidance by project activity, or managed through project implementation and consultation to enhance the resource. For example, planned prescribed fire can have positive effects to regenerate growth in certain plant species used by Native Americans in basketry or traditional food preparation.

CR-5 In the event of inadvertent effects or new discovery during implementation, the Forest would comply with the stipulations of the Regional Programmatic Agreement.

CR-6 Forest Heritage Staff shall provide written approval for actions by special use permit holders that may have an effect on historic landscape characteristics associated with historic structures, including maintenance of surrounding landscaping and adding vegetation (planting), per the Regional Programmatic Agreement.

Air Quality

AIR-1 Conduct dust abatement practices along native surfaced roads and landings to reduce fugitive dust impacts on air quality.

The following are best available control measures (BACMs) for prescribed fire as required under Section 190 of the Clean Air Act, as amended in 1990.[23] Specific techniques to reduce fire emissions include the following:

AIR-2 Conduct a full conformity analysis, as required by the Clean Air Act and the State Implementation Plan (SIP) to assess whether the proposed action produces less than de minimis emissions.

AIR-3 Ensure that all activities conform to the SIP.

[23] The U.S. Environmental Protection Agency (EPA) developed implementation strategies and BACM for areas that are designated serious non-attainment for particulate matter less than 10 microns (PM10) in 1992.

AIR-4 Provide timely information about prescribed burning activities, the potential for smoke impacting residents and visitors and actions people can take to protect themselves from smoke through local communications sources.

AIR-5 Employ avoidance techniques such as burning on cloudy days when the plume and residual smoke cannot be seen, burning during periods of atmospheric instability for better smoke dispersal, and burning during periods of low visitor use.

AIR-6 Avoid prescribed burning periods when smoke inversion layers are predicted and would adversely affect recreation residence occupants, docks, resorts, and adjacent communities.

AIR-7 Employ commonly used reduction techniques such as burning units after harvest before new live fuels appear; burning in the springtime prior to "green-up," burning when 1,000-hour fuels (woody debris larger than 3 inches in diameter) moistures are high, and burning when the duff is wet (after fall precipitation, or during winter and spring).

AIR-8 Employ techniques to optimize flaming combustion, including burning piled fuels rather than broadcast burning, reducing the amount of soil in piles, and employing rapid ignition to create a high intensity fire.

Monitoring

The following are monitoring elements specific to this project. They are applicable to both action alternatives unless stated otherwise:[24]

Vegetation

- A sample of trees which meet the severely diseased guidelines, but do not pose a threat to improvements even if they become snags, will be monitored within the Huntington Lake Recreational Area. The trees will be revisited in 5 years to assess the accuracy of the guidelines. A sample of trees which have some signs of poor vigor but do not meet the guidelines for removal will also be monitored and revisited in 5 years. This monitoring will calibrate the guidelines for future use. (Specific to alternative 2.)
- All known annosum root disease pockets will be revisited within 5 years after treatment to assess the effectiveness of treatments in preventing further spread of the disease.
- Plots will be staked and measured within planted areas to determine 1-year, 3-year and 5-year survival and stocking in compliance with National Forest Management Act. Plots will use the Forest Service, Pacific Southwest Region standard of staked tree plots. (Specific to alternative 2.)

[24] Information gathered before, during and after implementation of activities is used to ensure that the project was implemented as planned and to determine the effectiveness of the project's design and associated design features. It provides a feedback mechanism not only for this project but for similar projects planned in the future. Monitoring is completed at recurring intervals as a basis for Forest Plan implementation. Project effectiveness monitoring is completed by routine sampling specific projects at specified time intervals.

Visual Resources

- The Forest Landscape Architect will monitor the implementation of the precommercial thinning activities in units 60 and 65 to ensure proper visual screening around the recreation cabins, Huntington Lake Resort, and Camp Keola.

Fuels

- All fuel reduction treatment activities throughout the project area will be monitored and documented within the unit folders to document fuel treatment effectiveness after implementation. All monitoring will include pre- and post-photos, pre and post-ocular estimation of fuel loading, and if resource objectives have been met with regards to the overall change in surface fuel modification.

Wildlife

- Monitor for California spotted owls, PAC FR113 prior to project implementation.
- Pre-treatment survey will occur for goshawks in suitable habitat.

Aquatic Wildlife

- Monitoring of stream drafting requirements listed in design feature WLD-23 will occur during project implementation by the District Hydrologist or Aquatic Biologist. This includes conducting visual surveys for frogs and eggs prior to drafting activities.
- Surveys to determine effectiveness of design features will be required after project activities are complete for any special status aquatic species that are known to occur or are found to occur during project implementation in treatment units.
- Any seeps, springs, bogs, fens and/or wet areas will be monitored during project implementation to ensure required protection measures are being met.

Invasive Plants

- Monitor disturbed areas for invasive plants two years after vegetation treatments occur in a unit. Promptly remove any invasive weeds found to stop seed set. Continue monitoring these infected areas as necessary to eradicate new occurrences.

Hydrology/Soils

- Random sampling is utilized for the Best Management Practice Evaluation Program monitoring (USFS 2002) that observes hillslope conditions focusing on erosion and sedimentation following implementation as well as effectiveness of the measures implemented at least one winter season after implementation. Implementation is verified by the contract administrator for all units. In addition, each unit is included in various sample pools and has potential to be randomly selected for effectiveness monitoring.

Heritage

- According to the Regional Programmatic Agreement, the Forest shall conduct monitoring to ensure the effectiveness of the protection measures or prevent the loss of unidentified cultural resources. Heritage Resource Managers would determine the schedule and requirements for any monitoring based on the timing of project implementation; the type of project activity; and locations of known cultural resources. Monitoring results would be documented in the Sierra National Forest's annual Regional Programmatic Agreement report.

Air Quality

- Smoke monitoring and impacts to the public will occur through feedback from local residences and or recreationists.
- Smoke columns and drift will be visibly monitored for transport and dispersion to minimize impacts to forest visitors and communities and documented within the site specific burn plan.

Comparison of Alternatives

This section provides a summary of the effects of implementing each alternative. Information in table 5 is focused on activities and effects where different levels of effects or outputs can be distinguished quantitatively or qualitatively among alternatives.

Table 5. Table of comparison between the alternatives considered in this analysis.

	Alternative 1 (No Action)	Alternative 2 (Proposed Action)	Alternative 3 (Non-Commercial Funding)
Acres of Treatment (all in WUI)	0	550	550
Largest size tree proposed for treatment (cut)[25]	N/A	30" dbh except for hazard trees and extremely diseased trees next to human improvements could be greater	12" dbh except unit 54 is 16" dbh and hazard trees are independent of size
Commercial volume of timber proposed	0 MMBF	1.1 MMBF	0.155 MMBF
Reduces risk of life and property & Improves effectiveness of fire suppression and fire fighter safety by:	No	Yes	Yes
< 4' flame lengths	Portion of units	All units	All units
Fire type	Surface/passive/active	Surface	All surface but unit 54 conditional
Rate of spread	Varies 1.45 to 68.42	Decreased existing by 50-70%	Decreased existing by 50-70%
Decreases risk from insect/disease	No	Yes	Yes, but to a lesser extent than alternative 2
Scenic stability	Low	High	High
General silviculture prescription	N/A	Promotes more multi-storied stands	Thin from below
Trees per acre after mechanical treatment	Existing condition varies from 209 to 675	Varies from 64 to 198 (w/in mechanical treatment units)	Vaires from 44 to 253 (w/in mechanical treatment units)

[25] Hazard trees would be cut regardless of size due to human safety issues.

	Alternative 1 (No Action)	Alternative 2 (Proposed Action)	Alternative 3 (Non-Commercial Funding)
Predicted # large snags per acre created every 10 years	0.7	0.4	0.6
MIS habitat or ecosystem component:			
Early/mid seral	366 acres	342 acres*	350 acres*
Late seral open	53 acres	122 acres*	75 acres*
Late seral closed	83 acres	42 acres*	142 acres*
Snag green forest	550 acres	550 acres*	550 acres*
CA spotted owl habitatt	127	38*	127*
Pacific fisher habitat	297	253*	298*
Anticipated costs, including administrative costs to implement	$215k	$566k	$602K

*Predicted immediately after treatment

CHAPTER 3: AFFECTED ENVIRONMENT AND ENVIRONMENTAL CONSEQUENCES

This chapter focuses on the affected environment and environmental effects for those resources that the project intends to improve from the existing conditions (needs for the project) and those resources that received key issues from the public and/or interdisciplinary team during scoping (noted in chapter 1). This chapter also provides a preliminary finding of no significant impact based on the definition of "significantly" provided by the Council of Environmental Quality (40 CFR 1508.27) for the two action alternatives considered in detail. Direct environmental effects are those occurring at the same time and place as the initial cause or action. Indirect effects are those that occur later in time or are spatially removed from the activity, but would occur in the foreseeable future. Cumulative effects result when the incremental effects of actions are added to other past, present, and reasonably foreseeable future actions, regardless of what agency or person undertakes such actions. Cumulative effects can result from individually minor, but collectively significant, actions taking place over a period of time. Past, present, and reasonably foreseeable future actions are assessed along with the effects of the proposed action to determine whether significant cumulative effects may occur. This analysis is consistent with the Council on Environmental Quality memo from James L. Connaughton titled "Guidance on the Consideration of Past Actions in Cumulative Effects Analysis" dated June 24, 2005, which is incorporated by reference. A list of projects considered in determining cumulative effects for various resources is noted in appendix B.

Wildfire and Fuels[26]

Background and Affected Environment

The focus of the fuels analysis is to address the effectiveness of each alternative in meeting the needs for the project related to reducing the risk of life and property and improving effectiveness of fire suppression operations and firefighter safety within the project area. The wildfire behavior goal is to develop a fuels profile that will have low to moderate wildfire intensities instead of the current moderate to high intensities (as determined by a flame length of four feet or less [a measure of fire intensity]); surface fire; and 50 percent reduction in the rate of spread (measured in chains per hour) compared to pre-treatment conditions on a 95th percentile (mid- to late-summer or hotter) fire weather day on 100 percent of the treated area. Another goal is to establish an environment where volunteer and/or wildland firefighters can safely suppress wildfires. The overriding factors concerning fire and fuels revolve around fire risk and fire hazard.

Fire Risk

Fire risk is defined for this analysis area as the probability of a fire start occurring over a 10-year period for a given thousand-acre area. Based on the fire history over a 40 year period, the fire risk is 3.67 fires per decade. During the 40 year period, 33 percent of the recorded ignitions have been lightning caused while 67 percent have been human caused.

[26] The wildfire and fuels section of this EA is a summary from the Keola Fire and Fuels Report. This report is incorporated by reference and available in the project planning record located at the High Sierra Ranger District office.

Fire Hazard

Fire hazard can be characterized by how a fire will burn or fire behavior. Fire behavior is the product of the natural environment or the unique combination of topography, weather and fuels (Countryman 1972). Topography and weather are factors on which humans have little effect but fuels can be altered through human intervention or natural processes. When assessing fire hazard, the focus in this analysis is on fuels and the associated fire behavior, determined by fire behavior characteristics (i.e., predicted flame length, fire type, rate of spread) and resistance to control[27] based on 95th percentile fire weather conditions.

Alternative 1 (no action) provides the existing condition for these fire behavior characteristics and is a basis of comparison between the alternatives.

Fire Weather

For the purpose of this analysis, Fire Family Plus software program was used to determine historical fuel and weather conditions at the 95th percentile weather conditions specific to the analysis area. In comparing the 90th and 95th percentile weather parameters the only noticeable difference occurs within the 1,000 hour fuels and the wind-speeds. Fuels less than 3 inches are the primary driver of fire as well as the wind-speed which is often the most critical weather element affecting fire behavior. In analyzing the weather data, wind-speeds are recorded and analyzed utilizing the ten minute average. Winds that persist for one minute can affect gross fire behavior, including rate of spread and intensity. Momentary gusts have little effect on the overall rate of spread or intensity; however, they can produce large, temporary fluctuations in flame height and can easily trigger crowning and spotting (US NOAA 2011). Because the treatments are within WUI, 95th percentile fire weather conditions were utilized to compensate for probable momentary gusts that may affect firefighter and public safety.

Fuels

Fuel Model

In order to quantify the effects of a wildfire, a fuel model is selected to use as input to the fire spread model. A fuel model is defined by a set of fuel bed inputs needed for a particular fire behavior or fire effects model. A fuel model is chosen by the primary carrier of the fire (e.g., grass, brush, timber litter, slash) and its fuel characteristics (e.g., fuel loading, surface area to volume ratio, fuel depth). Rothermel (1983) has a detailed discussion on fuel models and how they are used to predict the spread and intensity of forest and range fires. These fuel models are derived from the vegetation layer and can describe fire behavior based on the fuel model, historical weather and topography.

The Rapid Refresh LANDFIRE fuel model layer was used and is the basis for the fuel model analysis. Table 6 displays the fuel models in terms of description and percent of area present within the boundary of the treatment area.

Table 6.Fuel models and percentages found within the treatment area.

Fuel Model	Percent of Treatment Area
Unburnable areas such as rock screes, lakes	3%
GS2 (122) Moderate Load, Dry Climate Grass-Shrub (Dynamic). The primary carrier of	10%

[27] Resistance to control is a measurement on the difficulty of obtaining fire suppression objectives.

Fuel Model	Percent of Treatment Area
fire in GS2 is grass and shrubs combined. Shrubs are about 1 to 3 feet high, grass load is moderate. Spread rate is high; flame length moderate. Moisture of extinction is low.	
SH5 (145) High Load, Dry Climate Shrub. Primary carrier of fire in SH5 is woody shrubs and shrub litter. Heavy shrub load, depth 4-6 feet. Spread Rate very high; flame length very high.	5%
TU5 (165) Very High Load, Dry Climate Timber-Shrub. The primary carrier of fire in TU5 is heavy forest litter with a shrub or small tree understory. Spread rate is moderate; flame length moderate.	23%
TL3 (183) Moderate Load Conifer Litter. The primary carrier of fire in TL3 is moderate load conifer litter, light load of course fuels. Spread rate is low; flame length is low.	8%
TL4 (184) Small Downed logs. The primary carrier of fire in TL4 is moderate load of fine litter and coarse fuels and includes small diameter downed logs. Spread rate is low; flame length is low.	9%
TL6 (186) Moderate Load Broad Leaf Litter. The primary carrier of fire in TL6 is moderate load broadleaf litter. Spread rate is moderate; flame length is low.	25%
TL7 (187) Large Downed Logs. The Primary carrier of fire in TL7 is very heavy load, forest litter. Spread rate is low; Flame length is low.	14%
TL9 (189) High Load Broad leaf Litter. The Primary carrier of fire in TL9 is very high load, fluffy broad leaf litter. TL9 can often be used to represent heavy needle drape. Spread rate is moderate; Flame length is moderate.	3%

Surface Fuels[28]

Excessive fuel loads created through disease, decadence, and fire exclusion now occur over large portions of the project area. Surface fuel loading data was collected through extensive stand exams and is included in table 7. As noted earlier, observations of past fire behavior shows that small woody material, less than 3 inches in diameter, has the most substantial influence on fire behavior (such as spread rates and fire intensity). However, large woody fuels greater than 3 inches can contribute to large fire development and high fire severity. The fuel loading of large material, coupled with the size and decay rate, can greatly influence fire severity (effects to soil, water, other forest resources) which is generally due to smoldering and persistent burn periods (Brown, Reinhardt, Kramer 2003).

Table 7. Fuel loading and coarse woody debris by treatment unit.

Unit #	Total Acres	Large Logs/ Acre	Ave. Tons per Acre of Dead/Down Fuels	Unit #	Total Acres	Large Logs/ Acre	Ave. Tons per Acre of Dead/Down Fuels
42	30	14.7	37	**53**	22	1.5	35
43	21	19.2	29	**54**	9	28.8	64
44	20	24	42	**55**	30	19	36
45	26	1.6	43	**56**	4	10	63
47	27	5	39	**57**	26	19	50
48	26	4.8	37	**59**	33	14	42
50	87	12	37	**60**	31	0	32
51	13	20.8	33	**65**	108	12.8	44
52	20	9.6	42	**115**	4	14	61
				126	13	6.4	33

[28] Surface fuels include all combustible material lying beneath or on the forest floor, including, roots, rotten buried logs, duff, and woody debris.

Aerial (Canopy) Fuels[29]

Canopy Base Heights and Canopy Bulk Density

Canopy base height (CBH) is the lowest height above the ground where there is sufficient amount of canopy fuel to transition a fire from the surface fuels into the tree crowns (Scott and Reinhardt 2001); therefore, low canopy base heights are a critical factor in determining crown fire potential. Canopy base heights were determined across the project area from Forest Service Forest Vegetation Simulator (FS-FVS) data and the Rapid Refresh LANDFIRE data. The structure and species composition of the stands, specifically white fir and red fir with low growing crowns, as well as dense understory trees, are contributing to the low canopy base heights observed. Drier sites in the project area tend to have greater variation in stand structure due to small openings in the canopy, but canopy base heights are still low due to the tall shrubs and understory trees. In these forest types, the fuels continuity from the surface fuels to the crown fuels has created the potential for surface fire to reach the crowns of the overstory trees. Fire behavior modeling for this project indicates that stands with canopy base heights of less than 4 feet are susceptible to higher crown fire potential. Table 8 provides a summary of canopy base height presently found based on the percentage of the total treatment area.

Canopy bulk density (CBD) is the mass of available fuel per unit of canopy volume (kg/m3). It is a bulk property of a stand, not an individual tree. CBD is an important crown characteristic needed to predict crown fire spread. Canopy bulk densities were estimated from FS-FVS outputs for representative stands within the project area as well as comparing site-observations to available research such as Scott and Reinhardt (2001). Dense stands can have a CBD of 0.30 kg/m3. CBD affects the critical spread rate needed to sustain active crown fire. The lower the canopy bulk density, the lower the potential for active crown fire. Table 8 is a summary of the canopy bulk density that presently occurs based on the percentage of the total treatment area.

Table 8. Percentage of canopy base heights and canopy bulk densities found within treatment areas.

Canopy Base Height		Canopy Bulk Density (kg/m^3)	
<4 Feet	47%	0-.05 kg/m3	24%
4-8 Feet	10%	0.05-.1 kg/m3	51%
8-11 Feet	19%	.1-.2 kg/m3	19%
+11 Feet	24%	.2 + kg/m3	6%

Fire Behavior

Crown Fire Potential

Crown fire potential is generally based on the amount of surface fuels, the amount of ladder fuels, and the density and spacing of the canopy. Heavy surface fuels generally contribute to longer flame lengths. Low canopy base heights can carry surface fires into the crowns. Once established the crown fire may persist. The more spaced the canopy, the greater the wind necessary to move fire from one crown to the next. Dense canopies would require much less wind speed to support crown fire. A crown fire will loft more firebrands into the air than a surface fire due to the amount and type of fuel being consumed. A crown fire is generally more intense, thus producing more wind and convective heating. These forces alone, or

[29] Aerial fuels consist of trees, shrubs, and low-growing branches on trees that allow fires to move from the surface to the tree canopy.

combined, will carry firebrands greater distances. Crown fires are more dangerous than surface fires and are more difficult to suppress.

Predicting Resistance to Control with Fire Suppression Actions

Flame lengths are a measure of how intense or severe a fire may become and a proxy for ease of fire suppression (resistance to control). Heavy surface fuels generally contribute to longer flame lengths. Table 9 is from appendix B of the Fireline Handbook (NWCG 2006) that is used as a general guide to determine fire hazard or the degree of resistance to control, resources needed, and methods of managing and suppressing a wildfire based on average flame lengths. Resistance to control is a relative measure of the capabilities of firefighting resources to suppress a wildland fire. Firefighting resources have enhanced production rates as fuel loading and fuel-bed depth decrease. Increased fireline production rates and changes to lower fireline intensities allow both ground-based and aerial suppression resources to be more effective.

Table 9. Level of resistance to control or difficulty in obtaining suppression objectives.

Resistance to control	Flame Length (feet)	Fireline Intensity (BTU/FT/S)	Possible Methods of Attack	Minimum Types of Resources and Location of Control Lines
Low	0-4	0-100	Direct	Hand/ground crews at fire edge.
Moderate	4-8	100-500	Direct/Indirect	Mechanized equipment supported by hand/ground crews at fire edge.
High	8-12	500-1000	Indirect	Primarily an indirect attack with line construction away from fire edge using a combination of aerial resources, mechanized equipment and hand/ground crews.
Extreme	>12	>1000	Indirect	Indirect attack is only option with line construction away from fire edge using a combination of aerial resources, mechanized equipment and hand/ground crews.

Environmental Consequences

Table 10 is a summary of the measurement indicators for each treatment unit by fuel model for each alternative. This data is the basis for the conclusions made for this section of the analysis.

Table 10. Summary table of measurement indicators for each alternative by each treatment unit based on the fuel model found in the treatment unit.

Unit	Fuel Model	Flame Length (feet)			Fire Type			Rate of Spread (ch/hr)		
		Alt 1	Alt 2	Alt 3	Alt 1	Alt 2	Alt 3	Alt 1	Alt 2	Alt 3
42	165	48.5	2.1	2.1	Passive/Active[30]	Surface	Surface	41.17	1.7	1.7
	186	2.3	<1	<1	Surface	Surface	Surface	3.25	<1	<1
43	186	2.3	<1	<1	Surface	Surface	Surface	3.25	<1	<1
	165	8.8	2.1	2.1	Passive	Surface	Surface	9.13	1.7	1.7
	183	1	<1	<1	Surface	Surface	Surface	1	<1	<1
44	165	6.4	2.1	2.1	Surface	Surface	Surface	5.68	1.7	1.7
	186	2.3	<1	<1	Surface	Surface	Surface	3.25	<1	<1
45	165	6.4	3.4	3.4	Surface	Surface	Surface	5.68	2.84	2.84
	184	1.2	<1	<1	Surface	Surface	Surface	3.25	1.62	1.62

[30] Crown fire can be passive, active, conditional or a combination of the three.

Unit	Fuel Model	Flame Length (feet)			Fire Type			Rate of Spread (ch/hr)		
		Alt 1	Alt 2	Alt 3	Alt 1	Alt 2	Alt 3	Alt 1	Alt 2	Alt 3
	186	2.3	1.2	1.2	Surface	Surface	Surface	3.25	1.62	1.62
47	145	40.6	4	4	Passive/Active	Surface	Surface	49.19	14.52	14.52
	165	6.4	2.1	2.1	Surface	Surface	Surface	5.3	1.7	1.7
	183	1	<1	<1	Surface	Surface	Surface	1.6	<1	<1
	186	2.3	<1	<1	Surface	Surface	Surface	3.25	<1	<1
48	165	6.4	2.1	2.1	Surface	Surface	Surface	5.68	1.7	1.7
	186	2.3	<1	<1	Surface	Surface	Surface	3.25	<1	<1
50	165	11.7	2.1	2.1	Passive/Active	Surface	Surface	13.3	5.68	5.68
	184	1.2	<1	<1	Surface	Surface	Surface	1.45	<1	<1
	186	2.3	<1	<1	Surface	Surface	Surface	3.25	<1	<1
	187	1.9	<1	<1	Surface	Surface	Surface	1.92	<1	<1
51	122	17	3.1	3.1	Passive/Active	Surface	Surface	63.28	20.52	20.52
	186	2.3	<1	<1	Surface	Surface	Surface	3.25	<1	<1
52	165	29.6	3.4	3.4	Passive/Active	Surface	Surface	30.96	2.84	2.84
	186	2.3	1.2	1.2	Surface	Surface	Surface	3.25	1.62	1.62
53	145	28.3	4	4	Passive/Active	Surface	Surface	48.8	14.5	14.5
	165	6.4	2.1	2.1	Surface	Surface	Surface	5.68	2.56	2.56
	186	2.3	<1	<1	Surface	Surface	Surface	3.25	<1	<1
54	165	66.4	2.1	51	Passive/Active	Surface	Conditional	49.46	1.7	1.7
	186	48.3	<1	45	Conditional	Surface	Conditional	49.46	<1	<1
55	122	20.8	4	4	Surface	Surface	Surface	68.42	20.52	20.52
	145	13.3	3.6	3.6	Passive/Active	Surface	Surface	48.64	14.52	14.52
	183	1	<1	<1	Surface	Surface	Surface	1	<1	<1
56	165	66.4	2.1	2.1	Passive/Active	Surface	Surface	49.46	1.7	1.7
	183	45.7	<1	<1	Conditional	Surface	Surface	49.46	<1	<1
57	145	29.7	4	4	Passive/Active	Surface	Surface	48.8	14.5	14.5
	165	6.4	2.1	2.1	Surface	Surface	Surface	5.68	1.7	1.7
	186	2.3	<1	<1	Surface	Surface	Surface	3.25	<1	<1
59	122	19.7	3.1	3.1	Passive/Active	Surface	Surface	62.54	20.1	20.1
	145	33.2	4	4	Passive/Active	Surface	Surface	40.3	8.6	8.6
	165	6.4	2.1	2.1	Surface	Surface	Surface	5.68	1.7	1.7
	186	2.3	<1	<1	Surface	Surface	Surface	3.25	<1	<1
60	122	9.4	3.1	3.1	Surface	Surface	Surface	68.42	20.5	20.5
	165	6.4	2.1	2.1	Surface	Surface	Surface	5.68	1.7	1.7
	186	2.3	<1	<1	Surface	Surface	Surface	3.25	<1	<1
	187	1.9	<1	<1	Surface	Surface	Surface	1.92	<1	<1
	189	4.1	1.4	1.4	Surface	Surface	Surface	5.18	1.55	1.55
65	165	45.4	2.1	2.1	Passive/Active	Surface	Surface	39.52	1.7	1.7
	184	1.2	<1	<1	Surface	Surface	Surface	1.45	<1	<1
	187	1.9	<1	<1	Surface	Surface	Surface	1.92	<1	<1
115	165	66.4	2.1	2.1	Conditional	Surface	Surface	49.46	1.7	1.7
126	122	9.4	3.1	3.1	Surface	Surface	Surface	68.42	20.52	20.52
	184	1.2	<1	<1	Surface	Surface	Surface	1.45	<1	<1
	187	1.9	<1	<1	Surface	Surface	Surface	1.92	<1	<1
	189	4.1	1.4	1.4	Surface	Surface	Surface	5.88	1.55	1.55

Alternative 1, No Action

Direct and Indirect Effects

Under the no action alternative there will be no new proposed treatments; therefore, no direct effects to the fuels within the project area. Indirect effects include natural processes that will continue, including accumulation of forest debris that will increase natural fuel loadings. Forest stands will remain overstocked and ladder fuels will continue to fill-in and crowd the overstory. The drier forest stands will continue to lose vigor due to competition from a dense understory of shade tolerant species. This understory will serve as ladder fuels that would permit a surface fire to expand into the canopy of overstory trees. Modeling results indicate that 31 percent of forested ecosystems would incur a high severity fire under 95th percentile fire weather conditions. High severity includes crown fire and high severity surface fire resulting in the loss of 80 to 100 percent of the overstory vegetation.

Predicted Flame Length

Based on the modeling, the predicted flame lengths and resistance to control under the no action alternative shows approximately 36 percent of the treatment area has predicted flame lengths greater than 12 feet with extreme rating for resistance to control and a total of 41 percent of the treatment area with predicted flame lengths greater than 4 feet (table 11).

Table 11. Summary of flame lengths and resistance to control by percentage of treatment area within the treatment area for alternative 1.

Flame Lengths	Resistance to Control	Percent of Treatment Area
0-4 feet	Low	59%
4-12 feet	Moderate-High	5%
> 12 feet	Extreme	36%

Predicted Fire Type

Table 12 provides a summary of the predicted fire types within the treatment area and table 10 provides the predicted fire type by treatment unit under this alternative. Modeling indicates that 31 percent of the area is subject to either passive or active crown fire should initial attack actions fail (27 percent is modeled as active crown fire).

Table 12. Summary of predicted fire type by percentage of treatment area for alternative 1.

Fire Type	Percent of Treatment Area
Surface	59%
Passive	4%
Active	27%

Predicted Rate of Spread

The predicted rate of spread average is approximately 50 to 70 percent greater than the post-treatment conditions for the action alternatives (table 10 provides a comparison by treatment unit and fuel model).

Risk to Life and Property and Improving Effectiveness of Fire Suppression Operations and Firefighter Safety

Should initial attack actions on a fire fail during 95th percentile fire weather conditions, the predicted flame lengths (41 percent of the treatment area with flame lengths greater than 4 feet), predicted fire type (31 percent crown fire), and similar percentage for the rate of spread will require mechanized equipment and indirect firefighting tactics for control with these areas having moderate to extreme resistance to control. Under these wildfire behavior conditions, improved effectiveness of fire suppression operations and firefighter safety within the project area will not occur and the risk to life and property within the project area will not be reduced. The modeling results indicate that fires that start under 95th percentile fire weather conditions inside the project area or start outside and move into the project area would likely be more expensive, difficult, and dangerous to suppress.

Cumulative Effects

The spatial context for specific treatments and the cumulative effects boundary is the Huntington Lake Recreation Area, approximately 4,700 acres. This boundary was selected because areas within the cumulative effects boundary would be dominated by the same

emphasis on visuals as well as the protection of structures that are within the WUI defense or threat zones. The temporal context is 10 years. Foreseeable future actions include additional state mandated 100-foot clearance around homes, but no significant activity on National Forest lands within the basin to address vegetation or fuels. In the event of a large fire, the effects of that fire would be similar to the Big Creek Fire that occurred in 1994. The cumulative effects associated with the occurrence of a wildland fire would be much the same as the indirect effects presented earlier. Fuel loadings and characteristics across the landscape would be immediately altered in the short term. Crown fire potential would be low in areas that experienced a high fire severity burn for one to two decades until regeneration is well established. Other areas where fire severity was low or did not burn would see the return or continuance of crown fire risk unless other actions were taken to reduce the potential. Characteristics of future prescribed fires or wildfires in the burned area following a severe crown fire would be less intense, less resistance to control, and perhaps provide more of a safety margin for firefighters and residents.

As directed by federal wildland fire policy and due to the fact the project area is fully within the Wildland Urban Interface, aggressive fire management actions will continue.

Alternative 2, Proposed Action and Alternative 3, Non-Commercial Funding Alternative

Direct and Indirect Effects

From a hazardous fuels perspective related to the fuels and fire needs for this project, there are little direct and indirect effects differences between alternatives 2 and 3. The treatments and combination treatments will produce similar results for flame lengths, fire type, and rate of spread in the event of an unplanned ignition (Table 10). The main differences between the two action alternatives are that alternative 2 will produce a greater reduction in canopy bulk density and increased level of crown base height (because of the greater reduction of smaller diameter trees) than alternative 3. Table 13 is a summary of the flame lengths that are needed to initiate passive or active crown fire as a comparison of the alternatives based on the level of treatments.

Table 13. Flame lengths required to initiate passive or active crown fire.

Treatment Unit	Required Flame Length to Initiate Passive or Active Crown Fire (in feet).			Treatment Unit	Required Flame Length to Initiate Passive or Active Crown Fire (in feet).		
	Alt 1	Alt 2	Alt 3		Alt 1	Alt 2	Alt 3
42	2.5	14	9.4	**54**	6.6	12.1	9.6
43	6.2	13.2	10.9	**55**	10.3	11.2	11.2
44	8	13.2	10.9	**56**	5	10.6	10.6
45	9.4	11.2	10.4	**57**	9.4	13.5	13.5
47	10.6	11.8	11.8	**59**	6.6	14	8
48	8.4	12.1	10	**60**	11.8	16.6	15.9
50	6.2	12.1	8	**65**	2.5	9.4	7.7
51	5.4	12.9	10	**115**	7	13.8	10.3
52	4.5	15.6	6.2	**126**	10	13.8	10.3
53	10.3	14.6	14.6				

Under either action alternative, ladder fuels (shrub and small tree) reduction would break up the horizontal and vertical continuity from the surface fuels to the canopy fuels increasing canopy base height. Aerial fuels separated from surface fuels by large gaps are more difficult to ignite, thereby decreasing the potential for crown fire. Surface fuel loading would be reduced by up to 70 percent through piling and pile burning, broadcast burning and underburning which will lower the predicted flame length. Because flame lengths predicted under 95th percentile fire weather conditions for both alternatives 2 and 3are below 4 feet (table 10) and the requirement flame lengths needed to initiate passive or active crown fire for both action alternatives in all treatment units are above 4 feet (table 13), passive or active crown fire would not be expected for either action alternative.

These treatments would reduce the amount of shading on surface fuels, increase wind speeds to the forest floor, reduce the relative humidity at the forest floor, increase the fuel temperature and reduce fuel moisture. These indirect effects may increase the probability of ignition compared with the no action alternative, depending on weather conditions. Should an ignition occur, the reduced fuel levels and arrangement would reduce fire severity, fire intensity and would increase opportunities for safe and effective fire management actions.

Predicted Flame Length

As noted in table 10, the predicted flame lengths are less than 4 feet for all treatment units in alternative 2 (100 percent of the treatment area) and for alternative 3, all treatment units except for treatment unit 54.

Predicted Fire Type

Table 10 shows that the predicted fire type for alternative 2 is entirely surface fire for all treatment units and for alternative 3, all treatment units are predicted as surface fire except for treatment unit 54, which is predicted as conditional crown fire. As noted earlier, conditional crown fire is a situation where surface fires are not present in sufficient amounts to initiate crowing but canopy fuels are sufficient to sustain an independent crown fire. With these conditions, crown fire must come from an adjacent stand. Unit 54 is bounded on all perimeters by other treatment areas that display surface fire behavior after treatment; therefore, the risk of conditional crown fire occurring in unit 54 after treatment occurs is low.

Predicted Rate of Spread

Modeling indicates the rate of spread over the treatment areas will be 50 to 70 percent less than the no action alternative.

Risk to Life and Property and Improving Effectiveness of Fire Suppression Operations and Firefighter Safety

Should initial attack actions fail during the 95th percentile weather conditions, the predicted flame lengths (generally less than 4 feet), predicted fire type (generally surface fire) and a 50 to 70 percent reduction in the rate of spread will allow for more effective fire suppression operations through direct firefighting tactics when compared with the no action alternative. Based on predicted fire behavior, a wildfire could be suppressed more easily. Firefighter safety would also be improved due to decreasing potential fire behavior. With improved effectiveness of fire suppression operations, flame lengths less than 4 feet, and predicted surface fire type near structures, the risk of life and property will be reduced. The length of individual treatment effectiveness from a hazardous fuels perspective will range from 7 to 15 years dependent on initial treatment levels (Finney et al. 2006, Graham et al. 2004).

Alternative 2 would likely last longer than alternative 3 due to the additional amount of thinning that would occur.

Cumulative Effects

Vegetation treatments as noted in appendix B are projects that were considered in this analysis and include activities such as thinning, pile burning and other vegetation management activities. These activities have positive effects to the fuels situation by removing material or vegetation; however, overall these actions have not addressed landscape fuels management and urban interface protection needs in the Huntington Lake Recreation Area. Where fuels treatments overlap with other completed and or planned projects there will be a cumulative benefit in the form of reduced fire behavior.

Vegetation[31]

Background and Affected Environment

The focuses of the vegetation analysis are to address: improving a stand's ability to withstand the drought cycles without mortality above endemic levels and reduce the risk potential for insect- and disease-driven mortality within the project area (one of the needs for the project) and project effects to stand characteristics (e.g., stand density, canopy cover) and large snag density (key issues from scoping).

Climate Change, Future Predictions

No published climate change or vegetation change modeling has been carried out for the southern Sierra Nevada. Most models predict at a larger spatial scale. A comparison of 21 published General Circulation Models did provide several general conclusions: all 21 reviewed models predicted warming temperatures for California. The most common prediction among the most recent models is temperature warming by about 9°F by 2100 with precipitation remaining similar or slightly reduced compared to today (Dettinger 2005 from Meyer and Safford 2010). Most models agreed that summers will be drier than they are currently and most modeling projects a continuously increasing rain: snow ratio and earlier runoff dates for the next century, with decreased snowpack and growing-season stream flow, even in the higher elevation river basins (Miller et al. 2003, Mosser et al. 2009 from Meyer and Safford 2010).

Insect and Disease

Stand Density Index is a relative measure that compares existing stand density to a reference maximum density. Maximum Stand Density Index levels used were the default levels in FVS (Keyser, 2008). They vary by species. For the species common in the Keola Project area they are 759 for white fir, 571 for Jeffery pine, 800 for red fir, 624 for other softwoods (which includes lodgepole pines), and 647 for sugar pine. Although Oliver (1995), indicates that the limiting Stand Density Index for even-aged ponderosa pine is actually 365, when dendroctonus bark beetles are involved, this was not used as the limiting level in this modeling.

[31] The Vegetation section of this EA is a summary from the Keola Vegetation and Silviculture Specialist Report. This report is available in the planning record located at the High Serra Ranger District office.

Benchmarks that correspond with 35 percent of maximum Stand Density Index (on set of increase insect mortality and inter tree competition) and 60 percent of maximum Stand Density Index (imminent risk and lower limit of self thinning) are identified as thresholds for insect activity (Oliver 1995, Oliver and Uzoh 1997, Sherlock 2007). The more acres found over the threshold the greater the potential for insect and density induced mortality. Table 14 provides a summary of the percent maximum of the Stand Density Index for each treatment unit. The majority to treatment units are above 35 percent of the reference maximum (or 84 percent of the total treatment acres) with 5 treatment units (or 27 percent of the total treatment acres) 60 percent or greater. Based on field observations in the Keola Project area, a disproportion amount of large dead trees are pine.

Table 14. Percent of maximum Stand Density Index by treatment unit.

Treatment Unit	Acres	Percent of Maximum SDI	Treatment Unit	Acres	Percent of Maximum SDI
42	30	44	**54**	9	69
43	21	28	**55**	30	27
44	20	54	**56**	4	68
45	26	60	**57**	26	42
47	27	41	**59**	33	57
48	26	38	**60**	31	37
50	87	51	**65**	108	60
51	13	31	**115**	4	69
52	20	59	**126**	13	44
53	22	29			

Two known sites of annosum root disease exist within the project area (treatment units 44 and 52). Both pockets are less than 0.25 acre in size. It is possible other areas within the project area have the annosum root disease. All annosum root disease found within the Huntington Lake Recreation Area is “S” type, which only affects true fir.

Mistletoe levels are currently low to moderate in the project area. All treatment units have a Hawksworth stand level mistletoe rating less than 1, ranging from 0.09 to 0.97. Table 15 provides the mistletoe rating by treatment unit. Stand level mistletoe rating above 1 is considered moderate to high and above 2.4 is extreme.

Table 15. Stand level mistletoe ratings for each treatment unit.

Treatment Unit	Stand Level Mistletoe Rating	Treatment Unit	Stand Level Mistletoe Rating
42	0.13	**54**	0.09
43	0.97	**55**	0.80
44	0.20	**56**	0.11
45	0.19	**57**	0.18
47	0.32	**59**	0.34
48	0.48	**60**	0.70
50	0.55	**65**	0.65
51	0.47	**115**	0.09
52	0.66	**126**	0.42
53	0.22		

Stand Characteristics

Vegetation within the project area is a mosaic strongly affected by past disturbances (timber sales, fire, and fuels treatments), site quality, and secondary succession. Stands are dominated by white fir with about 53.5 percent of the basal area being occupied by white fir, much of which has encroached in the understory over the last one hundred years. Red fir is also common across the landscape, comprising 34 percent of the existing basal area. Generally, red fir is very common in some stands, while being fairly uncommon in others. Jeffrey pine are found widely scattered across the project area and make up 7.4 percent of the basal area. Lodgepole pine is found scattered across the landscape and makes up approximately 5 percent of the basal area, typically near meadows and in areas of poor site quality. Sugar pine is found very rarely in the project area, comprising less than 0.1 percent of the basal area.

Stand Density

Presently stand density ranges from 96 to 675 trees per acre in which the majority of trees are less than 10 inches dbh. Table 18 provides a summary of trees per acre by diameter class for each alternative.

Basal area is another measurement for stand density. Figure 5 provides a graph representing the basal area by diameter class for each treatment unit. The weighted average basal area for all the treatment units is 197 square feet per acre.

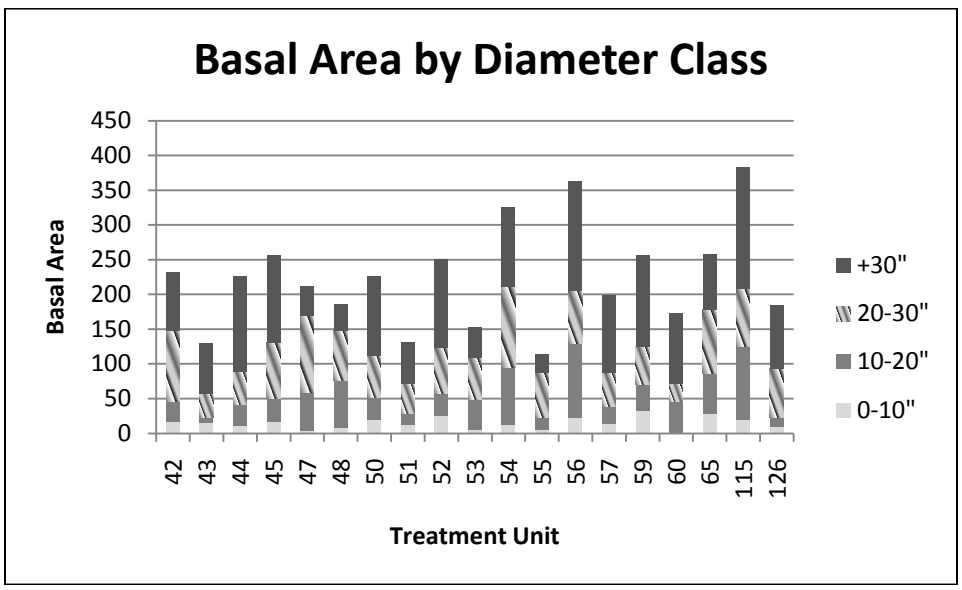

Figure 5. Graphic representation of basal area by diameter class for each treatment unit.

Currently, stands in the project area grow under conditions where competition based mortality and density are the primary drivers of future composition. In contrast, studies suggest old growth historically developed under conditions of trees growing at low density with little competition for water, nutrients and light (Tappeiner et al. 1997, North et al. 2004). These results suggest that tree removal is needed in dense young stands where the management objective is to speed development of old forest characteristics (Tappeiner et al. 1997).

Snag Density

The treatment units average approximately 4.85 large snags[32] per acre with each treatment unit varying from 3 to 15.3 snags per acre. Figure 6 provides a representation of the number of large snags per acre by treatment unit.

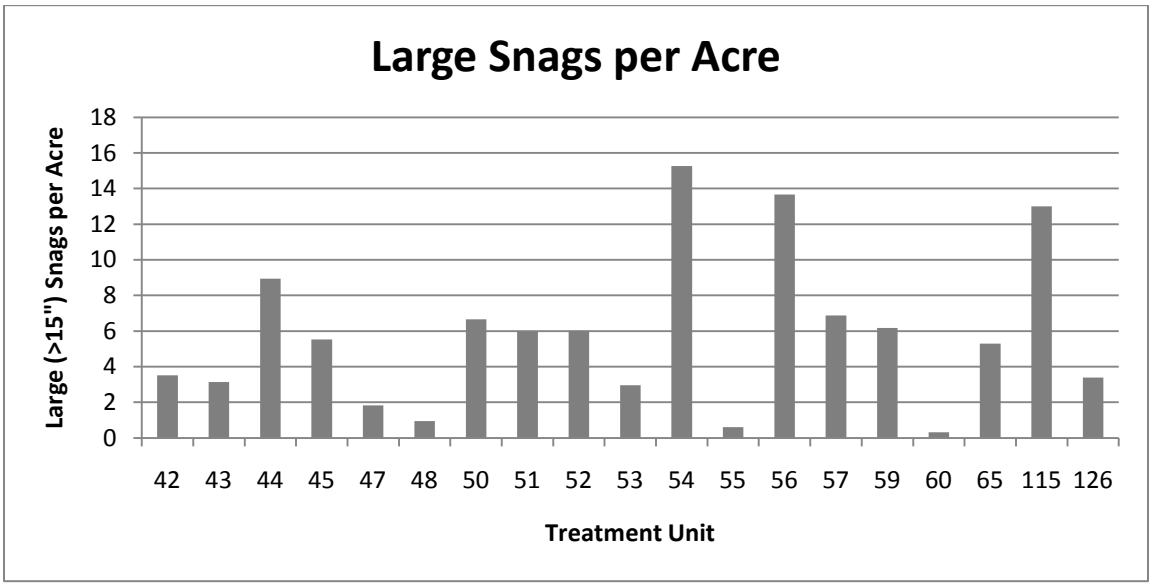

Figure 6. Graphic depiction of the large snags per acre for each treatment unit.

Environmental Consequences

Alternative 1, No Action

Direct and Indirect Effects

There are no direct effects to vegetation from the no action alternative.

Insect and Disease

Historical weather data indicates that the Sierra Nevada experiences periodic droughts (McKelvey et al. 1996, North et al. 2005). In below normal precipitation years, lack of water will weaken tree resistance and allow bark beetles to begin causing mortality in pockets. The mortality will likely exceed the periodic growth rate of stands (Oliver 1995). Forest health survey of Huntington Lake identified mortality caused by density and insects as the greatest threat to the project area (Bulaon and Mackenzie 2009). Predicted climate change will not lessen this risk. Though it is difficult to predict insect outbreaks, it is certain that present stand conditions and predicted weather conditions provide a risk of stand replacing insect mortality under the no action alternative. Table 16 provides a comparison between the alternatives of the percentage above the Stand Density Index for each treatment unit stand.

[32] Large snag is defined as dead standing tree larger than 15 inches dbh and taller than 10 feet

Table 16. Comparison of the percentage of maximum Stand Density Index for each alternative shortly after treatment.

Treatment Unit	Alternative 1, No Action	Alternative 2, Proposed Action	Alternative 3, Non-Commercial Funding Alternative
42	51	40	44
43	31	23	23
44	58	38	45
45	64	40	51
47	44	35	35
48	43	24	29
50	56	35	44
51	35	26	29
52	65	36	49
53	31	25	25
54	70	43	52
55	30	20	20
56	69	57	57
57	45	33	33
59	66	43	50
60	40	33	35
65	66	44	49
115	70	61	61
126	49	28	37

Annosum root disease is not considered within historic limits that may have existed before the development of recreation or housing facilities (Bulaon and Mackenzie 2009). Sampling data in Keola indicate that existing pockets are about 0.25 acre in size. Studies have shown that the existing annosum root disease pockets will continue to spread and could eventually more than quadruple in size (Rizzo et al. 2000). Based on field observations in the basin, the fir engraver beetle (*Scolytus ventralis*) attacks appeared to coincide with these root disease pockets. Trees compromised by root disease are often eventually killed by the fir engraver (Bulaon and Mackenzie 2009).

Historically fire played a role in the control of mistletoe in true fir stands in the west (Hawksworth 1978, Parker et al. 2006). Since fire has been removed from the project area for over a hundred years, the mistletoe infection levels have likely grown slightly worse over time and plot data indicate they currently range from very low to moderate at the stand level. Heavily infected overstory mistletoe individuals could infect understory trees and over time, the infection levels will increase.

Stand Characteristics

The dominance of mixed conifer stands by white fir continues under the no action alternative. True fir (red and white fir) will dominate the stands (over 87 percent of the basal area).

Stand Density

Stand density is highest under the no action alternative should no mortality occur from a large insect infestation outbreak or a moderate to high severity wildland fire. Table 17 provides a comparison between alternatives for the basal area and shows what presently exists in each treatment unit.

Table 17.Basal area remaining and percentage of basal area removed by treatment unit for each alternative.

Treat Unit	Total Acres	Basal Area (BA) After Mechanical Treatment					
		Basal Area			% of BA Removed		
		Alt 1	Alt 2	Alt 3	Alt 1	Alt 2	Alt 3
42	30	198	175	190	0%	13%	4%
43	21	112	107	107	0%	5%	5%
44	20	211	174	205	0%	21%	2%
45	26	236	201	230	0%	18%	3%
47	27	192	192	192	0%	0%	0%
48	26	165	129	157	0%	28%	5%
50	87	204	168	195	0%	22%	5%
51	13	115	97	112	0%	19%	3%
52	20	228	162	215	0%	41%	6%
53	22	138	138	138	0%	0%	0%
54	9	322	197	256	0%	63%	25%
55	30	99	99	99	0%	0%	0%
56	4	359	359	359	0%	0%	0%
57	26	188	188	188	0%	0%	0%
59	33	222	178	209	0%	25%	6%
60	31	169	135	158	0%	25%	7%
65	108	230	173	207	0%	33%	11%
115	4	379	379	379	0%	0%	0%
126	13	158	131	157	0%	21%	0%

Based on modeling, should a wildland fire occur in the next year, during 95th percentile fire weather conditions and initial attack actions fail, approximately 56 percent of the pre-fire live tree basal area would be lost (approximately 86 square feet per acre would remain). This potential loss increases over time as stands age and stand density and fuels increase. This estimate is consistent with what occurred during the Big Creek fire (within and adjacent to the project area) in which approximately 53 percent of the pre-fire live basal area was lost.

Table 18 provides a comparison of each alternative for the average number of trees per acre. For the no action alternative, the number of trees per acre in the 0 to 10-inch dbh diameter class dominates the treatment unit stands.

Table 18. A comparison between alternatives of trees per acre remaining by diameter size class after mechanical treatments for each treatment unit.

Treat Unit	Total Acres	Retained Trees per Acre after Mechanical Treatment (by diameter [dbh]class)																	
		0-10”			10-20”			20-30”			30-35”			>35”			Total		
		Alt 1	Alt 2	Alt 3	Alt 1	Alt 2	Alt 3	Alt 1	Alt 2	Alt 3	Alt 1	Alt 2	Alt 3	Alt 1	Alt 2	Alt 3	Alt 1	Alt 2	Alt 3
42	30	220	98	110	29	16	24	28	27	28	1.5	1.5	1.5	6.3	6.3	6.3	284	149	170
43	21	284	58	58	12	12	12	6	6	6	2.6	2.6	2.6	5.3	5.3	5.3	310	84	84
44	20	521	87	116	29	13	25	13	7	13	2.2	2.2	2.2	11.2	11.2	11.2	576	120	167
45	26	514	45	129	28	21	26	23	17	23	3.4	3.4	3.4	9	9	9	577	95	190
47	27	126	126	126	47	47	47	31	31	31	3	3	3	1.7	1.7	1.7	209	209	209
48	26	159	43	51	57	29	49	18	18	18	3.9	3.9	3.9	1.1	1.1	1.1	239	95	123
50	87	480	35	112	29	20	27	14	10	14	5.8	5.8	5.8	6.7	6.7	6.7	536	78	166
51	13	387	203	221	18	11	16	8	6	8	5.1	5.1	5.1	2.8	2.8	2.8	421	228	253
52	20	600	86	141	30	6	28	16	10	16	6.8	6.8	6.8	7.4	7.4	7.4	660	116	199
53	22	62	62	62	36	36	36	15	15	15	5	5	5	1.1	1.1	1.1	119	119	119
54	9	181	20	4	85	10	26	31	20	31	14.7	14.7	14.7	2.5	2.5	2.5	314	67	78
55	30	249	249	249	15	15	15	15	15	15	3.1	3.1	3.1	0.7	0.7	0.7	283	283	283
56	4	256	256	256	109	109	109	18	18	18	15.7	15.7	15.7	6.2	6.2	6.2	405	405	405
57	26	312	312	312	22	22	22	14	14	14	9.3	9.3	9.3	5.3	5.3	5.3	362	362	362
59	33	508	81	112	34	19	32	14	11	14	7.5	7.5	7.5	7.2	7.2	7.2	570	126	173
60	31	31	6	6	42	40	28	10	9	10	9.6	6.6*	9.6	3.1	2.1*	3.1	96	64	44
65	108	591	126	122	51	49	44	26	16	26	2.5	2.5	2.5	4.5	4.5	4.5	675	198	199
115	4	163	163	163	110	110	110	19	19	19	16.2	16.2	16.2	7.9	7.9	7.9	316	316	316
126	13	577	57	115	13	3	24	21	17	21	5.7	5.7	5.7	3.3	3.3	3.3	620	86	169

*The model indicates approximately 120 trees greater than 30” dbh being removed but field validation indicated less than 20 trees.

Canopy Cover

The canopy cover for the project area varies from approximately 25 (unit 55) to 79 percent (unit 115) canopy cover within the treatment units. Table 19 provides a summary for alternative 1 and comparison of the percent canopy cover over time for each alternative, assuming no large tree mortality due to wildfire or insect outbreak during this period.

Table 19. Canopy cover by treatment unit for each alternative pre-treatment (2009), after mechanical treatment (2012) and 10 years later[33] (2022).

Treatment Unit	Alternative 1, No Action (percent canopy cover)			Alternative 2, Proposed Action (percent canopy cover)			Alternative 3, Non-Commercial Funding (percent canopy cover)		
	Sampled year (2009)	Year 2012	Year 2022	Sampled year (2009)	Year 2012	Year 2022	Sampled year (2009)	Year 2012	Year 2022
42	46	49	57	46	38	43	46	42	48
43	26	28	37	26	23	25	26	23	26
44	43	46	59	43	33	37	43	41	45
45	49	53	62	49	39	41	49	45	49
47	45	47	51	45	47	42	45	47	42
48	42	44	49	42	33	31	42	40	37
50	45	48	58	45	31	34	45	39	43
51	31	35	43	31	25	30	31	29	34
52	49	54	64	49	28	33	49	41	46
53	36	37	40	36	37	34	36	37	34
54	78	70	70	78	43	46	78	53	55
55	25	27	35	25	27	25	25	27	25
56	77	74	74	77	74	63	77	74	63
57	46	45	50	46	45	37	46	45	37
59	54	58	68	54	38	43	54	45	51
60	44	45	46	44	38	40	44	41	42
65	56	61	69	56	40	46	56	43	48
115	79	75	74	79	75	67	79	75	67
126	33	39	55	33	26	30	33	33	39

Large Snag Density

Large snag density would increase over time at a relatively consistent rate, averaging about 0.7 snags per acre every 10 years (FVS modeling), should no mortality occur from a large insect infestation outbreak or a high severity wildland fire. The modeling does not take into account hazard tree removal due to health and safety issues. Because hazard trees are typically removed adjacent to structures, recreation sites, and roads, the number of hazard tree snags removed would have a minor effect on large snag density within the project area.

Should a wildland fire occur under very high or higher fire weather conditions or an insect epidemic occurs within the project area, snags per acre would rise precipitously in the short run; however, several years after the disturbance the large standing snags per acre in the area would drop to near zero levels (Passovoy and Fulè 2006). This is because large snags created by the disturbance would eventually rot and fall and the disturbance may have removed large diameter trees greater than 15 inches dbh) that would be recruitments for future snags.

[33] Modeling assumes mechanical harvesting of trees 12 inches dbh and larger occur in 2012 and prescribed burnings occur in 2015.

Cumulative Effects

The Huntington Lake Basin is the vegetation cumulative effects spatial boundary and the temporal boundary is 10 years. Cumulatively within the basin, the high stand density, prevalence of shade tolerant conifers, and smaller size trees is more at risk of an insect outbreak that could cover large patches of the landscape. Should a wildland fire occur within the project area during very high fire weather conditions and initial attack actions fail, the wildfire would likely be similar to the Big Creek fire in 1994. The fire resulted in a mosaic pattern in which half the conifer stands received moderate or high mortality. Over half of the live basal area was lost as a result of the fire, leaving 80 square feet per acre of basal area.
Alternative 2, Proposed Action

Direct and Indirect Effects

Insect and Disease

This alternative will reduce the density of the stands (and reduce the percentage above the Stand Density Index), which should increase available water and nutrient potential and improve stand resiliency to the drought cycles that are common in California (Bulaon and Mackenzie 2009). The improved individual tree vigor and growth will reduce the risk of some bark beetles and pathogen mortality, but will not eliminate the potential for insect attack or self thinning. Egan (2008) found that thinning did reduce the number of trees killed by fir engraver during times of extreme drought and could be attributed to providing less available hosts (Bulaon and Mackenzie 2009). Table 20 shows alternative 2 along with a comparison of the percentage above Stand Density Index for each alternative.

Table 20. Comparison of the percentage of maximum Stand Density Index after treatment for each alternative.

Treatment Unit	Alternative 1, No Action	Alternative 2, Proposed Action	Alternative 3, Non-Commercial Funding Alternative
42	51.0	40.2	44.1
43	31.4	23.0	23.0
44	58.1	37.9	45.3
45	64.2	39.7	50.7
47	43.8	34.6	34.6
48	41.7	24.4	28.7
50	56.2	34.8	43.5
51	35.0	25.5	28.8
52	64.7	36.3	48.9
53	31.2	25.3	25.3
54	70.1	43.2	52.1
55	29.7	20.1	20.1
56	69.4	56.7	56.7
57	45.4	32.7	32.7
59	65.7	43.1	50.4
60	40.1	33.0	35.1
65	66.0	44.3	48.8
115	70.2	60.9	60.9
126	49.3	27.6	36.5

Tree removal results in the creation of logging residue (slash) and can damage individual trees. Logging residue can result in the creation of habitat for pine engravers (*Ips* spp.) and fir engraver beetle (*Scolytus* spp.) when young trees less than eight inches in diameter are

thinned. If slash is created between January to June or when slash does not have time to dry, then bark beetles can breed in slash and latter emerge to damage or kill conifers (Furniss and Carolin 1977). The alternative is designed to reduce this risk by locating the piles in open, sunny locations and limiting the time when slash piles are created (i.e., July 1 through October 31). In addition, trees damaged from logging operations, where mortality is likely, are removed to prevent vectoring disease and insects.

Alternative 2 removes susceptible trees (true fir) around the two known annosum root disease pockets. Petersen (1989) recommends a 50-foot susceptible tree removal buffer around an infected tree in visually sensitive areas. The proposed action also plants pine in the openings created by the original root disease pocket and subsequent tree removals. Pine will provide forested characteristics that is resistant to the "S" type annosum root disease. If additional annosum root disease pockets are found during the implementation period, they will also be treated with this method.

The project also includes the application of a chemical fungicide, such as Sporax,® on all created stumps of firs of certain sizes. Several studies have shown that borax based chemical fungicide application has a 90 percent efficiency or greater in preventing infections of annosum root disease (Kliejunas et al 2006). While Sporax® treatment has been shown to be 100 percent effective in some studies, it cannot be guaranteed that more annosum root disease areas will not establish as a direct result of stump creation and bole damage due to implementation of the proposed action (Nelson and Li 1980).

Though the treatment prescriptions do not prioritize the removal of trees infected with mistletoe, it is one of the selection criteria. Treatment unit 60 is the exception where heavy mistletoe infected trees within 300 feet of structures will be the priority for removal (sanitation prescription). Understory prescribed fire will also reduce mistletoe levels by pruning low lying infected branches, potentially killing infected trees and the heat from the fire causes seed pods to dehiscence[34] (Parker et al. 2006). Tree species planted with this alternative will also be immune to the overstory mistletoe. Modeling shows mistletoe ratings increase over time but at a slower rate compared when compared to the no action alternative.

Stand Characteristics

Though the tree treatment prescriptions prioritize the retention of pines, the percentage of basal area by species remains relatively the same after treatment. Small openings totaling 11 acres are proposed for planting with a higher percentage to pine species.

Stand Density

The majority of trees removed are within the 0 to 10-inch diameter class (94 percent of the total trees removed and 66 percent of those trees in that size class) and 10 to 20-inch diameter class (5 percent of the total trees removed and 26 percent of the trees in that size class). Tree removal in intermediate size trees (20 to 30 inches) occurs primarily to meet the objectives of increasing forest resiliency (e.g., more open, multi storied stands) and amounts to approximately one percent to the trees removed (approximately 16 percent of the trees in this diameter class).

Table 17 provides a summary of basal area that remains after mechanical treatment and the percentage of basal area removed from each treatment unit (for all alternatives).

[34] Dehiscence is the spontaneous opening of the seed pod.

An indirect effect from the removal of the trees is to increase the likelihood that remaining large trees will survive a wildland fire that would occur during very high or higher fire weather conditions. This is consistent with published research that indicates that understory thinning and individual tree selection treatments directly benefit the protection of large trees (Agee and Skinner 2005, Kolb et al. 2007). Modeling, soon after mechanical treatments occur, shows the stands would average approximately 162 square feet per acre of basal area. Should a wildland fire occur at 95th percentile fire weather conditions after all treatments have been implemented, the modeling shows approximately 120 square feet per acre of basal area will be retained.

Table 18 provides the predicted average number of trees per acre retained by diameter class after mechanical treatment (for each alternative).

The proposed action provides growing space allowing for tree diameter and crown expansion. Stand density and trees size are inversely related given a long enough time period. Trees grown in low-density stands tend to be larger (Oliver and Larson 1996). In addition research by Poage and Tappanier (2002) would indicate that open stand conditions might be necessary to grow the large trees that dominated forest under a historic fire regime. Modeling indicates over time (40 years), large trees (greater than 35 inches dbh) will occupy a higher percentage of basal area for this alternative compared with the no action and to a lessen extent, the non-commercial funding alternative. Table 18 shows there is large difference in the number of trees per acre between all the alternatives and modeling over time indicates the proportional difference is relatively constant (assuming no event occurs that affects high rates of mortality).

Canopy Cover

As noted earlier, table 19 provides a comparison of predicted percent canopy cover by treatment unit at year 2012 (after mechanical treatment) and 10 years later (2022), assuming prescribed fire treatments occur in 2015. Mechanical treatments initially decrease canopy cover by 11 to 45 percent (year 2012) while broadcast or underburn treatment units show a decreased canopy cover by 5 to 20 percent (predicted burning occurs year 2015 and predicted canopy cover is measured in year 2022). Predicted canopy cover in year 2022 varies from 25 to 67 percent.

Large Snag Density

Large snags will only be removed should they be a hazard tree within the project area. Prescribed fire operations will likely add large snags to the project area. The majority of trees within the treatment areas are fir which are intolerant to fire. Though there are design features to minimize mortality to the overstory from prescribed fire, it is not possible to prevent mortality. Scientific literature for the Sierra Nevada found underburning alone created roughly 2 more large snags per acre compared to the control (Stephens and Moghaddas 2005, Innes et al. 2006). If the trees are not directly killed by the burning operations, trees (fir in particular) will likely be weakened where understory burning occurs and will be more vulnerable to insects and diseases.

Modeling shows the rate of change of snags per acre is much more uneven than the no action alternative over a 40-year period, averaging 0.4 large snags per acre created every 10 years. Modeling for the no action alternative shows 0.7 large snags per acre created every 10 years. This difference in the modeling is likely due to the increased health of individual trees due to

the reduced density of the stands. Modeling for this alternative shows a slight increase in large snags per acre compared to the existing condition over time; therefore, the Forest Plan snag standard and guideline will be met (i.e., maintaining an average of 4 large snags per acre for Sierran mixed conifer forest type and 6 large snags per acre for red fir forest type).

Cumulative Effects

Vegetation treatments considered in the cumulative effects analysis within the basin[35] partially involve removing large trees and large snags (typically hazard trees). It is anticipated that approximately two hazard trees per acre shall be removed over approximately 250 acres (5 percent of the cumulative effects boundary). These actions would not reduce the large snags per acre below what is required in the Forest Plan and due to the scope of large trees removed (approximately 2 trees per acre over 4 percent of the cumulative effects boundary), the effect on large tree density within the basin would be minimal. Approximately 15 percent of the area involves stand thinning projects that will reduce stand density, increase stand resiliency, and reduce the risk to insect outbreaks within the treatment areas. Several projects (i.e., 168 Hazard Tree Sale, Potter Hazard Tree Sale, hazard tree removal around special use facilities) do not require treatment of large fir stumps. These projects could increase the potential for infection of the annosum root disease within the basin. Though the risk for this alternative adding to this root disease expansion is minimal with the required use of the fungicide, there is a possibility it could add to this adverse cumulative effect.

Alternative 3, Non-Commercial Funding Alternative

Direct and Indirect Effects

Insect and Disease

Under the non-commercial funding alternative, approximately 10 percent of the treated areas would continue to have high index (greater than 60 percent threshold) and mortality risk in year 2022, similar to the proposed action. Based on the thinning, this alternative will have a positive effect on stand resilience when compared with alternative 1 but to a lesser extent when compared with alternative 2 over the long-term. The Stand Density Index increases at a more rapid rate when compared with the proposed action. This is likely the result due to the size of trees removed. Because this alternative does not remove trees over 16 inches dbh, there are more medium size trees that contribute to the increased Stand Density Index as they grow.

The prescription for stump treatment for annosum root disease is the same as alternative 2 and is expected to have similar results, except that this prevention method will not affect the two known annosum root disease pockets. In alternative 3, these pockets will not be treated for the disease and will continue to expand. Pines will not be planted in these pockets to ensure a forested site.

The prescription for alternative 3 does not include sanitation. Infected trees with mistletoe will be removed based on the thin-from-below prescription and will not be a high priority for treating unit 60. Mistletoe levels will not be reduced to the levels anticipated with alternative 2 but will be lower than alternative 1.

[35] Appendix B provides the list of present and reasonably future projects considered.

Stand Characteristics

Similar to alternative 2, the percentage of basal area by species remains relatively the same after treatment. The majority of the basal area (over 87 percent) will be made up of true fir. Unlike alternative 2, no pines will be planted in openings.

Stand Density

The non-commercial funding alternative does not remove as many trees as the proposed action and those trees removed are mainly in the smaller diameter classes. Similar to alternative 2, the majority of trees removed are within the 0 to 10-inch diameter class (97 percent of the total trees removed and 60 percent of the trees in that size class). Trees removed from the 10 to 20-inch diameter class is far less than alternative 2 (3 percent of the total trees removed and 13 percent of the trees in that size class). Trees greater than 16 inches dbh, for unit 54, and trees greater than 12 inches in other treatment units will only be removed if they are hazard trees; it is anticipated the numbers will be minimal. Table 18 provides a comparison between alternatives of trees per acre that will remain after treatment by diameter class and total for each treatment unit. Alternative 3 removes fewer trees in all size classes when compared with alternative 2.

Table 17 provides a comparison between alternatives of the summary of basal area that will remain after treatment and percentage of basal removed from each treatment unit (for each alternative). Modeling, soon after mechanical treatments occur, shows the stands would average approximately 185 square feet per acre of basal area. Should a wildland fire occur at 95th percentile fire weather conditions after all treatments are implemented, the modeling shows approximately 136 square feet per acre of basal area will be retained. As noted in alternative 2, modeling indicates over time (40 years), large trees (greater than 35 inches dbh) will occupy a higher percentage of basal area than the no action alternative, but alternative 2 will not be as high as the proposed action alternative.

Canopy Cover

Table 19 provides the predicted percent canopy cover by treatment unit over time. The canopy cover is less affected by alternative 3 than alternative 2. The canopy cover is close to existing condition or greater by year 2022 over 25 percent of the treatment acres and the predicted canopy cover varies from 26 to 67 percent.

Large Snag Density

The large snag density will be similar to alternative 2, except the highly diseased trees greater than 30-inch dbh in treatment unit 60 will not be removed with this alternative. This alternative will not remove approximately 20 trees that met this criteria that are proposed for removal in alternative 2. These trees could become future snags should they not pose a health and safety risk.

Modeling shows the non-commercial funding alternative creates snags over time similar to alternative 2 but at a slightly higher rate averaging 0.6 trees per acre every 10 years. As with the no action alternative, this snag level meets the Forest Plan standard and guideline (i.e., maintaining an average of 4 large snags per acre for Sierran mixed conifer forest type and 6 large snags per acre for red fir forest type).

Cumulative Effects

The cumulative effects to vegetation is similar to what is anticipated for alternative 2 except that the stand density will be higher and over the long-term will have less beneficial effects in reducing insect risk, annosum root disease and individual tree growth.

Scenery[36]

Background and Affected Environment

The focuses of the scenery analysis are to address maintaining the valued scenic character and its scenery attributes through time and ecological progression within the project area (one of the needs for the project) and maintaining the Huntington Lake Recreation Area is a year-round outdoor recreation destination that attracts local, state, national and international visitors. The focus for recreation and scenery in the area is on the higher elevation lake but vegetation and topography also play key roles.

The project area as seen from the key viewing points consists of a largely undisturbed scenic character. Some minor or unnoticed contrasts, such as existing roads, utilities, and recreation facilities exist, but the area cumulatively meets the retention and partial retention visual quality levels. The rustic and rural built environment (e.g., cabins and all other structures) are not evident and/or are subordinate to the landscape as they are screened by vegetation and landform features. The retention and partial retention visual quality levels are in compliance with the Forest Plan visual quality objectives. The general scenic character of the area is the natural appearing lake surrounded by relatively dense conifer stands, moderately steep to rolling landform, rock outcrops, and relatively clean air. Distinct color contrasts are evident with the tan-colored shoreline, shades of blues from the lake and sky, and greens and blue-greens from the vegetation that includes yellows and reds in the fall.

The scenic character within the project area is an important recreation value now and into the future. The visual quality objective provides a measurement for scenery disturbance from an otherwise natural-appearing forest landscape and the scenic integrity provides a measurement to which the valued scenic character can be sustained through time and ecological progression.

Visual Quality Levels

The Forest Plan visual quality objective for the project area is almost entirely retention (management activities are not visually evident) with a small area (less than 30 acres) in the southwest portion of the project in partial retention (management activities remain visually subordinate to the characteristic landscape).

Scenic Stability

The scenic stability in the recreation area is expected to be high stability or very high stability due to the high scenic quality standards. Presently the project area has low scenic stability due to its ecosystem condition and stressors (i.e., risk of high tree mortality due to insects and wildfire) and scenery attribute conditions related to the vegetation (e.g., high stand density, uniform conifer stands, heavy dead and down surface fuels).

[36] The Scenery section of this EA is a summary from the Keola Scenery Resources Specialist Report. This report is available in the planning record located at the High Sierra Ranger District office.

Environmental Consequences

Alternative 1, No Action

Direct and Indirect Effects

There will be no direct adverse or beneficial effects to the scenic resources from implementing the no action alternative.

Visual Quality Objective

As noted earlier, the project area as seen from key viewing points (e.g., lake, cabins, Huntington Lake Road, Camp Keola, Dowville Day-use site) consist of largely undisturbed scenic character with some minor or unnoticed contrasts such as roads, utilities and recreation facilities. Many of these facilities are hidden from view due to the dense forest environment. The visual screening of the built environment is dependent on the sustainability of the vegetation. Based on the fire and fuels analysis, under 95th percentile fire weather conditions, approximately 31 percent of the project area has the potential to produce conditional, passive or active crown fire with 1 to 66 feet flame lengths predicted. The vegetation analysis predicts 56 percent of the pre-fire live tree basal area could be lost. Based on these predictions, there would likely be pockets with high fire severity with high tree mortality and high bole scorch.

Due to the high stand densities, 44 percent[37] of the acres within the project area exceed the upper benchmark for the risk of high insect mortality in stands. Should a widespread insect outbreak occur under the no action alternative, mortality would likely be similar to the wildland fire scenario: pockets of high tree mortality.

Under the no action alternative, the desired scenic character will not be met (i.e., open, park-like setting with diverse forest canopy dominated by large conifers; presence of intermediate-sized trees would be greatly reduced with an attractive variety of spaces, light conditions, understory vegetation). If no high severity wildland fire or high tree-mortality from insect outbreaks occurs during this planning period, the project area will continue to be overly dense with understory firs, high levels of dead and down material and overtime become denser and less attractive. The no action alternative would not enhance and/or sustain the valued scenic character and its vegetative scenery attributes, in the project area.

Should a high severity wildland fire or high mortality insect outbreak occur within the project area under the no action alternative, the scenic character would change, diminishing the scenic attractiveness of the area due to the high tree mortality, tree bole scorch, and possibly opening up areas (e.g., cabins, roads) that are presently screened from key viewing points (e.g., Huntington Lake). Depending on the size and location of where tree mortality could occur, the scenery impacts could be hidden from key viewing points or clearly visible in the foreground (0 to 0.5 mile), middleground (0.5 mile to 4 miles), and background (greater than 4 miles) with extended viewing time from key viewing points. Should they be visible from key viewing points, color, texture, and size would be adversely affected until vegetation screening was reestablished.

The visual quality levels and Forest Plan visual quality objectives of retention and partial retention for the project area would remain the same unless a high severity wildland fire or high tree mortality insect outbreak occurs and opens up developed areas (e.g., cabins, roads,

[37] 44 percent is based on the weighted average for treatment area versus stand area.

pipelines) that are presently screened from key viewing points (e.g., Huntington Lake). Depending on the severity and location, the indirect effect could change the visual quality levels from retention and partial retention to partial retention or modification, a potential one or two level decrease from the Forest Plan visual quality objectives of retention and partial retention. These levels will not be in compliance with the Forest Plan.

Scenic Stability

The scenic stability would continue to meet the low scenic stability level under the no action alternative. Ecosystem stressors (e.g., wildland fire, insect outbreaks) would continue to seriously threaten the valued scenic character of the area through time and the vegetative scenery attribute conditions (high density and uniform conifer stands) would continue.

Cumulative Effects

The cumulative effects spatial boundary considered in this analysis is the Huntington Lake Basin because this basin as a whole is an important scenery and recreation attraction for the Ranger District. The temporal boundary is 10 years, the implementation period of this project. It would be difficult to predict future projects beyond this timeframe.

There are no activities proposed with the no action alternative and stands will continue to develop through natural processes. The greatest cumulative impact from implementing the no action alternative is that the basin will generally continue to have high stand densities and will not be trending towards the desired scenic character (i.e., open, park-like setting) and scenic stability (i.e., high) except in those areas where vegetation treatments have occurred or are proposed, or where stands and meadows are naturally open. In the high stand density areas, the basin scenic stability would continue to be low, threatening the valued scenic character of the area from ecosystem stressors. Should a wildfire occur within the project area during very high fire weather conditions and initial attack actions fail, the wildfire will likely go beyond the project area and further into the basin. The outcome could be expected to be similar to the Big Creek fire of 1994. This would cause short and long-term adverse effects to the scenic character including producing areas with moderate to high tree mortality and high tree bole scorch. Should a widespread insect outbreak occur within the project area, the insect kill could occur beyond the project boundaries and have adverse effects similar to the wildland fire scenario.

Should this fire and/or insect scenario occur, the visual quality levels in the basin could be adversely affected by opening up developed areas (e.g., cabins, roads, pipelines) that are presently screened from key viewing areas.

Alternative 2, Proposed Action

Direct and Indirect Effects

Visual Quality Objective

The proposed action (alternative 2) will have direct long-term beneficial effects to the scenic character of the project area by enhancing and sustaining the socially valued vegetative scenic attributes. Treatment of the conifer trees will reduce the density of the stands, primarily removing intermediate and suppressed red and white firs. The treatment will open up the stands providing deeper views into the forest. Three treatment units totaling 126 acres will receive single tree selection or sanitation prescriptions. Eleven acres are proposed for planting and 30 acres are proposed for release. These prescriptions/treatments will help

promote species and spatially diverse, multi-storied stands adding to the scenic character goals. This would also addresses the Forest Plan standard and guideline that encourages multi-storied stands in Visual Conditions Type II. Fuels treatments will further open the stands, remove much of the dead and down surface fuels, provide a mosaic vegetative pattern and add variety to the understory and/or shrub species. The fuels treatments also address the Forest Plan standard and guideline of implementing complete slash treatment in Visual Condition Type II. Over the long-term, thinning the stands will also promote the growth of large trees over the project area (see vegetation and silviculture report for this project). These effects will beneficially affect form, line, texture and pattern within the project area.

Should a wildland fire occur during very high (95th percentile) fire weather conditions within the project area, according to the fire and fuels report for this project, flame lengths would be less than 4 feet high (versus 1 to 66 feet high under the no action alternative) and fire type is predicted as only surface fires (versus 31 percent of the project having the potential of various types of crown fire in the no action alternative). The fire would have short-term adverse impact on scenic attractiveness in the project area (i.e., black ash, scorched trunks) but would increase the long-term scenic character goals of having more open, park-like setting with diverse forest canopy and vegetative mosaic. The risk for high tree mortality due to an insect outbreak will also be reduced compared with the no action alternative (see the vegetation and silviculture report for this project).

The scenic attractiveness will decrease soon after or just prior to treatment activities but will increase from the existing condition in the long-term.

Short-term adverse scenery disturbance will occur in the immediate foreground and foreground (0 to 0.5 mile) directly after treatments to several key viewing points. Unnatural forms, texture, and patterns will occur from the slash piles prior to burning. These piles could be seen from the foreground from the lake, Huntington Lake Road, recreation cabins, and Camp Keola. Tree marking paint, flagging, landings, and skid trails are also unnatural forms, textures, and patterns that may be seen from these same key viewing points. Impacts from these activities, beyond the foreground, are unlikely from key view viewing points due to the screening from the remaining vegetation. Design features are included in this alternative to minimize these short-term impacts, including: where feasible, locate burn piles in areas where they would not be highly visible from key viewing points and make efforts to burn these piles within three years (VIS-4); restrict landings to occur within existing openings, minimizing landing sizes and locate landings where they would not be highly visible from the key viewing points (VIS-5); where skid trails are highly visible from the key viewing points, the skid trails will be rehabilitated so that they are not visually evident from these key viewing points within three years (VIS-7); and tree marking and flagging should be done in a manner that screens these indicators from view of key viewing points (VIS-9).

To further screen treatments from key viewing points, design features include maintaining a vegetation buffer between the lakeshore and forest road 8S66 (VIS-1) and consulting with the Forest Landscape Architect during the precommercial thinning activities in units 60 and 65 to ensure proper visual screening (VIS-2). These two design features ensure compliance with the Forest Plan standard and guideline that states, “manage activities affecting vegetative cover type or structure to be visually buffered after completion.”

The location of temporary roads will not be highly visible from key viewing points and are generally no longer than 0.2 mile with the majority no greater than 0.1 mile. No temporary

road is in the immediate foreground to key viewing points and will be screened by the vegetation from these areas in the foreground, middleground, and background views. The temporary roads may be visible from the main arterial roads. To minimize scenery impacts to line, color, texture, and pattern from these temporary roads, a design feature was added to the alternative to construct such roads in a manner that closely duplicates the existing contour lines with a minimum degree of landform alteration, limiting the amount of earthwork. Upon completion, where the road access is not longer necessary to implement the project, the temporary roads will be closed and restored using native seed/vegetation (VIS-3).

To minimize short and long-term adverse impacts to the scenery resource, stump heights that are within 300 feet from key viewing points will be cut to a maximum of 6-inch heights from the uphill side (versus the 12-inch standard requirement in contracts). Tree stumps that are highly visible within unit 60 from the cabins and Camp Keola will be flush cut to a maximum of 3-inch heights from the uphill side (VIS-6). The intent of this design feature is to ensure the stumps are not visually evident from key viewing points.

To minimize short and long-term impacts from broadcast burning, a design feature requires firelines to follow natural contours whenever possible and underburns will be conducted to produce low intensity fire to minimize mortality to the overstory. While meeting the fuels objectives in these burn units, islands of unburned vegetation will be retained to increase visual interest by providing texture and pattern. The edges of the islands will be feathered and undulated to create a near-natural, non-linear appearance (VIS-8). In addition, the broadcast burn units are screened by topography (mountain) from most of the key viewing points (e.g., lake, Huntington Lake Road, recreation cabins, Camp Keola). There will be small areas of burn treatments that will be seen as middleground from Highway 168 (Sierra Heritage National Forest Scenic Byway), but due to topography and the curviness of the byway, the view will be of short duration over approximately one mile of road, perpendicular to the vehicles' path (not direct line of sight).

Based on the design of this alternative, including the design features, the project activities will meet the visual quality levels of retention and partial retention within 3 years after treatment as seen from the key viewing points. The retention and partial retention visual quality levels would be in compliance with the Forest Plan visual quality objectives.

Scenic Stability

In the proposed action (alternative 2), the scenic stability will change from low stability to high stability. As noted earlier, should a wildland fire occur during very high fire weather conditions within the project area, the fire is predicted to be a surface fire with flame lengths less than 4 feet high (averaging about 1-foot flame lengths). In addition, the vegetation and silviculture report for this project states the proposed action reduces tree stress by increasing available water, and in so doing lowers the potential for an insect outbreak. These two ecosystem stressors (tree mortality due to wildland fire and/or insect outbreak) will reverse the decline in the vegetative condition when compared to the no action alternative. In addition, this alternative will provide sustainability and improve the vegetative condition over time (i.e., reducing density of stands by primarily removing intermediate and suppressed firs, increasing the proportion and protection of large trees, removing much of the dead and down surface fuels, promoting multi-storied diverse stands and providing a vegetative mosaic). By decreasing risk of ecosystem stressors to vegetation and improving the vegetative scenery attribute conditions, the valued scenic character and its scenery attributes, primarily the

vegetation scenery attributes will be enhanced and sustained through time and ecological progression within the project area.

Cumulative Effects

Scenery management is a key resource in this highly used recreation area. The beneficial long-term effects of this project will likely go beyond 10 years but it would be difficult to determine reasonably foreseeable projects beyond this time period. Based on the cumulative effect projects noted in Appendix B of this document, all vegetation treatment projects existing and proposed (i.e., hazard tree removal, Rancheria Campground, Idywilde/Home Creek Thinning), including the Keola Project, will have short-term adverse impacts to the scenery resource in the Huntington Lake Recreation Area soon after implementation. Portions of most vegetation treatment projects will be seen in the foreground from key viewing points (e.g., scenic byway, recreation cabins, recreation facilities), including marking paint on trees, flagging and timber slash. For visitors driving along the scenic byway and onto Huntington Lake Road, this scenery impact will be off and on during the duration of their travel. The more prominent impacts will likely be the short-term impact of the logging debris, marking paint, and flagging from Rancheria Campground, Idywilde/Home Creek Thinning and Keola Project. The hazard tree removal will likely go unnoticed except during actual implementation. The vegetation treatments combined will have long-term beneficial effects and will increase the scenic character by removing trees (notably smaller sized intermediate and suppressed firs) and reducing stand density. Though there are hundreds of man-made improvements within the foreground of key viewing points within the Huntington Lake Recreation Area, the majority of these improvements are screened by vegetation. Generally, Keola Project, along with the cumulative effects projects being considered will not increase the impact these man-made improvements have to the scenery resource, from what presently exists.

Based on the vegetation treatments considered in this cumulative impact analysis, the scenic stability will increase for the recreation area. This is due to a decrease in risk in the treatment areas by the ecosystem stressors (i.e., risk of high tree mortality from severity fire and/or insect outbreak) and increase in the vegetative scenery attribute conditions (e.g., more open stands, removal of intermediate and suppressed size firs).

Alternative 3, Non-Commercial Funding Alternative

Direct and Indirect Effects

Visual Quality Objective

The non-commercial funding alternative (alternative 3) will have long-term beneficial effects to the scenic character of the project area by enhancing and sustaining the socially valued vegetative scenic attributes, but to a lesser extent that the proposed action (alternative 2). The treatment of the conifer trees will thin from below, focusing on the removal of suppressed-sized trees. The silviculture and fuels prescriptions will open up the understory in the stands but will not thin the stands/canopy to the same extent as alternative 2. This alternative also does not provide any reforestation activities that would promote multi-storied stands. Modeling completed for the vegetation and silviculture report shows this alternative will have more large trees than the no action alternative but less than the proposed action alternative. According to the vegetation and silviculture report, the stands will generally be multistoried after treatment, in compliance with the Forest Plan standard and guideline encouraging multi-storied stands in Visual Condition Type II.

This alternative retains all the fuel treatments proposed in alternative 2; therefore, the fuels treatment meets the standard and guideline of implementing complete slash treatment in Visual Condition Type II.

Should a wildland fire occur under very high (95th percentile) fire weather conditions within the project area, the fire and fuels report for this project indicates flame lengths (less than 4 feet) and fire type (surface) will be the same as the proposed action (alternative 2) except for treatment unit 54 where flame lengths are still predicted high (45 to 51 feet) and there is a potential for conditional crown fire. This unit is surrounded by treatments; therefore, fire impacts would remain within the 9-acre unit. Unit 54 is not visible from any of the key viewing points. As with the proposed action, a wildland fire would have short-term adverse impact on scenic attractiveness in the project area (i.e., black ash, scorched trunks) but would increase the long-term scenic character goals.

The risk for high tree mortality due to an insect outbreak is initially the same as the proposed action but overtime the stand density index increases at a faster rate than the proposed action and increases the risk for an insect outbreak (but at a lower level than the no action alternative). The vegetation and silviculture report notes this is likely due to the size of trees removed between the two action alternatives, with this action mainly removing the smaller sized trees.

Generally, the scenic attractiveness will be the same as the proposed action (alternative 2) with short-term adverse impacts and long-term benefits. There will be short-term adverse impacts in the foreground directly after treatments (e.g., skid trails, flagging, tree marking paint, slash piles) to several key viewing points (e.g., Camp Keola, recreation cabins). These impacts are reduced by implementing the design features incorporated into the alternative. Long-term beneficial effects promote the socially valued vegetative scenic attributes in the project area (e.g., more open, park-like, multistoried stands, vegetative mosaic) enhancing the valued scenic character.

The non-commercial funding alternative will meet the visual quality levels of retention and partial retention in the Forest Plan visual quality objectives within 3 years after treatment as seen from the key viewing points. This alternative will be in compliance with the Forest Plan related to visual (scenic) management.

Scenic stability

The scenic stability will also change from low stability to high stability over the long-term. The wildland fire stressor risk is greatly reduced when compared with no action and the insect outbreak stressor is reduced initially but if no additional conifer thinning activities occur 10 years after this project, the Stand Density Index will increase at a higher rate than the proposed action. By decreasing risk of two ecosystem stressors to vegetation and improving vegetative scenery attribute conditions (i.e., reducing density of stands and opening up the understory, removing much of the dead and down surface fuels, promoting multi-storied stands and providing a vegetative mosaic), the valued scenic character and its scenery attributes, primarily its vegetative scenery attributes, will be enhanced and sustained through time and ecological progression within the project area.

Cumulative Effects

The cumulative effects for this alternative would be the similar to the proposed action (alternative 2).

Wildlife[38]

Background and Affected Environment

The focuses of the wildlife analysis are to address several key issues brought up during scoping:

- Concern how this project will affect large snag density now and in the future and how this will negatively affect various wildlife species and the ecology within the project area.
- Concern how stand characteristics for each alternative will affect management indicator species, including California spotted owls.
- Concern how fire severity (based on modeling of the alternatives) will potentially impact various wildlife species within the project area, including cavity nesting species and California spotted owl.
- Concern how the alternatives will affect fisher rest sites within the project area related to snag and downs logs.

To address these issues, the wildlife analysis is divided into: habitat effects to affected Forest management indicator species (MIS); California spotted owl (*Strix occidentalis occidentalis*); Pacific fisher (*Martes pennanti pacifica*); and black backed woodpecker (*Picoides arcticus*), an example of an avian species beneficially impacted by wildfire (moderate and high fire severity).

Large snag dependent species considered in the analysis include Regional Forester's sensitive (sensitive) and Forest MIS: California spotted owl (spotted owl); sensitive and candidate species under the Endangered Species Act: Pacific fisher (fisher); and Forest MIS: hairy woodpecker (*Picoides villosus*). There is no section in the EA specific to effects of large snag dependent species. The effects of large snag density to these species are addressed in either the MIS section (i.e., hairy woodpecker) or separately (i.e., spotted owl, fisher).

Management Indicator Species

Management indicator species analysis focuses on effects to habitat of specific species. The species and habitat considered in this analysis that could be potentially impacted from this project are: mountain quail (*Oreortyx pictus*; early and mid seral coniferous forest habitats); sooty (blue) grouse (*Dendragapus obscures;* late seral open canopy coniferous forest habitat); California spotted owl, northern flying squirrel (*Glaucomys sabrinus*), American marten (late seral closed canopy coniferous forest habitat); and hairy woodpecker (snags in green forest habitat).

The mountain quail is the MIS for early and mid seral coniferous forest (ponderosa pine, Sierran mixed conifer, white fir, red fir, and eastside pine) habitat in the Sierra Nevada (USFS 2007). Early seral coniferous forest habitat is comprised primarily of seedlings (trees less than 1 inch dbh), saplings (trees 1 to 5.9 inches dbh), and pole-sized trees (6 to 10.9 inches dbh). Mid seral coniferous forest habitat is comprised primarily of small-sized trees

[38] Portions of the wildlife section of this EA are taken from the Keola Wildlife Biological Assessment/ Biological Evaluation (BA/BE) and MIS report. Potential impacts to sensitive species not addressed in this EA can be found in the wildlife BA/BE. These reports are available in the planning record located at the High Serra Ranger District office.

(11 to 23.9 inches dbh). The mountain quail is found particularly on steep slopes, in open, brushy stands of conifer and deciduous forest and woodland, and chaparral; it may gather at water sources in the summer, and broods are seldom found more that 0.5 mile from water (CDFG 2005). There are currently 366 acres of early and mid seral coniferous forest in the proposed treatment units. The majority of the habitat is composed of Sierran mixed conifer with white fir and a very small amount of red fir. There is an average of approximately 430 trees per acre in the treatment area with the majority of those trees measuring 10 inches dbh or less. Average canopy cover in the area is currently 48 percent and varies across the landscape from 26 to 79 percent. There are patches of brush in the understory and these areas occur where it is open.

The sooty grouse is the MIS for late seral open canopy coniferous forest (ponderosa pine, Sierran mixed conifer, white fir, red fir, and eastside pine) habitat in the Sierra Nevada (USFS 2007). This habitat is comprised primarily of medium to large trees (equal to or greater than 24 inches dbh) with canopy closures less than 40 percent. Sooty grouse occurs in open, medium to mature-aged stands of fir, Douglas-fir, and other conifer habitats, interspersed with medium to large openings, and available water. They occupy a mixture of mature habitat types, shrubs, forbs, grasses, and conifer stands (CDFG 2005). Empirical data from the Sierra Nevada indicate that sooty grouse drumming (or mating sites) are located in open, mature, fir-dominated forest, where particularly large trees are present (Bland 2006). Of the 550 acres proposed for treatment, there is currently 53 acres of late seral open canopy coniferous habitat in the Keola project area.

The California spotted owl, American marten and northern flying squirrel are MIS for late seral closed canopy coniferous forest (ponderosa pine, Sierran mixed conifer, white fir, and red fir) habitat in the Sierra Nevada (USFS 2007). This habitat is comprised primarily of medium to large trees (equal to or greater than 24 inches dbh) with canopy closures above 40 percent within ponderosa pine, Sierran mixed conifer, white fir, and red fir coniferous forests, and multi-layered trees within ponderosa pine and Sierran mixed conifer forests. Specific habitat for California spotted owls is noted below. Martens prefer coniferous forest habitat with large diameter trees and snags, large down logs, moderate-to-high canopy closure, and an interspersion of riparian areas and meadows. Important habitat attributes are: vegetative diversity, with predominately mature forest; snags; dispersal cover; and large woody debris (Allen 1982). The northern flying squirrel occurs primarily in mature, dense conifer habitats intermixed with various riparian habitats, using cavities in mature trees, snags, or logs for cover (CDFG 2005). There is currently 83 acres of late seral closed canopy coniferous forest habitat in the Keola treatment area.

The hairy woodpecker was selected as the MIS for the ecosystem component of snags in green forests (USFS 2007). Medium (15 to 30 inches dbh) and large (greater than 30 inches dbh) snags are most important. The hairy woodpecker uses stands of large, mature trees and snags of sparse to intermediate density; cover is also provided by tree cavities (CDFG 2005). Mature timber and dead snags or trees of moderate to large size are apparently more important than tree species (Siegel and DeSante 1999).

California Spotted Owl

The spotted owl is a MIS for the Sierra Nevada but as a MIS, analysis focuses on habitat and trends. Separating this species from the MIS section is intended to focus analysis specific to the species.

The California spotted owl is strongly associated with forests that have a complex multi-layered structure, large-diameter trees, and high canopy closure (CDFG 2005, USFWS 2006). It uses dense, multi-layered canopy cover for roost seclusion; roost selection appears to be related closely to thermoregulatory needs, and the species appears to be intolerant of high temperatures (CDFG 2005). Mature, multi-layered forest stands are required for breeding (CDFG 2005). About 80 percent of known sites in the Sierra Nevada are found in mixed-conifer forest, with 10 percent in red fir forest (USDA Forest Service 2001).

Using California Wildlife Habitat Relationships (CWHR) classification, suitable owl habitat in Sierran Mixed Conifer includes the 4M, 4D, 5M, 5D, and 6 CWHR types. Tables 21 and 22 provide a description of these stand characteristics. Highly suitable owl reproductive habitat includes CWHR types 5M, 5D, and 6. CWHR types 4M and 4D have been classified as providing low reproductive habitat for spotted owls but medium cover and feeding habitat in Sierran Mixed Conifer. The CWHR identifies lodgepole pine as providing medium quality habitat for spotted owl in the 5M and 5D types, all other types provide low quality habitat (CDFG 2008). Mean home range size of California Spotted Owls most applicable to the Sierra National Forest is 2,500 acres (USFWS 2005). Gutiérrez et al (1992) suggests that California spotted owls habitat should have at least 20 square feet per acre of large snags (greater than 15 inches dbh) basal area in nesting and roosting habitat (approximately 6 to 8 large snags per acre) and at least 7 square feet per acre basal area in foraging habitat; (approximately 2 to 3 large snags per acre).

Table 21. CWHR Tree Size Class Descriptions.

CWHR Size	Description	Diameter at Breast Height
1	Seedling	Less Than 1 inch
2	Sapling	1 to 6 inches
3	Pole	6 to 11 inches
4	Small Tree	11 to 24 inches
5	Medium/Large	Tree Greater Than 24 inches
6	Multi Layered	Size 5 Over Size 4 Or 3; Total Tree Crown Closure Greater Than 60%

Table 22.CWHR Shrub Canopy Class Descriptions.

CWHR Shrub Canopy	Description (% Canopy Closure)
S	10 to 24%
P	25 to 39%
M	40 to 59%
D	60 to 100%

There are two recorded observations of California spotted owls in the project area. Both of these sightings are located on the northernmost portion of the Dowville treatment unit area (unit 65). Both areas were last surveyed in 2010.

There are also two protected activity centers (PAC; FR016 and FR113) and one home range core area (HRCA; FR113) partially within the project area. Approximately 54 acres of PAC FR016 is located in the northern portion of the project area within unit 65, and 8 acres of PAC FR016, within unit 42, and 106 acres of HRCA FR113 are located in the southern portion of the project area in portions of units 42, 54, 55, 57, 59 and 115. Of the total 160 acres of PAC and HRCA in the treatment units, approximately 33 acres are considered suitable owl habitat (i.e., CWHR type 4M, 4D, 5M, 5D, 6) based on stand exam data using the CWHR vegetation classification system. The remaining acres are classified as true fir

and wet meadows. In addition, based on the vegetation data, there are approximately 94 acres of suitable habitat outside the PACs and HRCA but within the treatment units (total of 127 acres of suitable habitat within the treatment units).

Pacific Fisher

Fishers occur in California from the northern Coast Range eastward to the southern Cascades and then south through the western slope of the Sierra Nevada. In 1995, Zielinski et al. determined that Pacific fishers remain extant in just two areas comprising less than half of their historic distribution: northwestern California and the southern Sierra Nevada from Yosemite National Park southward, separated by a distance of approximately 250 miles. The fisher is associated with late-successional and old-growth conifer forest (Powell et al. 1994, Freel 1991). In the southern Sierra Nevada, fishers occur sympatrically with martens at elevations of 5,000 to 8,500 feet in mixed conifer forests (Zielinski et al. 1995). Also in the southern Sierra Nevada, fishers have been found to primarily use live, large tree cavities and snags as den sites. Resting habitat consists of large downed logs, broken top trees and snags. Mazzoni (2002) found that canopy cover, tree basal area, distance from water, and crown volume were the most significant indicators of fisher rest sites in the southern Sierra. In the southern Sierra, the presence of water and hardwoods was significant (Zielinski et al. 2004a). Zielinski et al. (1995) found that almost half of the rest sites used by fishers in the southern Sierra Nevada were in large diameter black oaks and canyon live oaks. Indicators of high quality rest sites include: clumps of five or more conifer trees greater than 30 inches dbh or oaks greater than 20 inches dbh; basal area is greater than 240 square feet per acre; and contain rest structures (e.g. large trees, snags, downed logs with cavities, broken tops, large limbs, mistletoe brooms, or platforms made by raptors or squirrels).

Based on a modified CWHR classification, Davis et al. (2007) developed a fisher habitat model based on best available science. Within the project area, moderate to high capability habitat for fisher includes Sierran mixed conifer and white fir: 4P, 4M, 4D, 5S, 5P, 5M, 5D, 6. Table 23 is a summary of existing moderate and high capability habitat within the treatment areas which totals approximately 297 acres.

Table 23. Summary of moderate and high capability habitat acres for Pacific fisher within the treatment areas.

CWHR Type Size and Class	Moderate Capability		High Capability	
	Sierran Mixed Conifer Habitat	White Fir Habitat	Sierran Mixed Conifer Habitat	White Fir Habitat
4P	71	7		
4M	80	30		
4D	1	0		
5S	0	0		
5P	27	0		
5M			10	19
5D			0	0
6			36	17
TOTAL	**178**	**37**	**46**	**36**

There is one documented occurrence of a Pacific fisher in the project area. This sighting was located within treatment unit 52. Habitat capability based on the forest vegetation data for fishers varies across the project area. The northwestern portion of the project area is poor while the majority of the southern portion of treatment areas is fair to good. There is a small area of excellent habitat capability in unit 42. The proposed project is located entirely within

the Southern Sierra Nevada Fisher Conservation Area. Table 24 is a summary of percent probability of habitat capability for Pacific fisher in the project area and within the treatment area.

Table 24. Percent probability of habitat capability for Pacific fisher.

Capability (in percent)	Project Area (in acres)	Treatment Area (in acres)
0-19	414	89
20-39	682	239
40-59	212	125
60-79	98	97
>79	0	0

Black-backed Woodpecker (High Severity Fire)

High severity stand-replacing wildfires have been suggested to be important for black-backed woodpeckers (Hutto 1995, Kotliar et al. 2002, Smucker et al. 2005) with habitat quality peaking within the first few years of a high-severity fire (Murphy and Lehnhausen 1998, Nappi and Drapeau 2009, Saracco et al. 2011). The abundant snags associated with severely burned forests provide perches, prey (by providing food for the specialized beetle larvae that serve as prey), and nesting sites (Hutto and Gallo 2006). Relatively recent burned areas presently do not exist within the project area.

Environmental Consequences

Alternative 1, No Action

Direct and Indirect Effects

There are no direct impacts from implementing the no action alternative to wildlife species of concern or their habitat since no actions are being taken. Early to mid-coniferous habitat will remain overstocked and mortality will naturally occur due to increased competition for nutrients, sunlight and space.

Management Indicator Species

Potential indirect effects to management indicator species would occur to those species dependent on late seral closed canopy coniferous forests. Many of the existing stands are overstocked with an understory of small sized trees (less than 10 inch dbh). The existing stand densities are suppressing the rate at which these stands will have late seral habitat-type characteristics (large trees).

Potential indirect effects to management indicator species could occur if a wildfire occurs under 95th percentile fire weather conditions. As noted earlier, 31 percent of the project area has the potential to produce conditional, passive or active crown fire with 56 percent of the pre-fire live tree basal area lost. In addition, 44 percent of the treatment areas exceed the upper benchmark of the risk of high insect mortality in stands. A wildfire under these conditions or an insect outbreak would produce pockets of high tree mortality. Long-term adverse impacts could occur under these conditions to late seral closed canopy habitat due to the loss of canopy cover (spotted owls, marten, flying squirrel). Beneficial long-term impacts could occur to late seral open canopy habitat (grouse) by opening up the canopy and promoting individual tree growth. Short-term beneficial impacts would occur for the hairy woodpecker with the increase in snags within the project area.

California Spotted Owl

Though there are 127 acres of suitable habitat within the treatment areas, the majority of these acres are classified as CWHR type 4M (approximately 80 acres) and are scattered throughout the project area. As noted earlier, CWHR type 4M provides low reproductive habitat with medium cover and foraging habitat for this species. There is 46 acres of highly suitable owl reproductive habitat (10 acres CWHR type 5M and 36 acres CWHR type 6). Snag densities over the treatment area average 4.85 trees per acre. According to the modeling, large snag density would increase at a relatively consistent rate, averaging about 0.7 snags per acre every 10 years (assuming no event [e.g., wildfire, insect outbreak] occurs). As noted earlier, general habitat needs for the spotted owl is 6 to 8 snags per acre; however, the Sierra Nevada Forest Plan Amendment (USFS 2004) requires at least 4 snags per acre in mixed conifer forest types. Looking at figure 6, nine of the 19 treatment units presently meet the 6 to 9 snags per acre criterion and 11 of the 19 treatments units presently meet the 4 snags per acre.

Many of the stands would remain overstocked with the smaller sized trees making it difficult for the owls to utilize as it would make travel through them and foraging difficult. The stands will also take longer to reach late seral conditions (large trees) which is the highly suitable habitat for the spotted owls.[39]

Should an event (wildfire or insect outbreak) produce large pockets of high tree mortality in the 127 acres of suitable habitat, the indirect long-term adverse impact would occur to nesting and roosting habitat by opening these stands and possibly removing suitable habitat conditions. The short-term beneficial effect could be increasing foraging habitat by opening these stands, and adding snags.

Pacific Fisher

There are approximately 215 acres of moderate and 82 acres of high habitat capability for fisher in the proposed treatment areas (table 23). Similar to spotted owl habitat, the majority of these acres are in stands with trees less than 24 inches dbh and canopy covers less than 59 percent.

The potential indirect effects to fisher from the no action alternative are similar to those management indicator species that utilize late seral closed canopy habitat: the existing stand densities are suppressing the rate at which most stands within the treatment area will have late seral habitat-type characteristics (large trees).

Should an event (wildfire or insect outbreak) produce large pockets of high tree mortality within the 297 acres of habitat, the indirect long-term impact could be adverse by removing existing and potentially future habitat. Short-term beneficial impacts would be providing more snags and downed logs with cavities and broken tops to the habitat.

Black-backed Woodpecker (High Severity Fire)

Presently there is no recently burned area habitat within the treatment areas for black-backed woodpecker or other cavity nesting avian species that depend heavily on the abundant standing dead trees associated with severely burned forests. Should a wildland fire occur at

[39] Figure 3-9 in the Vegetation Specialist Report for this project (on file in the planning record at the District office) displays the increase in the proportion of large trees over time for each alternative. Alternative 2 results in the highest percentage of total basal area occupied by trees greater than 35” dbh; alternative 1 results in the lowest percentage.

95th percentile fire weather conditions under this alternative, there is a potential 56 percent of the pre-fire live tree basal area would be lost to snags (habitat for the black backed woodpecker). This would be a short-term beneficial impact to this species since the snags provide perches, nesting and foraging habitat. A study by Nappi and Drapeau (2009) found that nest density for this species in burned areas was high the first two years (84 percent and 73 percent) after fire, but it dropped dramatically the third year (25 percent). If a wildfire were to occur within the project area during 95th percentile fire weather conditions, habitat conditions for black-backed woodpecker and other avian species dependent on similar habitat conditions could be improved.

Cumulative Effects

Spatial boundary for all species but Pacific fisher is the Huntington Lake Recreation Area and the temporal boundary is 10 years. The temporal boundary was chosen because it would be difficult to predict reasonably foreseeable future projects beyond this timeframe. Spatial boundary was chosen because the type of land use common to the area has and will continue to have an effect to species in this area. The cumulative effects projects considered in this analysis are noted in appendix B of this document.

The cumulative effects spatial boundary for the Pacific fisher is slightly different than the boundary for all other species. For this project, the cumulative effects boundary is based on HUC 6 watersheds. There are two HUC 6 watersheds that encompass the project area: Huntington Lake and Tamarack Creek. All of the projects considered for the other wildlife species are within these two watersheds. In addition, there are other existing facilities in these two watersheds that are not included in the list. A small community called Big Creek is located in the Huntington Lake watershed. This area includes homes, a school, and powerhouse facilities that are part of the hydroelectric facilities between Huntington and Shaver Lakes. Temporal boundary is 10 years.

Alternative 1 does not propose any direct disturbances to the cumulative effects spatial area and stands will continue to develop through natural processes. This alternative will, however, contribute to the adverse effects of wildfire and wildfire suppression activities to wildlife species that are depending on live conifer stands if a fire were to occur in this area under very high fire weather conditions and initial attack actions failed. Under this scenario, short-term beneficial effects would occur to wildlife species that are dependent on high severity fires.

Alternative 2, Proposed Action and Alternative 3, Non-Commercial Funding Alternative

Direct and Indirect Effects

Management Indicator Species

By removing the smaller size trees, alternative 2 is anticipated to result in a total net loss of 24 acres of early (18 acres) and mid seral (6 acres) coniferous forest habitat and alternative 3 will have a total net loss of 16 acres in the first year after treatments (habitat for the mountain quail). Over the long-term, the early and mid seral stands will move into the next size class sooner (by increasing individual tree growth) decreasing overall early and mid seral habitat. Broadcast and underburning will also reduce the brush cover and smaller sized trees over the short-term, but the brush will likely increase over the long-term by opening up the stands.

Alternatives 2 and 3 will reduce the amount of acres of mountain quail habitat over the short-term (24 acres for alternative 2 and 16 acres for alternative 3 of the total 366 acres of habitat) and long-term but will likely have minimal adverse effect to this species.

Both action alternatives will increase the amount of late seral open canopy coniferous habitat in the project area (habitat for the sooty grouse). It is predicted there will be an initial increase of 69 acres of this habitat post-project and it is expected to increase by 40 acres 10 years later for alternative 2 and a 22-acre increase with alternative 3. Trees per acre will decrease by over half of what is currently in the area for both action alternatives because of the amount of trees less than 10-inch dbh removed by project activities (table 18). Based on table 19, canopy cover within the treatment areas will generally be less than 40 percent for alternative 2 and just over 40 percent for alternative 3; both alternatives show canopy covers increase over time. The trend towards increased canopy cover will continue in the long-term as trees currently in smaller size classes grow into larger size classes. Though alternative 2 is increasing habitat acres for this species and to a lesser extent alternative 3, the amounts will not lead to a change in the distribution of sooty grouse across the Sierra Nevada bioregion.

Alternative 2 will initially result in a loss of 41 acres of late seral closed canopy coniferous forest habitat (for MIS: spotted owl, marten, northern flying squirrel). It is estimated that in 10 years post-project, the amount of habitat will increase by 7 acres. Based on modeling, alternative 3 will have an initial gain of 59 acres of habitat. The difference is because alternative 3 removes less canopy cover than alternative 2 (see table 19), but alternative 2 treatments promote a more multi-storied stand compared to alternative 3. Long-term, treatments under alternative 2, and to a lesser extent alternative 3, will increase the rate of late-seral habitat conditions by encouraging individual tree grown and canopy cover will increase as individual trees grow. For both action alternatives, treatment activities are also expected to lower the amount of downed large logs, but this effect will be minimized due to a design feature to retain some of these habitat structures as fisher habitat (WLD 15). Treatment activities are expected to also reduce the coarse woody debris load by 70 percent. This will result in an approximate average of 10 to 12 tons per acre. Snags levels are also expected to decrease slightly after treatment of hazard trees but will also increase as snags are initially created as a result of fuels treatments. Snag recruitment will continue to occur over the long-term due to effects of fuels treatments and natural processes. Although alternative 2 will have a direct adverse impact of 41 acres of late seral closed canopy and alternative 3 will have a direct beneficial impact of 59 acres, these amounts will not lead to a change in the distribution of California spotted owls, American martens, or northern flying squirrels across the Sierra Nevada bioregion.

The amount of snags per acre is anticipated to remain at or above four snags per acre, post treatment (hairy woodpecker habitat). Both action alternatives will have a small effect on medium and large snags because treatment prescriptions limit removal of 15-inch dbh and less sized snags to only those that pose a hazard. As noted in the vegetation section in this chapter, snags will be created from the prescribed fire operations. Generally, based on modeling, the snag density increases an average of 0.4 trees per acre every 10 years for alternative 2 and 0.6 trees per acre every 10 years for alternative 3. The two action alternatives will have little effect to the hairy woodpecker habitat and will not lead to a change in the distribution of hairy woodpeckers across the Sierra Nevada bioregion.

California Spotted Owl

Direct effects to California spotted owls from implementing either action alternative include noise due to the presence of heavy equipment during treatment activities and smoke resulting from prescribed fire activities, such as broadcast burning in the understory and pile burning. These effects will be minimized by a limited operating period (LOP) which prohibits activities within 0.25 mile of an owl activity center from March 1 to August 15 unless surveys confirm that California spotted owls are not nesting (WLD-9). The LOP will prevent disturbance to owls during the breeding season which is the most sensitive period for owls. In addition, mechanical treatments are prohibited within a 500-foot radius buffer around an activity center (WLD-8).

For alternative 2, treatment activities will result in an initial loss of 89 of the 127 acres of suitable habitat[40] within the treatment units based on stand vegetation models for pre and post-treatment conditions. The loss of suitable habitat will not affect California spotted owl PAC FR016 as there will be no initial net change in that PAC from this project. There will be an increase of two acres of suitable habitat in CWHR type 4M ten years after treatment. PAC and HRCA FR113 will initially have a net loss of 18 acres of suitable habitat in CWHR 4M and 6 (from the existing condition of 32 acres) and will gain back an acre in CWHR type 5M ten years after treatment. This loss will not directly affect current nesting area which occurs outside the project area. Decreases in CWHR types (owl habitat) are primarily due to the removal of trees less than 20 inches dbh and not due to the removal of large trees. Sixty-seven of the 89 acres are in CWHR type 4 (low reproductive habitat; medium cover and feeding habitat). Two treatment units (units 50 and 57) contribute the highest decrease in CWHR type 6 (highly suitable habitat) with a total of 30 acres. Of the trees in these two units, over 87 percent of the stands consist of trees less than 10 inches dbh. Treatments in these two units are different, one has a thinning prescription (unit 50) while the other unit (unit 57) will be broadcast burn. With either treatment, it is anticipated that many of the small trees will be removed or will die from treatment activities. This will result in stands that will likely decrease in canopy cover, resulting in stands that no longer fall into CWHR type 6.

Alternative 3 will have no net affect on suitable habitat after treatment for the California spotted owl and shows an increase of 5 acres of suitable habitat after 10 years. This is likely due to the lighter thinning prescription of smaller size trees. Based on this information, there should be no indirect effect to the spotted owl due to a loss of suitable habitat.

Both action alternatives will improve foraging habitat for spotted owls. Treatment activities will open up stands, allowing owls to migrate through the stands. Portions of the project area are so overstocked, it would be difficult for owls to fly through the stands to forage (Sue personal observation 2010). Prey species for spotted owls could be temporarily displaced during treatment activities particularly during thinning, broadcast and pile burning. Young prey species could be killed if not mobile when activities take place. This effect will be short-term and will occur during the day when owls are roosting.

Alternatives 2 and 3 include the construction of temporary roads that are 0.1 to 0.2 mile in length. Areas where these roads are placed will be restored to near natural conditions once project implementation is complete. Existing roads will also be improved and maintained as needed. Maintenance activities to existing roads will not affect spotted owl habitat. One of the temporary roads is located within a spotted owl PAC and two others are located within

[40] Spotted owl suitable habitat is different from late-seral closed canopy habitat as described in the MIS section.

the spotted owls HRCA. The closest nest tree to a temporary road would be approximately 0.28 mile. These roads are located within treatment areas and effects will be no more than the effects treatment activities will have on spotted owls and their habitat.

Average snags per acre will remain relatively constant over time (modeling estimates 0.4 [alternative 2] and 0.6 [alternative 3] snags per acre every 10 years). Generally the stands will average just above the existing condition of 4.85 snags per acre. Initially after treatment the snag level will decrease slightly due to hazard tree and snag removal. The two alternatives follow management guidelines for snag treatment in California spotted owl habitat. The area does not currently have the maximum amount of snags per acre (eight) based on management guidelines (Verner et al. 1992); however, the change in existing snag levels will not have a significant effect to owl habitat. The majority of snags retained will be larger than 15 inches dbh and snag levels are expected to increase over time as a result of fuels treatments. This will benefit owls in the long-term.

Both alternatives reduce the risk of high severity fire under 95th percentile fire weather conditions. The stands will also reach late-seral habitat conditions sooner than the no action alternative (alternative 2 promotes an increased rate when compared to alternative 3). Long-term, these conditions will have a beneficial effect on the species.

Pacific Fisher

As with the spotted owl, direct effects to Pacific fisher include noise due to the presence of heavy equipment during treatment activities, smoke resulting from prescribed fire activities, such as broadcast burning and pile burning for both action alternatives. These effects will be minimized by a LOP from March 1 through June 30 which prohibits vegetation treatments (except low intensity treatments such as planting, hand release, hand-thinning, and hand piling) within fisher den site buffers (700 acres) as long as habitat remains suitable or until another Regionally-approved management strategy is implemented (WLD-13). The LOP will prevent disturbance to fishers during the breeding season.

As noted earlier, there are a total of 297 acres of moderate to high habitat capability for fisher in treatment areas. In alternative 3, there will be no change in acres of moderate to high capability fisher habitat; therefore, no indirect effect to the fisher based on changes in habitat. For alternative 2, treatment activities will result in an initial loss of 44 acres of moderate to high capability fisher habitat based on stand vegetation models for pre and post-treatment conditions. The change in type 6 (53 acres to 16 acres) for alternative 2, is caused by the removal of small trees, not large trees, reducing the canopy cover. As noted in the spotted owl effects section, the majority of these acres are found in units 50 and 57 where the predicted decrease in canopy cover will remove the acres from CWHR type 6. For alternative 2, canopy cover is expected to initially decrease to below 40 percent (on average) and for alternative 3, slightly above 40 percent (on average) and will slowly increase over time (see table 19). Some of the treatment units are heavily stocked with trees less than 20 inch dbh. Alternative 2, and to a lesser extent alternative 3, will focus on removing many of these trees to meet project needs for decreasing the risk of a high severity wildfire and increasing stand resilience. There will be no removal of live trees greater than 30”dbh unless they are heavily diseased in unit 60 (alternative 2) or pose a safety hazard (both action alternatives).

Large snags will also be retained with treatment prescriptions limiting removal of snags to those that are 15 inch dbh or less unless the snag in question poses a safety hazard. Long-term, treatment units from both action alternatives will reach late seral habitat conditions

sooner than alternative 1 due to the decrease stand competition and increasing growth on individual trees (alternative 2 sooner than alternative 3).

Although downed wood is not modeled, large log data was collected in sampling plots. Estimates for large logs existing on the landscape are estimated to be 11.8 large logs per acre. A design feature included in both action alternatives includes designing measures prior to vegetation treatments to protect important habitat structures for fisher as identified by the wildlife biologist. This includes retaining large diameter snags and oaks, patches of dense large trees typically 0.25 to 2 acres, large trees with cavities for nesting, clumps of small understory trees, and coarse woody material (WLD-15). This design feature will minimize effects to fisher habitat in the project area. Current estimates of the coarse woody debris loads in the project area are 40 tons per acre. Treatment activities are expected to reduce the coarse woody debris load by 70 percent. This will result in an approximate average of 10 to 12 tons per acre. Project design requires that the 2 action alternatives maintain no less than 10 tons per acre of coarse woody debris.

Based on the plot data used for the vegetation and silviculture report, the project area presently has very little high quality fisher rest site characteristics. Approximately 15 percent of the project area has a greater than 10 percent chance of being used as a fisher rest site as defined by Zielinksi et al in 2010. Of this area, only 25 percent (about 27 acres) will include mechanical tree removal. Although fishers may be indirectly affected by a possible decrease in rest sites in the short-term, it is expected the availability of rest sites will increase in the long-term due to the increased rate of development for late seral habitat conditions.

Impacts from temporary roads and road maintenance activities will be similar to spotted owls: they will have no more effect than the effects treatment activities have on fisher and their habitat.

Reducing the risk of a high severity wildfire during 95th percentile fire weather conditions and increasing growth on individual trees will have long-term beneficial effects to the fisher and their habitat.

Black-backed Woodpecker (High Severity Fire)

Both alternatives will not directly affect black-backed woodpecker since the existing condition does not have high quality habitat (high density of snags caused by wildfire). Indirectly, the action alternatives are intended to reduce the risk of high severity fire (including any form of crown fire). The two action alternatives will reduce the potential of 31 percent of the project producing crown fire should a wildfire occur under 95th percentile fire weather conditions. Reducing the risk that this would occur has an indirect adverse impact to black-backed woodpeckers and their habitat within the project area.

Cumulative Effects

Vegetation treatments for the two action alternatives along with the vegetation treatments projects considered in this analysis will alter existing habitat conditions for most of the species analyzed and in some cases, it will reduce the amount of suitable habitat available. These effects will last through the life of the project; however, the magnitude of the effects will decrease in time. That is, after treatments are completed, the stands will continue their natural processes which will slowly improve habitat conditions for many of the wildlife species considered in this analysis and slowly increase the amount of suitable habitat available.

Activities such as recreation use, the presence of special use facilities (dam and reservoir, powerlines, ski resort, recreation cabins), road maintenance projects and the community of Big Creek will continue to impact wildlife in the area. However, all of these activities and facilities have been occurring for years and on a regular basis. The dam and reservoir in the project area have been in existence for over 40 years (began construction activities for the Huntington Lake dam in 1911) and wildlife are used to the presence of these structures and the activities associated with them.

There has been only one large wildfire within the two HUC6 watersheds and recreation area since 1911, with smaller infrequent fires occurring in various areas. It is likely small wildland fires will occur over the next 10 years (fire and fuels section of this analysis estimates fire risk is 3.67 fires per decade within the project area and would likely be greater for the cumulative effects spatial area) and will have some impact to wildlife species by altering small patches of suitable habitat. Grazing activities appear to continue to occur in the area; however, there are no active grazing allotments in the project area. This activity will continue to affect vegetation, soil and water quality in the area and may impact prey populations for wildlife species.

Either action alternative would cumulatively increase adverse effects to wildlife species analyzed for this project and in some cases their habitat when reviewed with other projects/activities. Disturbance from treatment activities will be short-term and will be due to the presence of personnel and equipment during project implementation. Vegetation treatments included in the proposed action will initially impact wildlife species and habitat, but the amount of habitat for many of those species will improve existing conditions in the future. Reviewing the projects effects to the wildlife species considered in this analysis, along with those projects and activities considered in the cumulative effects, the potential cumulative effects to wildlife species will not be significant to the species or habitats.

Economic Costs[41]

Background

The focus of the cost analysis is on economic costs, including administrative costs to address one of the purposes of the project (cost-efficiency in designing treatments to maximize acres treated) and a key issue brought up during scoping (concern over the economic costs for the project). It identifies and estimates the economic costs associated with this project and the potential income. Effects that are difficult to predict or quantify economically are not part of this analysis (e.g., fire suppression costs, air quality, safety, recreation/scenery values, wildlife habitat,). Predicted economic values are based on model outputs, current and previous production costs and wood values with the mill site in Terra Bella, California. The Forest Vegetation Simulator (FVS) was used to determine the harvest volumes and tree removals produced from each action alternative. These harvest volumes were used in this economic analysis to determine the value of wood products extracted from the forest (stumpage values.). Quantities are based on the alternatives as designed.

[41] The economic costs section of this EA is a summary from the Keola Economic Specialist Report. This report is available in the planning record located at the High Sierra Ranger District office.

Environmental Consequences

Alternative 1, No Action

Direct and Indirect Effects

The only direct costs involved with this alternative are the costs to prepare the environmental analysis and documents (approximately $215,000). No potential revenue would be generated from the no action alternative. There would likely be indirect costs from not implementing the project, but because they would be difficult to predict and quantify, they are not included in the analysis (e.g., recreation/scenery values, fire suppression, safety). The no action alternative would not contribute towards the local economy, maintenance of jobs or contribute to the maintenance of lumber mills infrastructure.

Cumulative Effects

An important effect by taking no action relates to the Sierra Forest Products sawmill, located in Terra Bella, California, 90 miles from the project area. This mill is dependent on timber from the southern portion of California and should it close due to not enough timber to mill, the economic costs to transport logs to the next nearest mill would likely double. As noted earlier, the no action alternative would not contribute to the maintenance of Sierra Forest Products lumber mill infrastructure, which is an important lumber production resource for southern California.

Alternative 2, Proposed Action and Alternative 3, Non-Commercial Funding

Direct and Indirect Effects

The proposed action and non-commercial funding alternatives generates both direct costs and revenues. Revenues result from commercial harvest. Cost result from administrative actions (environmental analysis, sales preparation, sales administration, burn plan preparation, monitoring) and post-treatment costs (small tree removal, reforestation activities [for alternative 2] and fuels treatments).

The proposed action (alternative 2) results in approximately 1.1 million board feet (or 1.1 MMBF) of commercial sawlog timber. An appraisal of this saw timber indicates total revenue of approximately $29,000 from the sale of commercial wood products. The non-commercial funding (alternative 3) results in approximately 155 thousand board feet (or 0.155 MMBF) of commercial sawlog timber and an appraisal of this alternative indicates the cost to remove the volume is approximately $16,000. Both action alternatives have similar costs for administrative actions and implementation. Road pre-haul maintenance is necessary to provide equipment access. The cost of this road maintenance is $17,000 for both action alternatives.

Under the proposed action post harvest tree removal, mechanical and hand fuels treatments costs are approximately $247,000. Prescribed fire (pile burning, underburning and broadcast burning) adds approximately $38,000 dollars. Regeneration costs, which are exclusive to the proposed action, adds an additional cost of $6,000. Total post harvest implementation costs are approximately $311,000 for the proposed action. The non-commercial funding alternative total post harvest implementation costs are approximately $285,000. These values do not acknowledge additional administrative costs to implement (e.g., NEPA process, ground preparation of the actions associated with the alternatives [e.g., identifying trees for removal

and boundary layout], administration of the contract[s], costs associated with burn plan preparation, monitoring). Table 25 summarizes these costs for each alternative.

Table 25. Implementation and administrative cost estimates (in thousands) for each alternative..

	Harvest Volume (MBF)	Timber Revenue	Road Mainte-nance Cost	Post Harvest cost*	Environ-mental Assess-ment	Sales Prepar-ation	Sales Admin-istra-tion	Burn Plan Prepar-ation	Moni-toring	Total Costs
Alt 1	0	$0	$0	$0	$215	$0	$0	$0	$0	$215
Alt 2	1,116	$29	$17	$291	$215	$22	$15	$2	$33	$566
Alt 3	155	$-16	$17	$285	$215	$22	$15	$2	$30	$602

*Post harvest costs include fuels treatment activities.

One of the Sierra Nevada Forest Plan Amendment goals related to fire and fuels management is to consider cost-efficiency in designing treatments to maximize the number of acres that can be treated under a limited budget. Of the alternatives proposed, the proposed action (alternative 2) provides the highest cost-efficiency while meeting the fire and fuels needs for the project. The project would be implemented using the stewardship contracting authority. Revenue generated from the stumpage value would help compensate for costs and would better meet the purposes and needs for the project.

Cumulative Effects

The cumulative effects spatial boundary is the area that the Sierra Forest Products sawmill services (southern California) and the temporal boundary would be the potential life of the contract (3 years). A cumulative economic effect relates to the viability of the Sierra Forest Products sawmill. This project along with other existing and potentially foreseeable timber producing projects provide the sawlogs to maintain the mill. The mill requires approximately 30 to 35 million board feet a year to remain viable. Alternative 2 (proposed action) would play a larger role than alternative 3 (non-commercial funding) in contributing to the mill in the next 3 years. Maintaining the viability of the mill by providing timber through this and other projects will help maintain the costs of implementing future vegetation treatment projects in southern California. However, given the multiple sources supplying the mill, this project would likely have a minimal cumulative effect (approximately 3 to 4 percent of the mill's annual board foot production).

Consequences Relative to Significance

Council on Environmental Quality regulations (40 CFR part 1500-1508) for implementing the National Environmental Policy Act (NEPA) includes a definition of "significantly." The context and elements of this definition are important for a finding of no significant impact, when an action would not have a significant effect on the human environment. The context and elements of significance are discussed below in relation to all action alternatives (alternatives 2 and 3). The intent of this section is to show the action alternatives do not have a significant effect to the human environment; therefore, an environmental impact statement is not needed. Specialist reports and required documents needed for the environmental assessment analysis and compliance with law, regulation, or policy are located in the project planning record.[42] Conclusions from these reports are summarized and referenced below.

[42] The Keola project planning record is on file at the High Sierra Ranger District office.

Context

Context means that the significance of an action must be analyzed in several contexts (i.e., local, regional, worldwide) and over short and long timeframes. For site-specific actions, significance usually depends upon the effects in the locale rather than in the world as a whole (40 CFR 1508.27(a)). Both short-term and long-term effects are relevant.

Although Keola project directly affects 550 acres of the 4,700-acre Huntington Lake Recreation Area, the majority of the project area is not accessible to the general public by motor vehicles. Due to the size and general location within the recreation area, the project is not likely to significantly affect society as a whole in the region, state, or nationally. This project could have an effect on the local timber industry by providing timber to the southern California sawmills. Alternative 2 would have a greater beneficial effect for the mill than alternative 3. The effect would not be significant (volume involved varies from 0.155 to 1.1 MMBF) and would be short-term (during the life of the contract).

Intensity

Intensity refers to the severity of expected project impacts. The following ten factors and their expected impacts are considered below.

1. Beneficial and Adverse Impacts

Both beneficial and adverse effects have been taken into consideration and displayed in this chapter of the document, and some are summarized in chapter 2, table 5. Beneficial effects have not been used to offset or compensate for potential adverse effects. Singularly and collectively, the resources affected by the action alternatives are not likely to be exposed to significant impacts.

The adverse impacts associated with the action alternatives include:

- Short-term impacts (up to 3 years) to the scenic quality as seen from several key viewing points (e.g. cabins, Huntington Lake Road, Keola Camp).
- Short-term impacts will occur to rodents (prey species) for special status species during treatment activities (habitat and individuals will likely be destroyed).
- Alternative 2 will have a short-term impact with a total net loss of 24 acres of early and mid seral coniferous forest habitat; alternative 3 will have a total net loss of 16 acres of this same habitat types. Presently there is 366 acres of these two habitat types within the treatment units.
- Alternative 2 will have a short-term impact with an initially loss of 41 acres of the 83 acres of late seral closed canopy coniferous forest habitat in the treatment area.
- Alternative 2 will have a short-term impact with an initial loss of 89 of the 127 acres of California spotted owl habitat and 44 acres of the 297 acres of moderate to high capacity Pacific fisher habitat. to high

Beneficial impacts include:

- Both action alternatives reduce the fire hazard to an acceptable level for WUI defense zones reducing risk to life and property and improving the effectiveness of fire

suppression operations and firefighter safety within the project area. The length of individual treatment effectiveness will range from 7 to 15 years dependent on initial treatment levels (Finney et al. 2006, Graham et al. 2004).

- Improves stands abilities within the treatment areas to withstand drought cycles without massive amounts of mortality due to insects and disease. Alternative 2 provides a higher level of reduced risk than alternative 3.
- The valued scenic character and its scenic attributes will be enhanced and sustained through time and ecological progression within the project area. Because of the added treatment prescription (i.e., heavier thinning and more uneven aged treatment including tree cutting and reforestation) alternative 2 has a greater long-term beneficial effect than alternative 3.
- Reducing the risk of high fire severity in the treatment areas will have long-term beneficial effects on wildlife species that require late seral habitat. Reducing the density of trees for both action alternatives will promote individual tree growth, increasing the rate at which stands will have late seral characteristics and will reduce the risk of existing stands having high tree mortality should a wildfire occur during 95th percentile weather conditions.
- Alternative 2 will have a short term impact by initially increasing late seral open canopy coniferous habitat by 69 acres; alternative 3 will initially increase this habitat type by 22 acres. In the existing condition (no action), there is presently 53 acres of this habitat type within the treatment areas.
- Reducing the density of stands will increase foraging habitat for several raptors, including the California spotted owl.

2. The Degree of Effect to Public Health and Safety

None of the actions from either action alternative should have significant adverse impacts to human health and safety and implementation of either alternative should reduce risks to human health and safety compared to the existing condition (no action). Several needs for the project involve human safety (i.e., reduce the risk of life and property and improve effectiveness of fire suppression operations and firefighter safety from an unusually severe wildland fire event). The design for both action alternatives are to provide for improvements to human health and safety, through hazardous fuels reduction and the removal of hazard trees.

3. Unique Characteristics of the Geographic Area, including Historic and Cultural Sites

Unique characteristics for this project are defined as: proximity to historical or cultural sites, wetlands, and Huntington Lake.

As noted in chapter 2, under design features for cultural/heritage resources, the project implementation will comply with the stipulations of the *First Amended Regional Programmatic Agreement Among the USDA Forest Service, Pacific Southwest Region, California State Historic Preservation Officer, and Advisory Council on Historic Preservation Regarding the Process for Compliance with Section 106 of the National Historic Preservation Act for Undertakings on the National Forests of the Pacific Southwest*

Region (Regional Programmatic Agreement; USFS-SHPO 2001) and *Interim Protocol for Non-Intensive Inventory Strategies for Hazardous Fuels and Vegetation Reduction Projects* (USFS-SHPO 2004). Design features in this section also provide protection to any historic or cultural sites within the treatment areas and include avoidance, restrictions on treatment, monitoring, and implementation of protection measures should new sites be found. These measures will eliminate any potential impacts to historic or cultural resources to no effect from these action alternatives.

Design features were developed for both action alternatives to minimize impacts to wetlands or the lake itself. There is a 100-foot mechanical equipment exclusion zone from edges of meadows or other special aquatic features and direct ignition for prescribed fire is not allowed in RCA/SMZ areas. Due to these protection measures, no significant impacts are predicted to wetlands or Huntington Lake.

4. The Degree to which the Effects on the Human Environment are likely to be Highly Controversial

Based on the analysis, there is no indication that the effects of the action alternatives on the quality of the human environment are likely to be highly controversial. Proposed treatments including harvest methods, fuels treatment methods and road management actions are routine activities that are consistent with the Forest Plan. These activities were designed to minimize or eliminate potential effects on the human environment.

5. The Degree to which the Possible Effects on the Human Environment are Highly Uncertain or Involve Unknown Risks

Proposed silviculture and fuels treatments and road maintenance are routine activities that have been conducted in the area over many years. All of the proposed management practices under either action alternative has been conducted both separately and in various combinations within similar landscapes and vegetation types. The basin was originally logged when the reservoir was constructed (1911-1913). The nature and magnitude of the effects to the human environment from implementing either action alternatives for this project are well understood (thinning, fuel reduction, temporary road construction and road maintenance) do not have highly uncertain effects on the human environment or involve unique or unknown risks.

6. The Degree to which the Action may Establish a Precedent for Future Actions with Significant Effects or Represents a Decision in Principle about a Future Consideration

The action alternatives are project-specific and do not establish a precedent for future actions with significant effects. Any future projects will need to consider all relevant scientific, site-specific information available at that time, and complete an independent analysis of environmental consequences.

The project does not involve future connected actions that have not already been addressed in this document (e.g., dust abatement, road maintenance).

7. Whether the Action is related to other Actions with Individually Insignificant but Cumulatively Significant Impacts

Based on the cumulative effects analysis noted in this chapter (i.e., fuels, vegetation, scenery, wildlife), along with those completed for other resources (e.g., special status aquatic and plant species, cultural resource sites, air quality, hydrology, soils) and documented in each specialist report noted earlier in this document, there will be no significant cumulative effects. This project, along with similar past, present, and foreseeable actions, will increase health and vigor to the treated stands, decrease the risk of insect outbreaks, reduce the risk of high fire severity over time, and increase the scenic stability in the treated areas within the Huntington Lake Basin. There will be short-term cumulative adverse effects to scenery and wildlife species dependent on high canopy cover (mainly after implementation of the vegetation treatment projects) but based on the scale of these vegetation treatment activities, the cumulative effects will not be significant to these resources.

8. The Degree to which the Action May Adversely Affect Districts, Sites, Highways, Structures, or Objects Listed in or Eligible for Listing in the National Register of Historic Places, or may cause Loss or Destruction of Significant Scientific, Cultural, or Historic Resources

As noted in intensity factor 3 above, the action alternatives will comply with the Regional Programmatic Agreement (USFS-SHPO 2001) and *Interim Protocol for Non-Intensive Inventory Strategies for Hazardous Fuels and Vegetation Reduction Projects* (USFS-SHPO 2004). In addition, design features are included in the action alternatives to eliminate the effects. With the implementation of design features, both action alternatives will have no effect to cultural and historic resources.

9. The Degree to Which the Action may Adversely Affect an Endangered or Threatened Species or its Habitat that has been Determined to be Critical under the Endangered Species Act of 1973

There is no current threatened or endangered (T&E) plant or animal species within the project area on the Sierra National Forest; therefore, there will be no impacts to T&E species.[43] Pacific fisher is a candidate species. As noted in this document, alternative 2 will initially reduce the 297 acres of moderate to high capability habitat to 253 acres (based on CWHR modeling). Alternative 2 would have no net change in acres. Several design features would reduce potential effects (WLD-13-16) from the project.

10. Whether the Action Threatens a Violation of Federal, State, or Local Law or Other Requirements Imposed for the Protection of the Environment

The action alternatives are in compliance with federal, state, and local laws and other requirements imposed for the protection of the environment. Based on the project design (chapter 2) and effects analysis (summarized in this chapter and detailed in the various specialist reports), the action alternatives are in compliance with environmental laws including the National Environmental Policy Act, Clean Water Act, National Forest Management Act, and Clean Air Act.

[43] Botany, aquatic and wildlife BE/BAs for this project are in the project planning record at the High Sierra Ranger District office, Sierra National Forest.

Several natural and social resources were not discussed in detail in this document because they were not addressed as a concern or issue from the public or the interdisciplinary team during scoping.[44] Below are some of these applicable federal, state, and local laws and regulations with a brief compliance summary.

The Forest Service Manual provides additional National Forest Management Act management direction, regarding species viability. FSM 2670.32 provides direction to avoid or minimize impacts to species whose viability has been identified as a concern. This includes Forest Service sensitive species. Regarding sensitive wildlife and plant species design features in chapter 2 are incorporated in the action alternatives to minimize impacts to special status species and their habitat. Based on the botanist and wildlife review and biological evaluations, there will be no to negligible impact to Forest Service sensitive plants from both action alternatives (with implementation of the design features).and little to moderate short-term impacts to sensitive wildlife species habitat. The management indicator species report determined there are potential short-term beneficial effects to late seral open canopy coniferous habitat; negligible adverse impacts to early and mid seral habitat; and moderate short-term adverse impact and long-term beneficial impact to late seral closed canopy coniferous habitat.

The noxious weed risk assessment report analyzed potential effects from noxious weeds. Implementing the “invasive plant” design features will reduce the risk of invasive weed expanding into the project area; therefore, the action alternatives are in compliance with Executive Order 13112 of February 3, 1999.

Based on the water resource report, both action alternatives will comply with the Clean Water Act by implementing the BMPs noted in appendix A of this document. The cumulative watershed effects analysis determined the project will have little cumulative effect to the five HUC8 subdrainages. The Keola action alternatives would increase this subdrainages equivalent road acres (ERAs) by 0.1 percent.

Based on the air quality report,[45] the action alternatives adhere to the particulate matter standards set by the San Joaquin Valley Unified Air Pollution Control District. Estimates of emissions produced from this project were calculated and in order to ensure the project stay below the threshold of significance established by the air quality management district. By not exceeding the level of significance, the action alternatives will not impede the progress of the air quality management district towards attainment of the National Ambient Air Quality Standards; therefore, the project is compliant with the Clean Air Act.

As noted in intensity factors 3 and 8, there will be no effect to heritage resource sites. By complying with Regional Programmatic Agreement (USFS-SHPO 2001) and *Interim Protocol for Non-Intensive Inventory Strategies for Hazardous Fuels and Vegetation Reduction Projects* (USFS-SHPO 2004), both action alternatives are in compliance with the National Historic Preservation Act.

[44] An EA is defined as a concise public document, it should not contain long descriptions or detailed data which the agency may have gathered. Rather, it should contain a brief discussion of the need for the proposal, alternatives to the proposal, the environmental impacts of the proposed action and alternatives, and a list of agencies and persons consulted. This EA focuses on disclosing the effects and issues relevant to the decision, in accordance with the Council on Environmental Quality regulations for implementing NEPA, section 1508.9, and 40 Frequently Asked Questions.
[45] The project Air Quality Report is available in the project planning record at the High Sierra Ranger District office, Sierra National Forest.

The action alternatives are in compliance with Executive Order 13186 regarding migratory birds.[46]

Executive Order 12898 relating to Environmental Justice requires an assessment of whether minorities or low-income populations will be disproportionately affected by any proposed action. The action alternatives are located in a recreation area that does not have a disproportionate number of minorities or low-income populations; therefore, there will be no disproportionate effects on minorities or low income populations.

The action alternative would be located entirely on National Forest System lands. The action alternatives are not in conflict with planning objectives for local counties or tribes. Both action alternatives are in compliance with the Forest Plan.

CHAPTER 4: CONSULTATION AND COORDINATION

List of Preparers

ID TEAM MEMBERS:

Wendy Boes, Adaptive Management Services Enterprise Team (AMSET) Botanist
Chris Clervi, AMSET GIS Specialist
Bob Hawkins, AMSET Hydrologist
Marian Kadota, AMSET Forester
Steve Marsh, High Sierra Ranger District Archaeologist
Tim Metzger, AMSET Fuels Specialist
Teresa Sue, AMSET Wildlife Biologist
Zach Tane, High Sierra Ranger District Forester

PERSONS CONSULTED

As noted in the public involvement section in chapter 1 of this document, two collaboration meetings were held for the Huntington Basin, which included the project area. The intent was to consult with potentially interested individuals and groups prior to developing the proposed action.

Forest Staff Consulted

Carolyn Ballard, District Fuels Officer
Stephanie Barnes, District Aquatic-Species Biologist
Marianne Emmendorfer, Acting Forest Environmental Coordinator
Alan Gallegos, Forest Soils Scientist
Julie Gott, District Hydrologist
Andy Hosford, District Transportation Engineer
Annette Lambert, District Special Uses, Recreation Staff
Jamie Tuitele-Lewis, Botanist
Ramiro Rojas, District Silviculturist
Cesar Sanchez, Forest Landscape Architect
Kim Sorini-Wilson, District Wildlife Biologist

[46] The project Migratory Bird Report is available in the project planning record at the High Sierra Ranger District office, Sierra National Forest.

FEDERAL, STATE, AND LOCAL AGENCIES AND TRIBES CONSULTED:

Sixteen individual letters were sent to Native American tribes, groups, and individuals. A letter was received from Table Mountain Rancheria, Tribal Government Office indicating the project site was beyond their area of interest.

No threatened and endangered species will be impacted from this project; therefore, United States Fish and Wildlife Service was not consulted. The Forest consulted with the State Historic Preservation Office (SHPO) regarding 5 heritage resource sites within the project area. A letter from SHPO, dated April 12, 2011, concurred all five sites are ineligible historic era archaeological sites. All National Register eligible and potentially eligible properties would be managed for no effect (per the Regional Programmatic Agreement) from project activities. No consultation on project effects to these sites with the California State Historic Preservation Officer is required per compliance with the terms of the Regional Programmatic Agreement (Stipulation III.D.(3)).

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APPENDIX A, BEST MANAGEMENT PRACTICES

Implementation of BMPs are included in the Keola Fuels and Forest Health Project in order to meet applicable standards and guidelines for watershed resources (Forest Plan standard and guideline124).

Implement Best Management Practices (BMPs) as described below.

BMP Name, Objective, and Direction	Application to the Keola Project	Project Phase
BMP 1-1 Timber Sale Planning Process: To incorporate water quality and hydrologic considerations into the timber sale planning process.	Implemented through the Riparian Conservation Objectives/Forest Plan Consistency report, specification of operational BMPs, Environmental Analysis including interdisciplinary team office and field discussions, and incorporation of water quality protection measures in the Timber Sale Contract for the Keola Project.	Planning
BMP 1-4 Use of Sale Area Maps (SAM) and/or Project Maps for Designating Water Quality Protection Needs: To ensure recognition and protection of areas related to water quality protection delineated on a SAM or project map.	The sale administrator and purchaser will review these areas on the ground prior to commencement of ground disturbing activities. Examples of water quality protection features that will be designated on the project map include: 1) Location of stream courses and riparian zones to be protected, including the width of the protection zone for each area. 2) Wetlands (meadows, lakes, springs, etc.) and other sensitive areas (such as shallow soils) to be protected. 3) Boundaries of harvest units, specified roads and roads where hauling activities are prohibited or restricted, areas of different skidding and/or yarding methods, including post-harvest fuels treatments, and water sources available for purchaser's use.	Timber Sale Contract
BMP 1-5 Limiting the Operating Period of Timber Sale Activities: To ensure that the purchasers conduct their operations, including erosion control work, road maintenance, and so forth, in a timely manner, within the time frame specified in the Timber Sale Contract.	The purchaser's contract operation period will be limited to contract-specified periods when adverse environmental effects are not likely. The Sale Administrator will close down operations due to rainy periods, high water, or other adverse operating conditions in order to protect resources.	Timber Sale Contract

BMP Name, Objective, and Direction	Application to the Keola Project	Project Phase
BMP 1-8 Streamside Management Zone Designation: To designate a zone along riparian areas, streams and wetlands that will minimize potential for adverse effects from adjacent management activities. Management activities within these zones are designed to improve riparian values.	Streamside management zones (SMZs) have been supplemented with RCAs as described in hydrology report and the hydrology and aquatics biology design measures. Within SMZs, the constraints defined in Sierra Supplement No. 1 (USDA Forest Service, 1989) apply. This includes no self-propelled ground based equipment, a minimum groundcover of 50%, and shade canopy may not be modified in a way that affects stream temperature. Modifications to these guidelines are possible where site-specific needs exist if the action is reviewed by a hydrologist or fisheries biologist.	Timber Sale Contract Burn Plans
BMP 1-9 Determining Tractor Loggable Ground: To minimize erosion and sedimentation resulting from ground disturbance of tractor logging systems.	Limit ground skidding and machine piling with tractors to slopes less than 35%. Endlining can be used to remove logs from steeper slopes. Ground disturbance on areas of shallow soils, notably soils adjacent and abutting to rock outcrops, will be avoided.	Timber Sale Contract Site Prep
BMP 1-10 Tractor Skidding Design: By designing skidding patterns to best fit the terrain, the volume, velocity, concentration, and direction of runoff water can be controlled in a manner that will minimize erosion and sedimentation.	The sale administrator and purchaser will designate all skid trails prior to ground disturbing activities. If uncertainty arises regarding potential resource impacts of skid trail location, consult with an earth science specialist (i.e., hydrologist, aquatic biologist, or soil scientist).	Timber Sale Administration

BMP Name, Objective, and Direction	Application to the Keola Project	Project Phase
BMP 1-12 Log Landing Location: To locate new landings in such a way as to avoid watershed impacts and associated water quality degradation	The following criteria are to be used by the Sale Administrator when evaluating landings: a. The cleared or excavated size of landings will not exceed that needed for safe and efficient skidding and loading operations. Trees considered dangerous will be removed around landings to meet the safety requirements of OSHA. b. Selected landing locations will involve the least amount of excavation and fill possible. Landings must be located outside of SMZs. c. Locate landings near ridges away from headwater swales in areas that will allow skidding without crossing stream channels, violating SMZs, or causing direct deposit of soil and debris to a stream. d. Locate landings where the least number of skid roads will be required, and sidecast can be stabilized without entering drainages or affecting other sensitive areas. Keep the number of skid trails entering a landing to a minimum. e. Position landings such that the skid road approach will be nearly level as feasible, to promote safety and to protect soil from erosion. f. Avoid excessive fills associated with landings constructed on old landslide benches. g. Construct stable landing fills or improve existing landings by using appropriate compaction and drainage specifications. In some cases, using an existing landing located within an RCA or CAR is preferable to constructing a new landing outside of it. These situations will be reviewed on a site-by-site basis by an earth science specialist (aquatics, hydrology, geology, or soils).	Timber Sale Administration

BMP Name, Objective, and Direction	Application to the Keola Project	Project Phase
BMP 1-13 Erosion Prevention and Control Measures during Timber Sale Operations: To ensure that the purchasers' operations will be conducted reasonably to minimize soil erosion.	Timber purchaser responsibilities for erosion control will be set forth in the Timber Sale Contract. Equipment will not be operated when ground conditions are such that excessive damage will result. The kinds and intensity of control work required of the purchaser will be adjusted by the sale administrator to ground and weather conditions with emphasis on controlling overland runoff, erosion, and sedimentation. Erosion control work required by the contract will be kept current. At certain times of the year this means daily, if precipitation is likely or weekly when precipitation is predicted for the weekend. Erosion prevention measures must be applied no later than October 1 and immediately upon completion of activity begun after November 1. If the purchaser fails to perform seasonal erosion control work prior to any seasonal period of precipitation or runoff, the Forest Service may temporarily assume responsibility, complete the work, and use any unencumbered deposits as payment for the work.	Timber Sale Contract Timber Sale Administration
BMP 1-14 Special Erosion Prevention Measures on Disturbed Land. To provide appropriate erosion control and sedimentation protection for disturbed areas.	Design features include specific ground cover requirements on slopes greater than 35%, where 70% ground cover is required and around rock outcrops where 100% ground cover is required.	Timber Sale Administration
BMP 1-16 Log Landing Erosion Protection and Control: To reduce the impacts of erosion and subsequent sedimentation associated with log landings by use of mitigating measures.	Landings will be properly cross-ditched, ripped (if soils are compacted), re-contoured (as necessary), and mulched after use and before the winter precipitation period, whichever comes first. Excess material not needed for erosion control can be piled and burned. Upon completion of the project, consult with the hydrologist or soil scientist to determine the need for additional soil protection measures.	Timber Sale Administration
BMP 1-17 Erosion Control of Skid Trails: To protect water quality by minimizing erosion and sedimentation derived from skid trails.	Erosion control measures will be installed on all skid trails, tractor roads, and temporary roads. Erosion control measures include, but are not limited to, cross ditches (water bars), organic mulch, and ripping. Cross ditches will be spaced according to the LRMP standard 128, maintained in a functioning condition, and placed in locations where drainage would naturally occur (i.e., swales). The level of maintenance will be contingent upon existing or predicted weather patterns as determined by the Sale Administer (see BMP 1-13).	Timber Sale Administration
BMP 1-18 Meadow Protection during Timber Harvesting: To avoid damage to the ground cover, soil, and hydrologic function of meadows.	Mechanical equipment is not permitted in meadows unless specifically authorized by an aquatic biologist <u>and</u> hydrologist.	Timber Sale Administration

BMP Name, Objective, and Direction	Application to the Keola Project	Project Phase
BMP 1-19 Streamcourse and Aquatic Protection: The objectives of this BMP are: a. To conduct management actions within these areas in a manner that maintains or improves riparian and aquatic values. b. To provide unobstructed passage of stormflows. c. To control sediment and other pollutants entering stream courses. d. To restore the natural course of any stream as soon as practicable, where diversion of the stream has resulted from timber management activities.	a. The location and method of crossings on Class IV and V streams must be agreed to by the sale administrator (SA) prior to construction. b. Stream crossings on Class I – III streams must be approved by the hydrologist and aquatic biologist. c. Damage to stream banks and channels will be repaired to the extent practicable. d. All sale-generated debris will be removed from stream courses, unless otherwise agreed to by the SA, and in an agreed upon manner that will cause the least disturbance. e. Felled trees will not be pulled across perennial or intermittent stream channels without prior approval by the hydrologist or aquatic biologist. f. Methods for protecting water quality while utilizing tractor skid trail design in stream course areas where harvest is approved include: (1) end lining, (2) falling to the lead, and (3) utilizing specialized equipment with low ground pressure such as feller buncher harvester. g. Water bars or other erosion control structures will be located so as to disperse concentrated flows and filter out suspended sediments prior to entry into stream course. h. Material from temporary road construction and skid trail stream course crossings will be removed and stream banks restored to the extent practicable. i. Special slash treatment site preparation activities will be prescribed in sensitive areas to facilitate slash disposal without use of mechanized equipment. j. Project-related bare soil areas (e.g. skid trails, landings, temporary roads, etc.) will be covered with existing native vegetation mulch, organic debris, or certified weed free straw to at least 50%, well distributed cover, and cross-ditched per BMP 1-17 requirements.	Timber Sale Administration
BMP 1-20 Erosion Control Structure Maintenance: To ensure that constructed erosion control structures are stabilized and working.	During the period of the timber sale contract, the purchaser will provide maintenance of soil erosion control structures contracted by the purchaser until they become stabilized, but not more than one year after their construction. If the purchaser fails to do seasonal maintenance work, the Forest Service may assume the responsibility and charge the purchaser accordingly. The Forest Service sale administrator is responsible for ensuring erosion control maintenance work is completed.	Timber Sale Administration

BMP Name, Objective, and Direction	Application to the Keola Project	Project Phase
BMP 1-21 Acceptance of Timber Sale Erosion Control Measures before Sale Closure: To ensure the adequacy of required erosion control work on timber sales.	The sale administrator must inspect erosion control measures to ensure their adequacy prior to accepting closure on the unit and/or sale. The effectiveness of erosion control measures will be evaluated using BMPEP protocols (see Monitoring Plan) after the sale area has been through one or more wet seasons. This evaluation is to ensure that erosion control treatments are in good repair and functioning as designed before releasing the purchaser from contract responsibility. The purchaser is responsible for repairing erosion control treatments that fail to meet criteria in the Timber Sale Contract, as determined by the Sale Administer, for up to one year past closure of the sale.	Timber Sale Administration
BMP 1-22 Slash Treatment in Sensitive Areas: To maintain or improve water quality by protecting sensitive areas from degradation which would likely result from using mechanized equipment for slash disposal.	All burn piles made with mechanical equipment must be located outside of the SMZ. Hand piles will be kept at least 50 to 100 feet away from all streams, meadows, springs, seeps, and other sensitive aquatic areas.	Timber Sale Administration Site Prep
BMP 2-1 General guidelines for the Location and Design of Roads: To locate and design roads with minimal resource damage.	The Keola Project will construct new temporary roads during the timber sale contract period. The following considerations are incorporated into the planning process of temporary road location and design. These measures are preventative, apply to all transportation activities, and indirectly protect water quality: (a) Transportation facilities will be developed and operated to best meet the resource management objectives with the least adverse effect on environmental values. (b) The location, design, and construction of roads will include the use of the IDT. (c) Sensitive areas such as wetlands, inner gorges, and unstable ground will be avoided to the extent practicable. (d) Stream crossings will be designed to provide the most cost efficient drainage facility consistent with resource protection, facility needs, and legal obligations.	Timber Sale Administration
BMP 2-2 Erosion Control Plan To minimize erosion through effective planning prior to construction	Erosion control methods identified in the design features and contract are implemented in a plan developed by the purchaser and approved by the Forest Service.	Timber Sale Administration
BMP 2-3 Timing of Construction Activities: To minimize erosion by conducting operations during minimal runoff periods and when soils are dry and less prone to compaction.	Ground-disturbing activities will occur when soils are dry. In some cases soils may never dry sufficiently. Ground-disturbing work that occurs off of existing roads will occur during the dry season and will reduce ground disturbance as much as possible.	Timber Sale Administration

BMP Name, Objective, and Direction	Application to the Keola Project	Project Phase
BMP 2-4 Stabilization of Road Slope Surfaces and Spoil Disposal Areas: To minimize erosion from exposed cut slopes, fill slopes, and spoil disposal areas.	This is a preventive practice using erosion control methods on exposed cuts, fills, and spoil areas as necessary.	Timber Sale Administration
BMP 2-5 Road Slope Stabilization Construction Practices: To reduce sedimentation by minimizing erosion from road slopes and slope failure along roads.	An adequate soils and geologic investigation will be conducted when finalizing new road construction designs for: correct cut and fill steepness based on the angle of repose for the type of material; methods to handle surface runoff; and necessary compaction standards and surfacing needs.	Timber Sale Administration
BMP 2-6 Dispersion of Subsurface Drainage from Cut and Fill Slopes: To minimize the possibilities of cut or fill slope failure and the subsequent production of sediment.	Subsurface drainage is often necessary if road prisms intersect ground water. No subsurface drainage is proposed for the Keola project. If subsurface drainage is necessary, the district hydrologist and aquatic biologist will be consulted prior to installing any subsurface drainage so that impacts to adjacent aquatic features can be avoided.	Timber Sale Administration
BMP 2-7 Control of Road Drainage: To minimize the erosive effects of water concentrated on roads, to disperse runoff from road surfaces, to lessen sediment yield from roaded areas, and to minimize erosion of the road prism.	Newly constructed or reconstructed roads will be designed to reduce hydrologic connectivity and soil erosion wherever feasible. The sale administrator or other Forest Service representative will ensure that roads are adequately maintained during project implementation to ensure that road drainage features function as designed.	Timber Sale Administration
BMP 2-8 Constraints Related to Pioneer Road Construction: To minimize sediment production and mass wasting from pioneer road construction.	For project temporary roads (a) Roads will be constructed within the planned roadway limits unless otherwise specified or approved by the ER or COR. (b) Pioneer roads will be located to prevent undercutting of the designated final cut slope, avoid deposition of materials outside the designated roadway limits, and accommodate drainage with temporary culverts. (c) Erosion control work will be completed prior to the rainy season and in accordance with the contract.	Timber Sale Administration

BMP Name, Objective, and Direction	Application to the Keola Project	Project Phase
BMP 2-9 Timely Erosion Control Measures on Incomplete Roads and Stream Crossing Projects: To minimize erosion and sedimentation from disturbed ground on incomplete projects.	Erosion control must be completed before the rainy season (usually October in the Keola project area). Preventative measures for timely erosion control include: (a) Removal of temporary culverts, culvert plugs, diversion dams, or elevated stream crossings. (b) Installation of temporary culverts, side drains, flumes, cross drains, diversion ditches, energy dissipaters, dips, sediment basins, berms, debris racks, or other facilities needed to control erosion. (c) Removal of debris, obstructions, and spoil material from channels and floodplains. (d) Planting vegetation, mulching, and/or covering exposed surfaces with jute mates or other protective material.	Timber Sale Administration
BMP 2-10 Construction of Stable Embankments: To construct embankments with materials and methods which minimize the possibility of failure and subsequent water quality degradation.	Temporary roadways will be designed and constructed as stable and durable earthwork structures with adequate strength to support the treadway, shoulders, subgrade and road traffic loads.	Timber Sale Administration
BMP 2-11 Control of Sidecast Material During Construction and Maintenance: To minimize sediment production originating from sidecast material during road construction or maintenance.	Sidecasting is not permitted within SMZs. Waste areas must be located where excess material can be deposited and stabilized.	Timber Sale Administration
BMP 2-12 Servicing and Refueling Equipment: To prevent pollutants such as fuels, lubricants, bitumens and other harmful materials from being discharged into or near rivers, streams and impoundments, or into natural or man-made channels.	Storage of hazardous materials (including fuels) and servicing and refueling of equipment will be conducted at pre-designated locations outside of RCAs. If fueling and/or storage of hazardous materials are needed within RCAs, those sites must be reviewed and approved by the district hydrologist or aquatic biologist. Additional protection measures, such as containment devices, may be necessary.	Timber Sale Administration
BMP 2-13 Control of Construction and Maintenance Activities Adjacent to SMZs: To protect water quality by controlling construction and maintenance actions within and adjacent to SMZs so that SMZ functions are not impaired.	Construction and maintenance fills, sidecast, and end-hauled materials will be kept out of SMZs except at designated crossing sites to minimize the effect to the aquatic environment.	Timber Sale Administration
BMP 2-14 Controlling In-Channel Excavation: To minimize stream channel disturbances and related sediment production.	There will be no in-channel or stream bank excavation during any phase of project activities unless authorized by the district hydrologist or aquatic biologist.	Timber Sale Administration

BMP Name, Objective, and Direction	Application to the Keola Project	Project Phase
BMP 2-15 Diversion of Flows Around Construction Sites. To ensure that all stream diversions are carefully planned, to minimize downstream sedimentation, and to restore stream channels to the natural grade, condition, and alignment as soon as possible.	No in-channel work is proposed as part of the Keola project. There will be no in-channel or stream bank diversions related to road construction during any phase of project activities unless authorized by the district hydrologist or aquatic biologist.	Timber Sale Administration
BMP 2-16 Stream Crossings on Temporary Roads and Skid Trails: To ensure crossings do not unduly damage stream channels or impede aquatic species passage.	Mechanical equipment crossing of perennial and intermittent (generally class I – III) streams is not permitted unless approved by the district hydrologist or aquatic biologist. Ephemeral streams (stream class IV and V) may be crossed at designated locations as agreed upon by the sale administrator and purchaser. Designate skid trails to avoid stream crossings and SMZs wherever possible. Designated crossings must be as perpendicular to the channel as possible and avoid sensitive soils and riparian vegetation damage. Stream banks must be repaired upon completion of the project.	Timber Sale Administration
BMP 2-17 Bridge and Culvert Installation. To minimize sediment and turbidity resulting from excavation of in-channel structures.	No bridges or culverts are proposed as part of the Keola project. Any bridge or culvert installation will be coordinated with the district hydrologist or aquatic biologist.	Timber Sale Administration
BMP 2-19 Disposal of Right-of-Way and Roadside Debris: To ensure that organic debris generated during road construction is kept out of streams so that channels and downstream facilities are not obstructed.	If slash generated by road work is disposed of within SMZs, it will be piled and burned or chipped. Material may also be removed from the SMZ for disposal.	Timber Sale Administration
BMP 2-20 Specifying Riprap Composition: To minimize sediment production associated with the installation and utilization of riprap material.	No riprap is proposed as part of the Keola project. Any riprap installation will be coordinated with the district hydrologist or aquatic biologist.	Timber Sale Administration
BMP 2-21 Water Source Development Consistent with Water Quality Protection: To supply water for roads and fire protection while maintaining existing water quality.	Water drafting will not occur in streams when the base discharge is less than 1.5 cfs, and will not draft more than 50% of the ambient discharge over 1.5 cfs. New drafting sites shall be approved by the district hydrologist or fisheries/aquatic biologist and located to minimize sediment and maintain riparian resources, channel condition, meadow integrity, and aquatic species viability and habitat. Approaches will be as near perpendicular to the stream as possible and will be gravel surfaced or otherwise stabilized. If water-drafting is required, pumps with low entry velocity and suction strainers with screens less than 2 mm in size (1/8 in.) will be used.	Timber Sale Administration Prescribed Fire Implementation

BMP Name, Objective, and Direction	Application to the Keola Project	Project Phase
BMP 2-22 Maintenance of Roads: To maintain roads in a manner that provides for water quality protection by minimizing rutting, failures, sidecasting, and blockage of drainage facilities, all of which can cause erosion, sedimentation, and deteriorating watershed conditions.	Roads needed for project activities will be brought to current engineering standards of alignment, drainage, and grade before use, and will be maintained through the life of the project. Roads will be inspected at least annually to determine what work, if any, is needed to keep ditches, culverts, and other drainage facilities functional and the road stable.	Timber Sale Administration
BMP 2-23 Road Surface Treatment to Prevent Loss of Materials:	Surface stabilization will be considered where grades exceed 12% or road is within riparian conservation areas.	Timber Sale Administration
BMP 2-24 Traffic Control During Wet Periods: To reduce road surface disturbance and the rutting of roads, and to minimize sediment washing from disturbed road surfaces.	On roads not designated for all weather or winter haul, heavy equipment operations will be limited until the period after the soil has dried in the top 12 inches in the spring.	Timber Sale Administration
BMP 2-25 Snow Removal Controls to Avoid Resource Damage: To minimize the impact of snowmelt runoff on road surfaces and embankments and to consequently reduce the probability of sediment production resulting from snow removal operations.	No snow removal is planned for the Keola project. If snow removal is necessary to implement project activities, appropriate controls will be implemented in consultation with the district hydrologist prior to approving snow removal.	Timber Sale Administration Prescribed Fire Implementation Tree planting
BMP 2-26 Obliteration or Decommissioning of Roads: To reduce sediment generated from temporary roads, unneeded system and non-system roads by obliterating or decommissioning them at the completion of the intended use.	Temporary roads will be obliterated after serving their intended purpose for this project. This includes: (1) road effectively barricaded; (2) road effectively drained by measures such as re-contouring or outsloping to return surface to near natural hydrologic function; (3) a well distributed mulch or organic cover provides at least 50% cover, or road surface is revegetated using local native species; (4) side slopes are reshaped and stabilized to match the natural contour (as necessary); and (5) stream crossings are removed and natural channel geometry is restored. If non-local mulch is used (such as straw), it must be approved by the Forest Service as weed free.	Timber Sale Administration
BMP 5-8 Pesticide Application According to Label Directions and Applicable Legal Requirements: To avoid water contamination by complying with all label instructions and restrictions for use.	This BMP requires Sporax® applicators to strictly adhere to pesticide label instructions.	Timber Sale Administration

BMP Name, Objective, and Direction	Application to the Keola Project	Project Phase
BMP 5-10 Pesticide Spill Contingency Planning: To reduce contamination of water by accidental pesticide spills.	A pesticide spill contingency plan (PSCP) will be developed and implemented for the project use of Sporax®. It may be incorporated into any spill prevention and countermeasure plan developed for BMP 7-4. The pesticide spill contingency plan will at a minimum include: the types and amounts of Sporax® located in the project area, pre-project identified locations for Sporax® storage (must be located outside of RCA unless prior approval by the district hydrologist or aquatic biologist is obtained), methods for containment of hazardous materials and contents of on-site emergency spill kit, and a contingency plan (including notification requirements, contact names with phone numbers) to implement in the event of a spill. The PSCP plan must be approved by the Forest Service prior to project implementation.	Timber Sale Administration
BMP 5-11 Cleaning and Disposal of Pesticide Containers and Equipment: To prevent water contamination resulting from cleaning or disposal of pesticide containers.	The cleaning and disposal of Sporax® containers will be done in accordance with Federal, State, and local laws, regulations and directives.	Timber Sale Administration
BMP 5-12 Streamside Wet Area Protection During Pesticide Spraying: To minimize the risk of pesticide inadvertently entering waters, or unintentionally altering the riparian area, SMZ, or wetland.	If Sporax® is to be applied within a SMZ, the district fisheries/aquatic biologist will need to be consulted prior to application.	Timber Sale Administration
BMP 6-2 Consideration of Water Quality in Formulating Fire Prescriptions: To provide for water quality protection while achieving the management objectives through the use of prescribed fire.	Prescribed burning is planned at the minimum intensity and severity necessary to achieve management objectives, and each Burn Plan will incorporate all relevant design measures from this EA.	Burn Plans
BMP 6-3 Protection of Water Quality from Prescribed Burning Effects: To maintain soil productivity, minimize erosion, and minimize ash, sediment, nutrients, and debris from entering water bodies.	Fires will be allowed to back into riparian vegetation, but direct lighting within riparian vegetation will not occur. All fire lines within RCAs will be water barred per BMP 1-17 spacing requirements. Fire lines within RCA (i.e., 150 ft., seasonal streams, and 300 ft. perennial streams, springs, and meadows) will be designed and constructed to reduce sediment entry into channels. Fire lines in RCAs will cross perpendicular to streams and follow the natural landscape contour as much as possible. Firelines within the SMZ will be hand cut. Waterbars will be placed on either side of each stream crossing to prevent or reduce sediment entry into streams.	Prescribed Fire Implementation

BMP Name, Objective, and Direction	Application to the Keola Project	Project Phase
BMP 7-3 Protection of Wetlands: To avoid adverse water quality impacts associated with destruction, disturbance, or modification of wetlands.	Ground disturbing activities will not occur in wetlands or meadows.	Timber Sale Administration
BMP 7-4 Oil and Hazardous Substance Spill Contingency Plan and Spill Prevention Containment and Countermeasure (SPCC) Plan: To prevent contamination of water from accidental spills.	A spill contingency plan and spill prevention and countermeasure plan (SPCC) must be prepared if hazardous materials (including fuels and oils) stored on the Sierra National Forest exceed 1320 gallons, or if a single container exceeds 660 gallons. A SPCC is also required for Sporax® application. (See BMP 5-10). The plan will at a minimum include: the types and amounts of hazardous materials located in the project area, pre-project identified locations for hazardous materials storage and fueling/maintenance activities (must be located outside of RCA unless prior approval by district hydrologist or aquatic biologist is obtained), methods for containment of hazardous materials and contents of on-site emergency spill kit, and a contingency plan (including contact names with phone numbers) to implement in the event of a spill. The SPCC plan must be approved by the Forest Service prior to project implementation.	Timber Sale Administration Prescribed Fire Implementation

APPENDIX B –CUMULATIVE EFFECTS PROJECTS CONSIDERED IN ANALYSIS

Table B1 is a list of the potential existing and reasonably foreseeable projects that were considered in this analysis within the Huntington Lake Recreation Area. Figure B1 provides a spatial map of where many of these projects/activities exist in relationship to this project.

Table B1. List of potential existing and reasonably foreseeable projects for cumulative effects analysis within the Huntington Lake Recreation Area.

Project or Activity	Description	Actions
China Peak Ski Resort including Parking Lot Expansion Project	China Peak Ski Resort	(existing and reasonably foreseeable) The permit area includes ski runs and ski lifts, structures, parking areas including the removal of vegetation in a 2-acre area for a paved parking lot expansion. Where the ski area improvements are located it is reasonable to assume no conifers will grow in the next 10 years
Huntington Lake Recreation facilities on NFS lands	Campgrounds, visitor center, work center, day-use sites, boat docs, resorts, organization camps, recreation cabins, , water systems	(existing and reasonably foreseeable) Facilities and maintenance of those facilities, including hazardous fuels reduction and hazardous tree removal around structures. This also includes a large water system in the Dowville area (treatment unit 65) which includes springs, waterlines and water tanks. It is reasonable to assume these improvements will remain during the next 10 years
Huntington Lake Recreation facilities on non-NFS lands	structures including condominiums, cabins, resorts, stores	(existing and reasonably foreseeable) Facilities and maintenance of those facilities, including hazardous fuels reduction and hazardous tree removal around structures. It is reasonable to assume these improvements will remain during the next 10 years
SCE improvements and maintenance	Powerlines, waterlines, dams.	(existing and reasonably foreseeable) Facilities and maintenance of those facilities including treating vegetation along the right-of-way. It is reasonable to assume these improvements will remain during the next 10 years
Roads and trails	Roads and trails	(existing and reasonably foreseeable) Existing footprint and maintenance. It is reasonable to assume these improvements will remain during the next 10 years
Highway 168 hazard tree removal	Roadside hazard tree removal	(completed in 2010) These treatments remove damaged or dead trees along roads and near structures. The effect is to remove approximately 170 trees, likely mostly large old decadent live trees or snags in this project area. The cumulative effects boundary contains 85 acres of this project.

Project or Activity	Description	Actions
Potter Hazard Tree Removal	Roadside hazard tree removal	(past and existing) These treatments remove damaged or dead trees along roads and near structures. The effect is to remove approximately 30 trees, likely mostly large old decadent live trees or snags in this project area. The cumulative effects boundary contains 58 acres of this project.
Rancheria Campground Reconstruction Project	Campground reconstruction, thin from below	(reasonably foreseeable) The proposed treatments would remove some large trees in order to accommodate campground reconstruction in the near vicinity of the campground. Hazards to the campground, if existing will also be removed. Outside of the near vicinity small trees particularly fir will be removed. 1,838 trees averaging 14.5" DBH over 75 acres.
Idywilde/Home Creek Thinning	Thinning Project	(past and reasonably foreseeable) Precommercial thinning has already occurred in accordance with this project over 33 acres. Commercially small trees, particularly fir, will be removed in the future near housing tracts adjacent to the Keola Project Area. 1,746 trees will be removed as a result of this project over 75 acres.
Motorized recreation	snowmobile travel on designated routes	(existing and reasonably foreseeable) There are snowmobile travel routes and a snowmobile bridge is presently being constructed or will soon begin construction over Big Creek.
Livestock grazing	Grazing in the Kaiser and Blazingame allotment	(existing and reasonably foreseeable) On occasion cows get into the recreation area but use is minimal
Wildfire and aggressive fire management action (fire suppression)	Unknown size, location or intensity	Based on fire risk can expect approximately 3.67 fires per decade within the project area. Number of fire starts would be higher for the Huntington Recreation Area

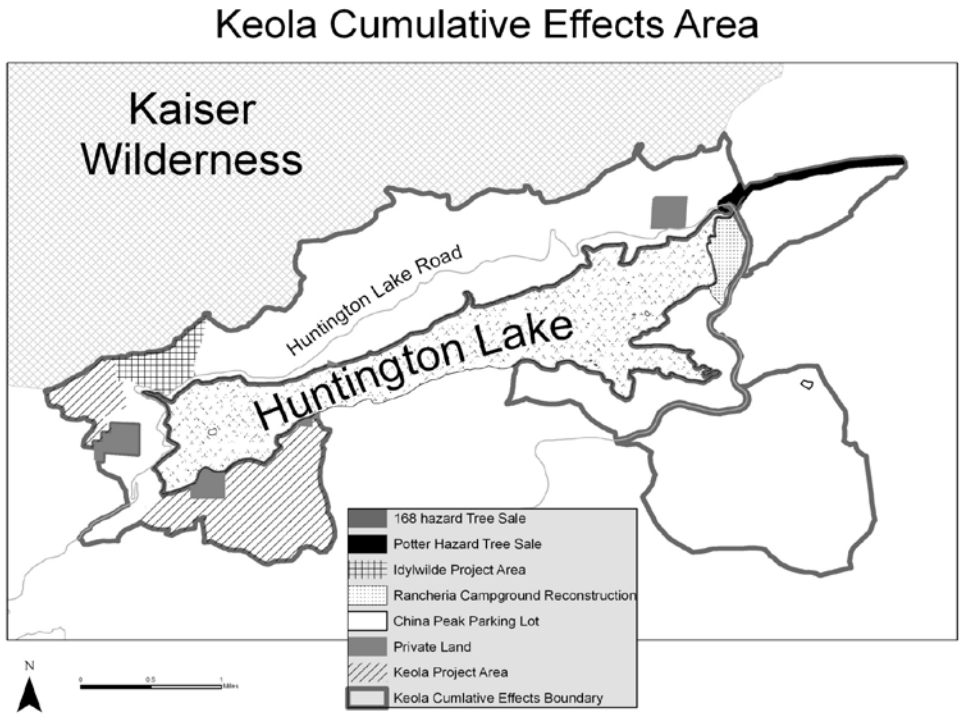

Figure B1. Projects and activities within the Huntington Lake Recreation Area.

APPENDIX C - RIPARIAN CONSERVATION OBJECTIVES CONSISTENCY REPORT

KEOLA FUELS AND FOREST HEALTH PROJECT

Alternatives 2 and 3

Standard and Guideline	Does it Apply?		Why or Why Not?	Consistency Determination and Rationale
	Yes	No		
Standards and Guidelines for RCAs and CARs				
91. Designate RCA widths as described in Part B of ROD appendix. RCA widths may be adjusted at the project level if a landscape analysis has been completed and a site-specific RCO analysis demonstrates a need for different widths.	X		There are streams in the project area.	Consistent – RCAs have been designated as described in the SNFPA ROD (2004). See the design features in Chapter 2 of the EA.
92. Evaluate new proposed management activities in CARs and RCAs during environmental analysis to determine consistency with RCOs at the project level and the AMS goals for the landscape. Ensure that appropriate mitigation measures are enacted to: 1) minimize risk of activity-related sediment entering aquatic systems and 2) minimize impacts to habitat for aquatic- or riparian-dependent plant and animal species.	X		Management activities are proposed within RCAs.	Consistent – the design criteria were developed to minimize sediment delivery and impacts to aquatic and riparian habitat. See the design criteria for Hydrology, Aquatic WIldlife, Soils, and the BMPs listed in Appendix A.
93. Identify existing uses and activities in CARs and RCAs during landscape analysis. At the time of permit reissuance, evaluate and consider actions needed for consistency with RCOs.		X	This is not a landscape analysis or a permit re-issuance project.	N/A
94. As part of project-level analysis, conduct peer reviews for projects that propose ground-	X		Ground-disturbing activities are proposed	Consistent – ground disturbing activities are defined in the SNFPA ROD (2004) as “activities that result in

Standard and Guideline	Does it Apply?		Why or Why Not?	Consistency Determination and Rationale
	Yes	No		
disturbing activities in more than 25% of the RCA or more than 15% of a CAR.			within RCAs and must be assessed to determine whether a peer review is triggered.	detrimental soil compaction or loss of organic matter beyond the thresholds identified by soil quality standards". The soils analysis concluded that soil productivity will not be affected because of design criteria including SOIL 1 to 5. Based on this information, ground disturbance will not exceed these percentages in RCAs or CARs, so a peer review is not required.
Standards and Guidelines Associated with RCO #1				
95. For waters designated as "Water Quality Limited" (Clean Water Act Section 303(d)), participate in the development of Total Maximum Daily Loads (TMDLs) and TMDL Implementation Plans. Execute applicable elements of completed TMDL Implementation Plans.		X	There are no 303(d) listed waterbodies in or near downstream of the project area.	N/A
96. Ensure that management activities do not adversely affect water temperatures necessary for local aquatic and riparian-dependent species assemblages.	X		Vegetation modification has the potential to change stream shading, which could affect water temperatures.	Consistent – The Water Resources analysis concluded that stream shading and temperatures could be affected, but are still expected to maintain the existing conditions. The water resource analysis recognizes that stream water temperature in Big Creek below Huntington Lake is affected by operation of the Big Creek Hydro Project, but that the proposed project will not worsen those conditions.
97. Limit pesticide applications to cases where project level analysis indicates that pesticide applications are consistent with RCOs.	X		Fungicide application is included in the project.	Consistent – BMPs 5-8, 5-11, and 5-12 will limit impacts. Proposed treatments in RCAs/SMZs will be approved by the District Hydrologist or Aquatic Biologist, and with appropriate buffers during stump treatments.
98. Within 500 feet of known occupied sites for the California red-legged frog, Cascades frog,		X	There are no known occupied sites for these	There are Yosemite toads in the analysis area, but the closest site is over 600' from any treatments.

Standard and Guideline	Does it Apply?		Why or Why Not?	Consistency Determination and Rationale
	Yes	No		
Yosemite toad, foothill yellow-legged frog, mountain yellow-legged frog, and northern leopard frog, design pesticide applications to avoid adverse effects to individuals and their habitats.			species in or within 500 feet of the project area.	
99. Prohibit storage of fuels and other toxic materials within RCAs and CARs except at designated administrative sites and sites covered by a Special Use Authorization. Prohibit refueling within RCAs and CARs unless there are no other alternatives. Ensure that spill plans are reviewed and up-to-date.	X		Fuel will be needed for heavy equipment operations and for the drip torches used for pile burning and underburning.	Consistent – This direction is included as design criteria (WLD-25, BMP2-12). Storage of these materials, refueling and maintenance will not occur in RCAs unless site-specifically approved by the District Hydrologist.
Standards and Guidelines Associated with RCO #2				
100. Maintain and restore the hydrologic connectivity of streams, meadows, wetlands, and other special aquatic features by identifying roads and trails that intercept, divert, or disrupt natural surface and subsurface water flow paths. Implement corrective actions where necessary to restore connectivity.	X		Roads in the project area may disrupt flow paths. In some cases, road maintenance may occur for the project and could be designed to address these issues.	Consistent – The accompanying road maintenance will correct diversion of water flow paths when possible as part of road reconstruction or routine maintenance actions.
101. Ensure that culverts or other stream crossings do not create barriers to upstream or downstream passage for aquatic-dependent species. Locate water drafting sites to avoid adverse effects to in stream flows and depletion of pool habitat. Where possible, maintain and restore the timing, variability, and duration of floodplain inundation and water table elevation in meadows, wetlands, and other special aquatic features.	X		Road reconstruction may include stream crossings. Water drafting is likely to occur for the project.	Consistent – Any stream crossings replaced for this project will be designed for appropriate passage of aquatic organisms. Only approved water drafting locations that meet the requirements in the LRMP, as amended, will be used (WLD-23, BMP2-21). Although the hydrology of Big Creek is substantially altered by the FERC licensed Big Creek Hydroelectric Project. Restoration actions related to

Standard and Guideline	Does it Apply?		Why or Why Not?	Consistency Determination and Rationale
	Yes	No		
				the FERC project impacts are outside the scope of the Keola Project.
102. Prior to activities that could affect streams, determine if relevant stream characteristics are within the range of natural variability. If characteristics are outside the range of natural variability, implement mitigation measures and short-term restoration actions needed to prevent further declines or that will result in an upward trend. Evaluate long-term restoration actions and implement them according to their status among other restoration needs.	X		Vegetation manipulation and prescribed burning have the potential to affect streams, although design features included in the project are designed to minimize this risk.	Existing observations and data indicate that for project area above Huntington Lake, stream channel types, channel stability, pool filling, and shading are generally within their natural range of variability. Below Huntington Lake, channel conditions have been altered by the FERC licensed Big Creek Hydroelectric Project. Restoration actions related to the FERC project impacts are outside the scope of the Keola Project.
103. Prevent disturbance to streambanks and natural lake and pond shorelines caused by resource activities (for example, livestock, off-highway vehicles, and dispersed recreation) from exceeding 20 percent of stream reach or 20 percent of natural lake and pond shorelines. Disturbance includes bank sloughing, chiseling, trampling, and other means of exposing bare soil or cutting plant roots. This standard does not apply to developed recreation sites, sites authorized under SUPs, and designated off-highway vehicle routes.	X		Mechanized treatments have the potential to disturb streambanks. High severity burn is also considered to be disturbance.	Consistent – Application of SMZs (BMP1-8) will protect streambanks from being disturbed by mechanized equipment. Stream crossings will be permitted but will be in approved locations (BMP1-19) and limited in number to minimize impacts. Stream bank trees will not be cut and areas within 50 feet of meadows and perennial streams will be left untreated (WLD-25, BMP1-22).
104. In stream reaches occupied by, or identified as “essential habitat” in the conservation assessment for the Lahontan and Paiute cutthroat trout and the Little Kern golden trout, limit streambank disturbance from livestock to 10 percent of the occupied or “essential habitat” stream reach. (Conservation assessments are described in the record of decision.) Cooperate		X	There is no ‘essential habitat’ for these species in or near the project area.	N/A

Standard and Guideline	Does it Apply?		Why or Why Not?	Consistency Determination and Rationale
	Yes	No		
with State and Federal agencies to develop streambank disturbance standards for threatened, endangered, and sensitive species. Use the regional streambank assessment protocol. Implement corrective action where disturbance limits have been exceeded.				
105. At either the landscape or project-scale, determine if the age class, structural diversity, composition, and cover of riparian vegetation are within the range of natural variability for the vegetative community. If conditions are outside the range of natural variability, consider implementing mitigation and/or restoration actions that will result in an upward trend. Actions could include restoration of aspen or other riparian vegetation where conifer encroachment is identified as a problem.	X		Riparian vegetation could be affected by underburning.	Riparian vegetation in the areas upstream of Huntington Lake is generally within the range of natural variability. Huntington Lake and streams below Huntington Lake have altered riparian vegetation due to the operations of the Big Creek Hydro Project. Big Creek in particular has sections where vegetation has encroached on the stream channel due to reduced channel maintenance flows. Restoration of those impacts is outside the scope of the Keola Project.
106. Cooperate with Federal, Tribal, State and local governments to secure in stream flows needed to maintain, recover, and restore riparian resources, channel conditions, and aquatic habitat. Maintain in stream flows to protect aquatic systems to which species are uniquely adapted. Minimize the effects of stream diversions or other flow modifications from hydroelectric projects on threatened, endangered, and sensitive species.		X	No element of this project relates to instream flows or stream diversions.	N/A
107. For exempt hydroelectric facilities on national forest lands, ensure that special use permit language provides adequate in stream flow requirements to maintain, restore, or recover favorable ecological conditions for local riparian-		X	This project is not related to hydroelectric facilities.	N/A

Standard and Guideline	Does it Apply?		Why or Why Not?	Consistency Determination and Rationale
	Yes	No		
and aquatic-dependent species.				
Standards and Guidelines Associated with RCO #3				
108. Determine if the level of coarse large woody debris (CWD) is within the range of natural variability in terms of frequency and distribution and is sufficient to sustain stream channel physical complexity and stability. Ensure proposed management activities move conditions towards the range of natural variability.	X		Vegetation manipulation has the potential to affect CWD recruitment.	Harvest could reduce LWD recruitment slightly, while burning could increase it. The soil resource and water resource analyses concluded that LWD retention requirements would provide sufficient levels of LWD.
Standards and Guidelines Associated with RCO #4				
109. Within CARs, in occupied habitat or "essential habitat" as identified in conservation assessments for threatened, endangered, or sensitive species, evaluate the appropriate role, timing, and extent of prescribed fire. Avoid direct lighting within riparian vegetation; prescribed fires may back into riparian vegetation areas. Develop mitigation measures to avoid impacts to these species whenever ground disturbing equipment is used.		X	There are no CARs within the analysis area.	
110. Use screening devices for water drafting pumps. (Fire suppression activities are exempt during initial attack.) Use pumps with low entry velocity to minimize removal of aquatic species, including juvenile fish, amphibian egg masses and tadpoles, from aquatic habitats.	X		Drafting may occur for road work or dust control during project implementation.	Consistent – this direction is incorporated into the alternatives as design criteria (WLD-23, BMP2-21) and will be followed if any water drafting occurs.
111. Design prescribed fire treatments to minimize disturbance of ground cover and riparian vegetation in RCAs. In burn plans for project areas that include, or are adjacent to	X		Prescribed fire is one of the tools that will be used in this project.	Consistent – pile burning will be set back from streams (BMP1-22), and underburning will be designed to retain at least 50% groundcover (SOIL-2). Direct lighting is not permitted in SMZs to

Standard and Guideline	Does it Apply?		Why or Why Not?	Consistency Determination and Rationale
	Yes	No		
RCAs, identify mitigation measures to minimize the spread of fire into riparian vegetation. In determining which mitigation measures to adopt, weigh the potential harm of mitigation measures, for example fire lines, against the risks and benefits of prescribed fire entering riparian vegetation. Strategies should recognize the role of fire in ecosystem function and identify those instances where fire suppression or fuel management actions could be damaging to habitat or long-term function of the riparian community.				minimize impacts to riparian vegetation (WLD-25) but fire may back into these areas – if it does, is expected to function within its natural role….
112. Post-wildfire management activities in RCAs and CARs should emphasize enhancing native vegetation cover, stabilizing channels by non-structural means, minimizing adverse effects from the existing road network, and carrying out activities identified in landscape analyses. Post-wildfire operations shall minimize the exposure of bare soil.		X	This project does not include post-wildfire management activities.	N/A
113. Allow hazard tree removal within RCAs or CARs. Allow mechanical ground disturbing fuels treatments, salvage harvest, or commercial fuel wood cutting within RCAs or CARs when the activity is consistent with RCOs. Utilize low ground pressure equipment, helicopters, over the snow logging, or other non-ground disturbing actions to operate off of existing roads when needed to achieve RCOs. Ensure that existing roads, landings, and skid trails meet BMPs. Minimize the construction of new skid trails or roads for access into RCAs for fuel treatments,	X		Mechanical ground-disturbing fuels treatments in the RCA are included in this project.	Consistent – This analysis documents that the proposed ground-disturbing fuels treatments are consistent with RCOs. Maintenance will occur on the roads as needed for BMP compliance. No temporary road construction is proposed in RCAs, and any temporary roads will be minimized, and roads will be decommissioned after project completion.

Standard and Guideline	Does it Apply?		Why or Why Not?	Consistency Determination and Rationale
	Yes	No		
salvage harvest, commercial fuelwood cutting, or hazard tree removal.				Skid trails and landings will follow BMPs (including BMPs 1-8; 1-10; 1-12; 1-13; 1-16; 1-17; 1-19)
114. As appropriate, assess and document aquatic conditions following the Regional SCI protocol prior to implementing ground disturbing activities within suitable habitat for California red-legged frog, Cascades frog, Yosemite toad, foothill and mountain yellow-legged frogs, and northern leopard frog.	X		There is identified suitable habitat for MYLF associated with Huntington Lake	SCI data is not needed for the assessment of the suitable habitat in this project area, because it is not stream channel habitat. Suitable habitat is associated with Huntington Lake, which is a reservoir operated as part of the Big Creek Hydroelectric Project. Based on the analysis in the Aquatic BA/BE, there will be no effect on MYLF.
115. During fire suppression activities, consider impacts to aquatic- and riparian-dependent resources. Where possible, locate incident bases, camps, helibases, staging areas, helispots, and other centers for incident activities outside of RCAs or CARs. During pre-suppression planning, determine guidelines for suppression activities, including avoidance of potential adverse effects to aquatic- and riparian-dependent species as a goal.		X	Fire suppression and pre-suppression planning are outside the scope of this project.	N/A
116. Identify roads, trails, OHV trails and staging areas, developed recreation sites, dispersed campgrounds, special use permits, grazing permits, and day use sites during landscape analysis. Identify conditions that degrade water quality or habitat for aquatic and riparian-dependent species. At the project level, evaluate and consider actions to ensure consistency with standards and guidelines or desired conditions.	X		There are some known conditions that degrade water quality or habitat in the project area	Consistent – improvement of these conditions will be incorporated where possible into the site-specific application of the proposed treatments. For example, road reconstruction will address known areas of flow diversion, erosion, and sediment delivery.
Standards and Guidelines Associated with RCO #5				

Standard and Guideline	Does it Apply?		Why or Why Not?	Consistency Determination and Rationale
	Yes	No		
117. Assess the hydrologic function of meadow habitats and other special aquatic features during range management analysis. Ensure that characteristics of special features are, at a minimum, at Proper Functioning Condition, as defined in the appropriate Technical Reports: (1) "Process for Assessing PFC" TR 1737-9 (1993), "PFC for Lotic Areas" USDI TR 1737-15 (1998) or (2) "PFC for Lentic Riparian-Wetland Areas" USDI TR 1737-11 (1994).		X	This project does not include range management analysis.	N/A
118. Prohibit or mitigate ground-disturbing activities that adversely affect hydrologic processes that maintain water flow, water quality, or water temperature critical to sustaining bog and fen ecosystems and plant species that depend on these ecosystems. During project analysis, survey, map, and develop measures to protect bogs and fens from such activities as trampling by livestock, pack stock, humans, and wheeled vehicles. Criteria for defining bogs and fens include, but are not limited to, presence of: (1) sphagnum moss (*Spagnum spp*.), (2) mosses belonging to the genus *Meessia*, and (3) sundew (*Drosera spp.*) Complete initial plant inventories of bogs and fens within active grazing allotments prior to re-issuing permits.		X	There are no bogs or fens in the area influenced by this project.	N/A
119. Locate new facilities for gathering livestock and pack stock outside of meadows and RCAs. During project-level planning, evaluate and consider relocating existing livestock facilities outside of meadows and riparian areas. Prior to re-issuing grazing permits, assess the		X	No component of this project involves the use of any kind of livestock.	N/A

Standard and Guideline	Does it Apply?		Why or Why Not?	Consistency Determination and Rationale
	Yes	No		
compatibility of livestock management facilities located in RCAs with RCOs.				
120. Under season-long grazing: • For meadows in early seral status: … • For meadows in late seral status: … Determine ecological status on all key areas monitored for grazing utilization … Under intensive grazing systems (such as rest-rotation and deferred rotation) where meadows are receiving a period of rest, … Degraded meadows (such as those in early seral status with greater than 10 percent of the meadow area in bare soil and active erosion) require total rest …		X	There will be no grazing as a result of this project.	N/A
121. Limit browsing to no more than 20 percent of the annual leader growth of mature riparian shrubs and no more than 20 percent of individual seedlings. Remove livestock from any area of an allotment when browsing indicates a change in livestock preference from grazing herbaceous vegetation to browsing woody riparian vegetation.		X	There will be no grazing as a result of this project.	N/A
Standards and Guidelines Associated with RCO #6				
122. Recommend restoration practices in: (1) areas with compaction in excess of soil quality standards, (2) areas with lowered water tables, or (3) areas that are either actively down cutting or that have historic gullies. Identify other management practices, for example, road	X			Consistent – Potential problem areas on system roads were identified and will be treated as part of the proposed project.

Standard and Guideline	Does it Apply?		Why or Why Not?	Consistency Determination and Rationale
	Yes	No		
building, recreational use, grazing, and timber harvests, that may be contributing to the observed degradation.				
Standards and Guidelines for Critical Aquatic Refuges				
123. Determine which CARs or areas within CARs are suitable for mineral withdrawal. Propose these areas for withdrawal from location and entry under US mining laws, subject to valid existing rights, for a term of 20 years.		**X**	This project is unrelated to mining claims.	N/A
124. Approve mining-related plans of operation if measures are implemented that contribute toward the attainment of maintenance of aquatic management strategy goals.		**X**	This project is unrelated to mining plans of operation.	N/A