Environmental Assessment

Last Chance Integrated Vegetation Management Project

American River Ranger District, Tahoe National Forest
Placer County, California

T14N, R12E, T14N, R13E, T15N, R12E, T15N, R13E

For Information Contact: Christopher Fischer
22830 Foresthill Rd
530-478-6254
cfischer@fs.fed.us

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CHAPTER 1

BACKGROUND

In 2005, the American River Ranger District identified a 40,000-acre landscape that showed signs of forest health decline (density and drought related mortality) and provided strategic potential for modifying wildfire behavior. An assessment conducted for this landscape identified opportunities to:

- reduce the probability of catastrophic wildfire on national forest and private lands while protecting habitat for Threatened, Endangered, and Sensitive Species (TE&S), and for Management Indicator Species (MIS);
- establish and maintain a pattern of area treatments that would be effective in modifying wildfire behavior;
- reduce the risk of insect, pathogen, and drought related mortality by managing forest stand density levels; and
- improve conifer tree health, vigor, and resistance to fire, insects, and disease while enhancing stand structural diversity.

The 40,000-acre landscape consisted of the North Fork of the Middle Fork of the American River watershed, which contains seven, seventh-field subwatersheds. Working with the District Ranger, an interdisciplinary team prioritized areas within these watersheds based on vegetation density, current mortality, California Spotted Owl Protected Activity Centers (PAC) locations, and opportunities to reduce severe wildfire effects through preventative hazardous fuels treatments. The result was an analysis area consisting of four seventh-field watersheds that began to take shape as a potential project proposal.

At the same time this project proposal was beginning to take shape, the Sierra Nevada Adaptive Management Project (SNAMP) became established. The SNAMP was formed to develop, implement, and test the adaptive management strategy outlined in the *Sierra Nevada Forest Plan Amendment Record of Decision* (SNFPA ROD, 2004). The SNAMP is made up of researchers from the University of California, the University of Minnesota, the USDA Forest Service, the USDI Fish and Wildlife Service, the California Resources Agency, and the public. The SNAMP Science Team is working with the agencies to develop an adaptive management and monitoring program consistent with the Sierra Nevada Forest Plan Amendment.

The SNAMP Science Team selected the American River Ranger District's project proposal to evaluate the efficacy of fuels treatments across four response variables, including public participation, wildlife, water, and fire/forest health. The four seventh-field watersheds in the analysis area were divided as follows: two of the watersheds were designated as "controls" for the SNAMP study while the other two were designated for treatment. Within the treatment watersheds, the American River District interdisciplinary team identified areas needing treatment based on: (1) forest stand density (existing occurrences of density and drought related tree mortality); (2) economics (tractor ground for improved economic efficiency); and (3) strategic wildfire behavior modification (creating fuel conditions favorable for fire suppression efforts in the event of a large wildfire). The Project Proposal became the Last Chance Integrated

Vegetation Management Project, hereafter referred to as the Last Chance Project. The American River Ranger District is responsible for planning and implementing the Last Chance Project while the SNAMP Science Team functions as an independent third party studying the response variables.

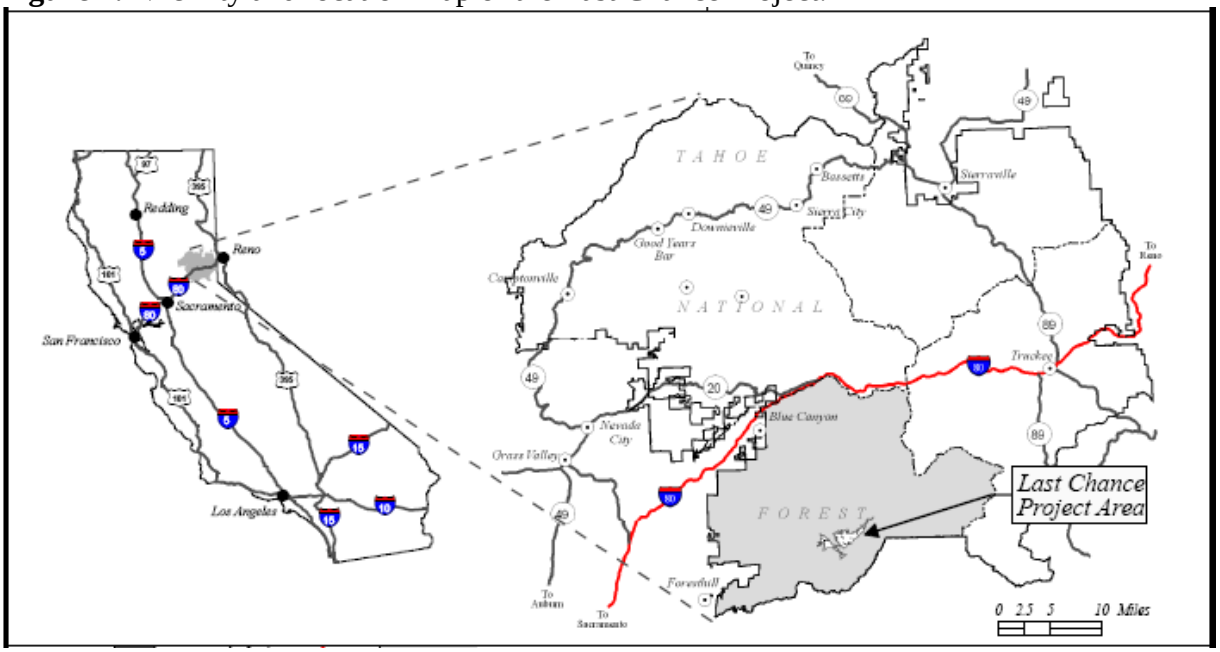
It should be noted that the 259 acres of small conifer thinning in existing plantations, originally part of the Last Chance Project, has been analyzed under a separate decision memo. There was an opportunity to fund this plantation thinning work in 2009 with Western Pine Beetle Prevention Thinning funds, creating the need to expedite a decision. For this reason, the plantation thinning proposal was removed from the Last Chance Environmental Assessment in May, 2008.

This project would be implemented under the stewardship contracting authority. Stewardship contracting allows the Forest Service to apply the value of timber or other forest products removed as an offset against the cost of services received.

Location of Project Area

The legal description of the Last Chance Project area is: T14N, R12E, T14N, R13E, T15N, R12E, and T15N, R13E. The Last Chance Project consists of two subwatersheds located within the North Fork of the Middle Fork of the American River roughly 15 miles northeast of Foresthill, California (Figure 1).

Figure 1. Vicinity and location map of the Last Chance Project.



Management Direction

The Last Chance Project area falls within portions of the Peavine and Mosquito Management Areas described in the *Tahoe National Forest Land Resource Management Plan* (LRMP 1990,

pages V-472 through V-475 and pages V-500 through V-504). The LRMP was amended in January 2004 by the SNFPA ROD. The SNFPA ROD identifies Wildland Urban Intermix (WUI), California Spotted Owl home range core area (HRCA) and Old Forest emphasis area as land allocations within these two Management Areas. Most of the proposed Treatment Areas fall within the Old Forest Emphasis Area Land Allocation (see Chapter 2).

The management intent for WUI is to provide a buffer between developed areas and wildlands (SNFPA ROD, page 46) as well as minimize the spread of wildfires to valuable historic sites, like Robinson Flat and the Duncan Peak Lookout. The management intent for HRCAs is to retain existing suitable habitat while treating fuels (SNFPA ROD, p. 46). The management intent for the Old Forest Emphasis Area land allocation is to maintain or develop old forest habitat while establishing and maintaining a pattern of area-treatments that are effective in modifying wildfire behavior. The desired forest structure and function has high levels of diversity, a range of tree sizes and multi-tiered canopies, both standing and fallen dead trees, and appropriate species composition (SNFPA ROD, p. 48). Management objectives for all of these land allocations include designing economically efficient treatments to reduce hazardous fuels (SNFPA ROD, pp. 45 through 48).

Additionally, the SNFPA ROD adopted an adaptive management strategy that provides an active approach to vegetation management with more flexibility for forest managers, working with local stakeholders, to design treatments that meet multiple objectives. More information about the SNFPA Adaptive Management Strategy can be found at:

http://www.fs.fed.us/r5/snfpa/library/archives/feis/vol_4/appn_e.pdf

As previously described, the Sierra Nevada Adaptive Management Project (SNAMP) was formed to develop, implement, and test the SNFPA Adaptive Management Strategy. In February 2005, Federal and State agencies responsible for managing forest resources in California, signed a Memorandum of Understanding in which the parties agreed to begin the development of a framework for cooperation among the parties and other stakeholders. The goal was to design and apply a multi-party adaptive management and monitoring system consistent with the SNFPA. The University of California was invited to serve as a neutral third party to help the Forest Service achieve this end. The fundamental mission of the University of California is to conduct basic research, educate University students, and provide public outreach.
The University's Science Team developed a workplan that provides details of the research program, including descriptions of the research sites, research agendas for each topic, and a plan for integrating results into the adaptive management process. More information on the Science Team's research program can be found at http://snamp.cnr.berkeley.edu/workplan/.

PURPOSE AND NEED

The UC Science Team performed extensive vegetation and fuel surveys during the summer of 2007. The information is located in the project file. These data were used to become familiar with the current condition of the forest vegetation and fuels, and model the vegetation and fire behavior changes over time. Additional vegetation and fuel model information was analyzed

using the Pacific Southwest Region (R5) Forest Inventory and Analysis (FIA) stand data compiled by the Remote Sensing Lab and the Stewardship & Fireshed Assessment group. FIA stand characteristics were found to be comparable to the UC Science Team's surveys. This data was used to model fire behavior characteristics and the effect of the proposed treatments as SPLATs.

Current tree mortality attributable to insects and/or pathogens is occurring at a low level within the project area. However, Forest Health Protection aerial surveys have detected elevated mortality levels for all tree species over the past 4 years within and adjacent to treatment units. This mortality is generally occurring in true fir, growing in mixed conifer stands, or in ponderosa pine, growing in plantations, at less than one tree per acre. Elevated levels of tree mortality in this area, as well as in the rest of the Sierra Nevada range, are strongly associated with periods of below normal precipitation. Successive dry years can exacerbate unhealthy stand conditions; typically resulting in higher levels of bark beetle caused tree mortality. For example, the mortality that was recorded within and adjacent to the project area during the period of 2004 -2007 followed successive dry years from 2001 to 2004 within the Sierra Cascade zone (Zone 3, Palmer Drought Severity Index Data for California). Most of these affected stands were in an overstocked condition (Cluck and Woodruff 2008).

Research has shown that reducing stand density helps to reduce the incidence of pest damage to a stand (Oliver 1995, Oliver 1990,). Stand Density Index (SDI) is a relative measure of stocking levels expressed as a number of 10-inch diameter trees per acre. Reineke (1933) first introduced SDI as a measure of site occupancy. He found that SDI could be consistently applied as an approximation of maximum density expected for a given average stand diameter. Most of the Last Chance SNAMP stands are in an overstocked condition, with SDI averaging approximately 465 (range 158 – 524); the maximum SDI for managing ponderosa pine density, the desired species in this area, is approximately 450. This puts many of these stands in a relative density range of over 100 percent (range 35 to 116 percent). This is well above the Regional Forester's recommendation for density management that suggests SDI levels be maintained below 60% of maximum SDI. As SDI values rise a mixed conifer stand, ponderosa pine and other shade intolerant conifer species will decline and be out-competed by species that are relatively shade tolerant. Shade tolerant trees, such as incense cedar and true firs, can persist at much higher densities causing a shift in species composition. This high stand density also puts these stands at risk for elevated levels of bark beetle caused mortality during any extended period of below normal precipitation.

Existing vegetation structure and species composition in the Last Chance Project shows the effects of past harvest activities and fire suppression. The project area's forest vegetation is heterogeneous, with highly variable tree sizes, overstory canopy cover, and understory canopy cover within and between the Treatment Areas. Ponderosa pine, sugar pine, Douglas-fir, white fir, incense cedar, and red fir dominate the overstory in varied mixtures. California black oak comprises less than 5 percent of the overstory. White fir is prevalent in the mid-story and white fir and incense cedar dominate the regeneration. The shrub layer is scattered and the herb layer is comprised of scattered dry and moderate site indicators. Figure 2 provides an example of the heterogeneity within the Last Chance Project stands.

Figure 2. View of a treatment area in the Last Chance Project.

California black oak (*Quercus kelloggii*) is widely distributed throughout California's montane environments (Griffin and Critchfield 1972, Bolsinger 1988) and is the dominant hardwood (broad-leaved) tree in California's montane hardwood-conifer habitats (Mayer and Laudenslayer 1988). Long-term sustainability of California black oak has been questioned as older trees die and are not replaced by younger trees because shade-tolerant conifers shade out the younger oaks in many of California's largely overstocked mixed-conifer stands (McDonald and Tappeiner 1996, and Garrison et al. 2002).

In the Sierra Nevada Mountains, California's dominant mountain range, two large area conservation efforts have identified California black oak sustainability as a significant conservation issue including the University of California's Sierra Nevada Ecosystem Program (McDonald and Tappeiner 1996), and the Forest Service's Sierra Nevada Forest Plan Amendment (U.S. Department of Agriculture 2004).

The purpose of the Last Chance Project is to implement the management direction from the SNFPA ROD described above and, in doing so, further the scientific understanding of the effects of vegetation treatments on wildlife, water, and forest health with consideration of fuels. In addition, knowledge and experience gained from this project would be used to further develop adaptive management and monitoring strategies for national forests throughout the Sierra Nevada.

The project is consistent with the overarching needs identified in the SNFPA ROD to reduce the potential adverse effects associated with large-scale disturbances, such as wildfire, drought, insects, and diseases; thereby providing more resilient stands that provide wildlife habitat into the future, including habitat for species such as the California Spotted Owl (SNFPA ROD, p. 6).

The Use of SPLATs

In order to meet the management direction, strategically placed land area treatments (SPLATs) are proposed over the landscape. The Tahoe National Forest's SPLAT strategy follows the direction in the 2004 Sierra Nevada Forest Plan Amendment (SNFPA). The fire and fuels management strategy within this decision is based on the premise that disconnected fuel treatment areas overlapping across the general direction of fire spread are theoretically effective in changing fire spread (Finney 1999). These disconnected fuel treatments, generally termed SPLATs act to slow the spread and reduce the intensity of oncoming fires. The locations of SPLATs also act to reduce damage to treated and untreated areas and the impact of large, uncharacteristically severe wildfires. The SNFPA decision further recognizes two criteria that must be met for the strategy to be effective: the pattern of area treatments across the landscape must interrupt fire spread and the treatment prescriptions must be designed to significantly modify fire behavior with in the treated area.

SPLATs are primarily located to function as "speed bumps," slowing the spread and reducing the intensity of oncoming fires, thereby reducing damage to both treated and untreated areas and reducing the impacts of large, uncharacteristically severe wildfires. SPLATs may be natural, constructed, or the result of unplanned disturbances, and it is important to note that SPLATs are not a fixture on the landscape. Effective SPLATs are characterized by more open stands of larger fire-resistant trees with reduced ladder and surface fuels. Such conditions would reduce the extent and severity of wildfires in the area, allowing for a reduced risk of damage to forest resources, including wildlife habitat and water quality.

The American River Ranger District created a preliminary baseline SPLAT map to assist the district staff when developing the district landscape level integrated vegetation and fuels plan. This initial layer relied on fire behavior, fire history, fuels characteristics, topography and existing barriers (road, streams) inputs. Resource constraints (protected activity centers, cultural resources) were not evaluated during the baseline SPLAT map development. During project initiation, the district interdisciplinary team reviews the baseline SPLAT pattern and makes any modifications needed to ensure resource constraints are evaluated and management direction and objectives are met during site specific project proposals.

The Last Chance SPLAT treatment areas were developed by a district interdisciplinary team (IDT) composed of specialists from fire, wildlife, soils, hydrology, heritage resources and vegetation management. The IDT modified the baseline SPLAT layer's size, shape, and location based on, among others, site specific information on topography, fuel characteristics, sensitive species habitat, roads and conditions favorable for fire suppression activities (flat ridge, anchor points), vegetative and fuels conditions that would produce low fire intensities and severities.

The SPLATS being proposed by the Last Chance Project Area may be maintained, modified, or replaced by "new" SPLATs during the development of future vegetation and fuels projects within the North Fork of the Middle Fork of the American River Watershed.

Each Ranger District developed their SPLAT layer independently using a collaborative approach among District and Forest staff and the Regional Stewardship and Fireshed Assessment Cadre.

Need for Action:

A landscape analysis (located in the project file) was completed to compare the broad desired conditions identified in the SNFPA ROD with site-specific local conditions that currently exist within the North Fork of the Middle Fork of the American River landscape, which includes the Last Chance Project. The analysis compared existing conditions with desired conditions to identify opportunities to move the landscape toward desired conditions. The sections below describe how differences between desired conditions and existing conditions have led to a need to take action in this area.

1. Action is Needed to Reduce the Adverse Effects of a Potential Wildfire in the American River Drainage.

Wildfires do not occur randomly on landscapes, but rather typically occur in locations with high ignition probabilities, topographically complex terrain, and propensity to warm, dry, and windy conditions (Graham et al. 2004, Sugihara et al. 2006, Bahro et al. 2007). Due to periodic dry summer lightning and heavy recreational use, wildfire ignitions occur every fire season; however, most ignitions are successfully put out before they become large enough to be represented in the fire history database. Canyons in the area are aligned with the prevailing direction of the wind during the summer months. The slopes are steep, the topography is complex, and a number of fires have historically escaped control (see Fire History Map in Appendix A). Action is needed in this area to slow future fire spread and lower fire severity levels in areas of forest that have been accumulating fuel for many decades.

In the vicinity of the proposed Last Chance Project, the Middle Fork of the American River drainage has supported a large wildland fire approximately every seven years on average (the median is three years). Access for fire suppression is difficult, and fires often escape initial attack. Watershed and wildlife habitat values, which are typically severely affected by wildfire, remain high in the unburned areas of the drainage. Action is needed to change the outcome of a potential "problem fire" and its resulting effects on these and other resources. If and when the project area burns, thoughtfully planned and implemented fuels management actions will create conditions where fire behavior would be moderate, and fire effects would be largely beneficial rather than destructive.

2. Action is Needed to Develop Forest Stands That are More Resilient to Ecosystem Disturbances, Including Wildfire and Drought as well as Insects and Diseases.

A complex array of pests and pathogens are at work in overstocked conifer stands in the Last Chance Project, resulting in heavy mortality. Among the most prevalent are bark beetles, dwarf

mistletoe, the fungus *Cytospora*: a secondary invader of branches weakened by other causes, white pine blister rust, and Annosus root disease, caused by the fungus *Heterobasidion annosum*. The effects of these pest and pathogens are exacerbated during drought conditions. An evaluation of stand conditions in the Last Chance Project Area was performed in 2007 by the Forest Pest Management Staff. They determined "…the high stand density also puts these stands at risk for elevated levels of bark beetle caused mortality during any extended period of below normal precipitation… ." Action is needed to improve stand health and vigor, allowing conifers a greater resistance to the effects of ecosystem disturbances, including insect, disease, drought, and fire.

3. Action is Needed to Promote Shade-Intolerant Conifer Species and Oaks.

A management objective for the Old Forest Emphasis area land allocation is to maintain and/or establish appropriate species composition (SNFPA ROD, page 48). In addition, forest-wide standards and guidelines direct managers to promote shade-intolerant sugar and ponderosa pines as well as hardwoods (SNFPA ROD, page 52). The absence of periodic fire in the Last Chance Project has allowed shade-tolerant white fir to dominate the understory in stands that historically had a greater component of shade-intolerant pines. Hence, action is needed to maintain and/or establish appropriate conifer species composition.

California black oak, which occurs in pure stands or mixed with conifers, is shade-intolerant and a vigorous sprouter (McDonald 1990). Long-term sustainability of California black oak has been questioned as older trees die and are not replaced by younger trees because shade-tolerant conifers shade-out the younger oaks in many of California's largely overstocked mixed conifer stands (McDonald and Tappeiner 1996 and Garrison et al. 2002). This phenomenon is occurring in the Last Chance Project area, creating a need to take action to enhance growing conditions for black oaks.

4. Action is Needed to Create Conditions That Would Allow Reintroduction of Low Intensity Fire to the Ecosystem.

Action is needed to develop vegetation and fuel conditions favorable for reintroduction of low intensity fire to the landscape, and begin the process of restoring fire to its natural role in the ecosystem. Prior to the era of aggressive fire suppression, forest vegetation in the Last Chance Project included lower densities of trees, lower amounts of surface fuels, lower densities of ladder fuels, more open crowns, and larger fire-resistant overstory trees, than exist today. Historically, these conditions created a more fire adapted ecosystem with more frequent and less intense fires, with a reduced potential for catastrophic wildfire. These conditions were maintained by a long-standing regime of natural fires. Today, forest stands in the Last Chance Project are characterized by denser vegetation in both the understory and overstory, heavier ground fuel loadings, and overstory trees that are smaller and less fire-resistant, with a species mix that has a greater true fir component. The suppression of past wildfires has extended the return interval of fire across the landscape and increased the potential for more intense catastrophic wildfire.

5. Action is Needed to Manage Beargrass for Traditional Weavers.

Areas of beargrass, *Xerophyllum tenax,* occur within the Last Chance Project. The leaves of this species are used by traditional weavers to make baskets, hats, and other items. Low intensity fire encourages supple new leaf growth that is desirable for weaving. Fire has been excluded from the project area for years, resulting in dense stands of slow-growing beargrass. Action is needed to enhance beargrass growth, thereby improving its traditional utility.

6. Action is Needed to Operate and Maintain a Road System That Provides Sustainable Access to National Forest Lands for the Administering, Protecting, and Utilizing the Tahoe National Forest's Lands and Resources.

There are approximately 57.2 miles of road within the project area. Some of these roads are in excess of management needs for the project area, while others are inconsistent with management objectives and uses in this project area. Action is needed to ensure that the road system is:

- consistent with the objectives of the Tahoe National Forest Land and Resource Management Plan, as amended;
- responsive to public needs;
- compatible with surrounding resources;
- affordable to maintain; and
- safe.

The Road Management Objectives for roads within the Last Chance Project establish the use, potential alteration, and proposed decommissioning of some National Forest System and non-system roads. At the time of this project proposal, the Tahoe National Forest Travel Management Project is underway. The travel management decision could affect some or all of the routes that would be proposed for management actions under the Last Chance Project. Implementation of the Last Chance Project would not limit the choice of alternatives in the Tahoe National Forest's Travel Management Plan. For routes identified to be decommissioned as part of the Last Chance Project, the Forest Travel Management Decision would override any differences with the Last Chance Project decision regarding those routes. Routes not designated as National Forest System routes in the travel management decision but identified in the Last Chance Project decision to be decommissioned, would be decommissioned. Any route identified for decommissioning as a result of the Last Chance Project would be delayed until the Tahoe National Forest Travel Management Record of Decision is signed and implemented.

PROPOSED ACTION

The proposed action is designed to enhance the growth of trees: (1) to increase the large tree component and associated canopy cover of the treated stands more rapidly than if left in an untreated condition; (2) reduce stand densities to increase resilience and reduce overcrowding and subsequent tree mortality; and (3) increase pine and Douglas-fir components of the tree species mix on south slopes and reduce the amount of white fir.

Thinning from below, retaining large fire-resistant trees, and reducing ground fuels would encourage development of forest conditions toward desired conditions for Old Forest Emphasis Areas. The proposed fuel treatments would reduce the potential for destructive wildfire, improve fire suppression safety and efficiency, and increase the feasibility of a future prescribed fire program aimed at establishing a more frequent, less intense fire regime.

This proposed action would be implemented with the stewardship contracting authority. The Forest Service was granted authority to enter into stewardship contracts or agreements to achieve agency land management objectives and meet community needs. Stewardship contracting allows the Forest Service to apply the value of timber or other forest products removed as an offset against the cost of services received. Stewardship contracts may be used for treatments to improve, maintain, or restore forest health; restore or maintain water quality; improve fish and wildlife habitat; and reduce hazardous fuels that pose risks to communities and ecosystem values.

The University of California Science Team would perform extensive vegetation and fuel surveys prior to treatments, as well as after treatments. These data would be analyzed to evaluate the effectiveness of fuels treatments in protecting old forests, wildlife habitat, and watersheds. The proposed action would meet the timing and treatment strategy that the University's Science Team is seeking.

The action proposed by the Forest Service to meet the purpose and need is:

1. Thin with Ground-Based Equipment with Follow-Up Mechanical Fuels Treatment (1,486 Acres). This prescription is designed to meet the standards and guidelines described in the SNFPA ROD. Specifically, it is designed to retain at least 40 percent of existing basal area, generally comprised of the largest trees and to retain all live trees greater or equal to 30 inches in diameter at breast height (dbh). Trees in the dominant and co-dominant crown classes would be retained whenever possible. Selected trees would be the best formed, disease and damage-free trees, with full crowns available. Intermediate crown classes would be retained when necessary to meet the required leave tree spacing.

Retain all live conifers 30 inches in diameter at breast height or larger and maintain at least 40 percent canopy cover (these are open stands or stands that are at or near 40 percent canopy cover). Maintain 50 percent canopy cover in stands designated as Old Forest vegetation type California Wildlife Habitat Relationship Model (CWHR) 4M, 4D, 5M, 5D, and 6. The prescription would emphasize vertical and horizontal heterogeneity and retain higher basal area and canopy cover in the larger (greater than 20 inch diameter) more fire resilient trees. The emphasis is to retain the heterogeneity of the stands. Trees with broken tops and other characteristics that are beneficial to wildlife and clusters of large trees will be maintained. The goal is to maintain clusters of five to seven trees where present, including clusters of trees in the 20-30 inch size class. Maintain roughly one to two clusters per acre.

While the project area is primarily located in the Old Forest Emphasis Land Allocation area, most of the forest stands are not currently in an old forest condition: of the 2,383 acres in the Last Chance Project, 254 acres are classified as "late seral, closed canopy coniferous forest"

(WFR6, WFR5D, WFR5M, SMC5M). This acreage is comprised of either small inclusions (less than five acres) or stands encompassed within a number of the project's Treatment Areas (Table 1). Hence, late seral closed canopy forest inclusions or stands comprise anywhere from 1 to 34 % of the acreage within the Treatment Areas in which they occur.

Table 1. Comparison of pre and post treatment on vegetation type and canopy closure using California Wildlife Habitat Relationship Model (CWHR)

CWHR Habitat Type	Existing Canopy Closure%	Post Treatment CWHR Type	Post Treatment Canopy Closure%	Total Acres
WFR6	75	WFR6	65	36
WFR5M	67	WFR5M	60	50
WFR5M	56	WFR5M	50	133
SMC5M	55	SMC5M	50	35
TOTAL				**254**

Table 2. Pre-treatment acres of CWHR habitat by treatment method

CWHR Habitat Type	Existing Canopy Closure %	Cable Thin	Tractor Thin	Underburn	Total Acres
WFR6	75	2	12	22	36
WFR5D	67	38	12	0	50
WFR5M	56	0	126	5	133
SMC5M	55	0	33	0	35
TOTALS		**40**	**183**	**27**	**254**

Reduce ladder fuel and tree densities by removing understory trees greater than four inches in diameter and up to 30 inches in diameter while retaining the largest and healthiest tree roughly every 25 feet. Through stewardship contracts and service contracts, thin forest stands (1,486 acres) on slopes generally less than 25 percent "from below" with chainsaws and mechanical harvesters. The thinning treatment would also enhance the growth of California black oak by removing competing conifers that are within 20 feet of the hardwood drip line. The goal is to manage for hardwoods at the density of four to seven percent of the trees per acre where existing.

Short pitches less than 150 feet long and up to 30 percent in slope would also be included. Thinning would occur within the next three years followed by fuels treatments that include mechanically piling and burning, underburning, shredding, mulching, or chipping shrubs and slash with equipment, and by hand. The emphasis is on mechanically piling and burning as it is the most cost effective method. The thinned areas would be treated through whole-tree yarding, whereby the entire tree (including tops and limbs) would be yarded to the landing. In addition, small trees damaged by harvesting activities would be cut and removed to the landing. Dead trees that are hazardous to operations in the Treatment Areas and along the haul route, within the sale area, would be removed.

Retain trees with greater than 40 percent crowns, free of damage or disease, with good form and give preference to Douglas-fir, sugar pine, ponderosa pine, and incense cedar over white fir. Maintain four snags per acre and 10 to 20 tons of down woody material per acre. Apply borate compound to cut conifer stumps (except Incense Cedar) greater than 14 inches in stump diameter. Follow mitigation for Limited Operating Periods (LOPs) and riparian

conservation areas (RCAs). Temporary roads and landings will be tilled, but this is an intermediate treatment and the use of skid trails, roads, and landings may occur within the next 20 to 30 years. Artificial regeneration of the landings is planned.

The proposed action will require the application of Borax for the prevention of Annosus root disease. For the areas to be harvested in the Last Chance, an average of approximately 15 stumps per acre with surfaces 14 inches and greater would receive borax treatment. With an average of 16.5-18.5 inches diameter (1.5 square feet to 1.9 square feet for cut surfaces), this would be approximately 833 pounds on approximately 25,250 stumps on 1,728 acres, or approximately 0.5 pounds per acre. An evaluation of human and ecological risk for borax stump treatment is located in the project file and available upon request.

2. Thin with Cable Yarding Equipment with Follow-Up Prescribed Fire Fuels Treatments (242 Acres). Apply the same guidelines outlined above for oak management, canopy cover, tree clusters, and heterogeneity.

Reduce ladder fuel and tree densities by removing understory trees greater than 10 inches in diameter and up to 30 inches in diameter and retain the largest and healthiest tree roughly every 25 feet. Yard all stem material to a top diameter of six inches, from timber designated for cutting, with the following exception: broken portions of logs and tops less than eight feet in length need not be yarded. Broken ends of merchantable logs shall not be bucked off in the stands.

Through service contracts and commercial timber sale contracts, thin forest stands on slopes generally greater than 25 percent "from below" with chainsaws. Thinning would occur within the next three years followed by prescribed burning wherever conditions permit. Retain trees with greater than 40 percent crowns, free of damage or disease, with good form and give preference to Douglas-fir, sugar pine, ponderosa pine, and incense cedar over white fir. Maintain four to six snags per acre and 10 to 20 tons of down woody material per acre. Apply borate compound to cut conifer stumps (except incense cedar) greater than 14 inches. Temporary roads and landings will be tilled. Artificial regeneration of the landings is planned.

3. Conduct Prescribed Burning. Burn landing piles of fuel generated from the 1,486 acres of tractor thinning ground. Eliminate or reduce, by burning concentrations of activity generated fuels (slash) and natural surface and ladder fuels in cable thin treatment areas (242 acres). Machine pile concentrations of natural surface fuels on Tractor Unit 66 (311 acres). Reduce natural surface and ladder fuels by prescribed burning in prescribed fire only areas (577 acres): thinning would not be conducted in these areas prior to burning. All prescribed fire operations would be designed and implemented to maximize fuels treatment effectiveness and minimize cost and the risk of resource damage or escape. Treat with prescribed fire roughly two acres of beargrass annually within the 78-acre area identified for beargrass enhancement.

4. Eliminate (excess) unneeded roads and address existing erosion impacts. The Road Management Objectives (RMOs) for roads in the project area were reviewed by the

Table 3. Summary of Proposed Actions

Treatment	**Area or Distance**
Tractor thin	1,175 acres
Cable Thin and underburn	242 acres
Prescribed burning only	577 acres
Tractor Thin, Machine pile and burn (Unit 66)	311 acres
Beargrass prescribed burning	78 acres
Roads obliterated	7.9 miles
Roads Used and Maintained	45.5 miles
Roads Reconstructed (improve drainage)	1.6 miles

****Note:** Some treatment areas overlap, therefore total acres on the project maps may be less than total acres by treatment type.

Table 4. Proposed Treatment Areas

Proposed Treatment	Treatment Area Number	Acres	SNFPA Land Allocation
Beargrass Prescribed Burn	134	78	Old Forest
Total		**78**	
Cable Thin	69	81	Old Forest
Cable Thin	70	95	Old Forest
Cable Thin	76	66	Old Forest / half HRCA
Total		**242**	
Tractor Thin	65	125	Old Forest
Tractor Thin	67	166	Old Forest
Tractor Thin	68	56	Old Forest
Tractor Thin	71	54	Old Forest
Tractor Thin	72	19	Old Forest
Tractor Thin	73	23	Old Forest
Tractor Thin	74	11	Old Forest
Tractor Thin	75	56	Old Forest
Tractor Thin	77	33	HRCA / mostly Old Forest
Tractor Thin	78	142	Old Forest
Tractor Thin	79	141	Old Forest/some WUI
Tractor Thin	133	32	Old Forest
Tractor Thin	134	151	Old Forest
Tractor Thin	135	121	Old Forest
Tractor Thin	136	45	Old Forest
Total		**1,175**	
Tractor Thin, Machine pile and burn	66	311	Old Forest
Total		**311**	Old Forest
Prescribed Burn	1000	44	Old Forest
Prescribed Burn	1001	51	Old Forest
Prescribed Burn	1002	14	Old Forest
Prescribed Burn	1003	241	Old Forest
Prescribed Burn	1004	170	Old Forest
Prescribed Burn	1005	57	Old Forest
Total		**577**	
TOTAL ACRES TREATED		**2383**	

All proposed activities would adhere to the Standards and Guidelines contained within the Tahoe National Forest Land and Resource Management Plan and the Final Supplemental Record of Decision of the Sierra Nevada Forest Plan Amendment (2004). The proposed action would not foreclose options for the long-term maintenance of old forest structural elements or future complimentary fuels reduction activities not proposed under the Last Chance Project.

DECISION TO BE MADE

The decision to be made is whether to implement the proposed action as described above, to vary the location or design of the project to meet the purpose and need while addressing issues raised in public scoping, or to take no action at this time. All proposed actions are consistent with the Tahoe National Forest Land and Resource Management Plan. The decision would likely be made during summer 2009 and implemented in the fall of 2009 or the spring of 2010.

CHAPTER 2

PUBLIC INVOLVEMENT

The Last Chance Project proposal was listed in the Schedule of Proposed Actions beginning in 2007. The proposal was provided to the public and other agencies for comment during scoping in July 2007 and November 2007. Twenty four letters were sent out as part of the public involvement process and another 210 letters were sent electronically to potential interested citizens and agencies. Two field trips were held in July and November 2007 to initiate collaboration and facilitate public understanding about the project. A third field trip was held in consultation with the local Tribes in November 2007. In addition to the 2007 field trips, two public field trips were held in 2008. The topic of the first field trip was Forest Health, and the second field trip was held as a request of members of the public in order to review the mark of trees. Comments as a result of public scoping were reviewed by the interdisciplinary team. Scoping comment letters were received from the Forest Issues Group, the John Muir Project, Sierra Forest Legacy with the Sierra Club, Richard Rypinski, Richard Artley, George Terhune, and Linda Blum.

The 30-day Opportunity to Comment was published in the *Auburn Journal* in April 2008 and *The Union* in July 2008. The first comment period assumed the environmental assessment was being prepared under the guidelines of the Healthy Forest Restoration Act (HFRA), but it was subsequently changed. This resulted in a second 30-day comment period under 36 CFR 215 regulations. Those who commented during the April 2008 30-day Opportunity to Comment period did not need to re-submit comments for standing to appeal. These include letters from the John Muir Project, Sierra Pacific Industries, and a joint letter filed on behalf of Sierra Forest Legacy and the Sierra Club. Additionally, Linda Blum and George Terhune submitted verbal comments during a SNAMP Owl IT meeting held on November 25, 2008.

As a result of correspondence received from interested parties, the Forest Service separated issues raised into two groups: significant and non-significant issues. Significant issues were defined as those directly or indirectly caused by implementing the proposed action. Non-significant issues were identified as those: 1) outside the scope of the proposed action; 2) already decided by law, regulation, Forest Plan, or other higher level decision; 3) irrelevant to the decision to be made; or 4) conjectural and not supported by scientific or factual evidence. The Council on Environmental Quality (CEQ) NEPA regulations require this delineation in Sec. 1501.7, "…identify and eliminate from detailed study the issues which are not significant or which have been covered by prior environmental review (Sec. 1506.3)…."

Most of the comments were non-significant issues and included requests for further information that would be incorporated in the proposal or the effects analysis rather than a dispute with the proposed action. A significant issue raised during the 30-day comment period was to consider an alternative that would retain more of the larger trees than the proposed action to respond to concerns regarding the potential impacts of removing trees up to 30 inches in diameter and reducing canopy cover on habitat for the California spotted owl. As described in Chapter 2, an alternative was added to the analysis to respond to this issue. Appendix B contains a summary of

all scoping comments and the Responsible Official's response to those comments, and responses to comments received during the 30-day comment period.

As described in Chapter 1, the SNAMP and the UC Science Team selected and began studying the proposed project area in 2005. The proposal, maps, research strategy, and other information has been displayed on the SNAMP website and discussed in public meetings since 2005.

ALTERNATIVES (INCLUDING THE PROPOSED ACTION)

The Proposed Action (Alternative 1) was developed to meet the Purpose and Need for this project. Alternative 2 (No Action Alternative) provides a baseline for estimating the effects of other alternatives. A third alternative was developed in response to public comments to consider retaining more of the larger trees to address concerns about potential impacts to California spotted owl habitat.

Alternative 1 - The Proposed Action

The proposed action is described in detail in Chapter 1.

Alternative 2 - No Action

Alternative 2 is the "No Action" Alternative, which would propose no activities at this time. Implementation of the No Action Alternative means that the proposed fuels treatments, thinning, road decommissioning or reconstruction, and beargrass burning would not be conducted. The SNAMP Science Team, working with the agencies to develop an adaptive management and monitoring program consistent with the SNFPA, would not evaluate fuels treatment efficacy associated with the Last Chance Project.

The development and analysis of the No Action Alternative allows for the comparison of the effects of No Action against the magnitude of environmental effects of the action alternatives.

Alternative 3 - 20 inch Upper Diameter Limit

Alternative 3 was developed in response to comments received during the 30-day Opportunity to Comment period. This third alternative retains higher levels of basal area in the larger trees than the Proposed Action (Alternative 1). Alternative 3 would remove no trees greater than or equal to 20 inches in diameter and is designed to respond to concerns regarding the potential impacts of removing trees up to 30 inches in diameter, and reducing canopy cover on habitat for the California spotted owl.

Initially 846 acres were considered for thinning in Alternative 3. Out of the 846 acres, only two Treatment Areas (# 67 and 133), totaling 198 acres, have sufficient volume (over 1.5 thousand board feet per acre) in trees less than 20 inches in diameter at breast height to be considered for thinning. At volume levels below 1.5 thousand board feet per acre, the risk of potential impacts associated with mechanical operations outweigh the benefits of only marginally achieving the purpose and need for action to move the treated areas toward the desired conditions.

1. Thin with Ground-Based Equipment (198 acres). This prescription is identical to that described for "thinning with ground-based equipment" under the Proposed Action, with the key exception that the prescription under Alternative 3 is specifically designed to retain all live trees greater than or equal to 20 inches in diameter at breast height.

2. Burn Landing Piles and Apply Prescribed Fire in Natural Stands. Burn landing piles not designated for biomass utilization. It is estimated that eight landings would be required to feasibly harvest the 198 acres. There would not be sufficient revenue generated to tractor pile and burn the surface and ladder fuels. Alternative 3 would reduce natural surface and ladder fuels by applying prescribed burning techniques on 577 acres. All prescribed fire operations would be designed and implemented to minimize cost and the risk of resource damage or escape, while ensuring fuels treatment effectiveness. Prescribed fire would be applied to approximately two acres of beargrass annually within the 78-acre area identified for beargrass enhancement.

3. Eliminate (Excess) Unneeded Roads and Address Existing Erosion Impacts. As described under the Proposed Action, the Road Management Objectives (RMOs) for roads in the project area were reviewed by the Interdisciplinary Team. Alternative 3 would eliminate unnecessary roads to reduce the negative effects on the environment. Roughly 7.9 miles (26 roads) of closed roads have been identified for obliteration (decommissioning), and 1.6 miles for reconstruction to manage water flow and reduce erosion impacts. Approximately 12.6 miles (eight roads) would be used for haul routes and maintained under Alternative 3.

Table 5. Possible Treatment Areas Considered for Inclusion under Alternative 3 (20-inches Upper Diameter Limit)

Treatment Area #	Acres	MBF Removed/Ac if 20inch Upper Diameter Limit
66	311	1.035
67	166	1.600 *
69	81	.916
70	95	.600
72	19	.894
78	142	.363
133	32	2.0 *
Total	846	7.408

* sufficient volume to consider thinning

Table 6. Summary of proposed actions under Alternative 3

Treatment	Area or Distance
Tractor thin	198 acres
Prescribed burning only	577 acres
Beargrass prescribed burning	78 acres
Roads obliterated	7.9 miles
Roads Used and Maintained	12.6 miles
Roads Reconstructed (improve drainage)	1.6 miles

COMPARISON OF ALTERNATIVES

The alternatives can be compared in terms of how well they respond to the purpose and need for action. Table 8 below provides a comparison of the alternatives in this regards. Table 7 identifies the number of acres for each type of proposed activity by Alternative. Chapter 3 of this EA also addresses each alternative in terms of environmental effects.

Table 7. Comparison of proposed actions by alternative

Treatment	**Alternative 1 Area or Distance**	**Alternative 2 Area or Distance**	**Alternative 3 Area or Distance**
Tractor thin	1,175 acres	0	198 acres
Cable Thin	242 acres	0	0
Prescribed burning only	577 acres	0	577 acres
Tractor Thin, Machine pile and burn	311 acres	0	0
Underburn cable Treatment Areas	242 acres	0	0
Beargrass prescribed burning	78 acres	0	78 acres
Roads obliterated	7.9 miles	0	7.9 miles
Roads Used and Maintained	44.5 miles	0	12.6 miles
Roads Reconstructed (improve drainage)	1.6 miles	0	1.6 miles

Table 8. Comparison of Last Chance Project alternatives in terms of meeting the purpose of and need for action.

Needs for and Purposes of the Project	**Alternative 1 (Proposed Action)**	**Alternative 2 (No Action)**	**Alternative 3 (20" dbh limit)**
Reduce adverse effects of potential wildfire.	All proposed activities on 2383 acres	0 acres managed	All proposed activities on 853 acres
Develop more resilient forest stands.	All proposed activities on 2383 acres	0 acres managed	All proposed activities on 853 acres
Promote shade-intolerant conifer species and oaks.	All proposed activities on 2383 acres	0 acres managed	All proposed activities on 853 acres
Create conditions favorable for introduction of low intensity fire.	2383 acres treated with prescribed burning	0 acres treated	655 acres treated with prescribed burning
Manage Beargrass for traditional weavers.	78 acres treated	0 acres treated	78 acres treated
Maintain road systems.	7.9 miles of roads obliterated, 44.5 miles maintained, 1.6 miles reconstructed	0 miles of roads managed	7.9 miles of roads obliterated, 12.6 miles maintained, 1.6 miles reconstructed

Alternatives Considered, But Eliminated from Detailed Study

Two comment letters suggested fully analyzing an alternative with a 16-inch diameter limit or a 16 to 20-inch upper limit diameter range to address concerns about the effects of removing larger trees on habitat for wildlife species associated with Old Forest ecosystems. As described above, a third alternative (Alternative 3) has been analyzed in detail to respond to this issue.

The Forest Vegetation Simulator (FVS) model was used to determine the effects of thinning with a 16-inch, 18-inch, and 20-inch upper diameter limit alternative on a subset of the proposed

Treatment Areas. Table 9 below summarizes the modeled timber removals. All supporting material is available in the project record at the American River Ranger District.

Table 9. Modeled timber removals

Treatment Area #	Acres	MBF[1] Removed/Ac if 16-inch Upper Diameter Limit	MBF Removed/Ac if 18-inch Upper Diameter Limit	MBF Removed/Ac if 20-inch Upper Diameter Limit	MBF Removed/Ac if 30-inch Upper Diameter Limit (Proposed Action)
66	311	.193	.476	1.035	20.000
67	166	.660	.660	1.600	5.875
69[2]	81	.704	.916	.916	3.000
70	95	.400	.491	.600	3.543
71	54	0	0	0	4.920
72	19	0	.894	.894	4.330
75	56	0	0	0	4.730
78	142	.363	.363	.363	30.000
79	141	0	0	0	3.000

All proposed Treatment Areas were modeled. The Treatment Areas above were selected for display to present a variety of stand conditions. The majority of the trees in most of the stands proposed for treatment are greater than 20 inches in diameter; hence, applying treatment prescriptions with lower diameter limits (in this case, 16, 18, and 20 inches) results in no or minimal tree removal in the lower diameter classes. The prescription is to always thin from below, starting with a four-inch diameter tree and working up.

As stated in the purpose and need, certain current conditions exist within the project area that can be improved by treating vegetation and fuels to move it toward desired conditions. These existing conditions affect the sustainability of a healthy forest, associated wildlife habitat, and the vulnerability of the ecosystem to the effects of large wildfires. An alternative that retained all trees greater than either 16 or 18 inches in diameter at breast height would not be technically viable because so few trees would be removed as to preclude even partially achieving the purpose of and need for action.

Therefore, alternatives with diameter limits of 16 and 18 inches were not analyzed in detail because they would not meet the purpose and need for improving forest health and wildlife habitat, creating more diverse stand structures, improving conditions for hardwoods, nor reducing stand density and increasing resistance to insect attack.

Management Requirements Common to All Action Alternatives

Management requirements are actions taken to avoid, minimize, reduce, or eliminate the potential effects of activities associated with the proposed action. The following sections describe the management requirements that would be implemented as part of the proposed action.

[1] MBF is one thousand board feet of timber.
[2] The majority of trees in Stand 69 are greater than 24" in diameter.

Watershed, Aquatic Resources, and Soils

Decommission identified roads by tilling and closing them to all vehicle traffic with log and earth or boulder and earthen barriers. Mulch the barriers with slash, wood chips, or weed-free rice straw. Facilitate recovery by removing culverts, installing waterbars, and leaving vegetated areas undisturbed as determined by the soil scientist or hydrologist. Allow to revegetate naturally.

Establish a 100-foot "riparian buffer" zone along each side of perennial streams, and 50-foot "riparian buffer" along each side of intermittent streams. These zones provide for coarse large woody debris (CWD) to the stream channel and adjacent land and provide shading. Establish a 25-foot "riparian buffer" zone along each side of ephemeral streams for protection of stream channel.

Fall and leave safety hazardous trees within 50-foot or 100-foot "riparian buffers," unless otherwise agreed by a hydrologist or aquatic biologist.

Coordinate water drafting locations with the District Biologist prior to use. Use drafting devices with 2-mm or less screening device and draft from the deepest part of the pool.

Limit ground-based equipment (tractors and masticators) to slopes generally less than 30 percent outside of Riparian Conservation Areas (RCAs). Field review the tractor treatment area boundaries by a hydrologist or soil scientist.

Limit ground-based equipment to slopes generally less than 20 percent within all RCAs.

Locate skid trails at least 75 feet apart, except where they converge near a landing. Trees would be directionally felled in tractor Treatment Areas to minimize the number of skid trails and associated ground disturbance. Use end-lining to designated skid trails. No end-lining within RCAs. In cable operations within RCAs, full suspension is required in "riparian buffers" and partial suspension is required outside "riparian buffers."

Allow skidding operations only when soil moisture conditions are such that compaction, gullying, and/or rutting would be minimal. Equipment may operate on designated skid trails when soils are dry to a minimum depth of four inches. Low-ground-pressure equipment may operate off of designated skid trails when soils are dry to a depth of four inches. High-ground-pressure equipment may operate off of designated skid trails when soils are dry to a minimum depth of eight inches. Off of designated skid trails, limit all equipment passes over the same piece of ground to reduce the potential for adverse soil compaction. Outside the normal operating season (NOS) or during wet periods within the NOS, utilize the TNF Wet Weather Operations Guidelines.

Deep till temporary roads, landings, and portions of skid trails within 100 feet of landings. Mulch barriers with slash, wood chips, or weed-free rice straw, as needed.

No new construction of landings in RCAs. Consult with hydrologist or aquatic biologist before using an existing landing located in an RCA.

Place rock on roads at perennial and intermittent stream crossings and segments within identified RCAs to reduce the impact of sediment delivery to associated stream courses. Place rock, slash, or certified weed-free rice straw at the outlets of rolling dips and/or waterbars to dissipate water where identified by road engineer and soil scientist, and/or hydrologist.

Waterbar spacing: use moderate or high Erosion Hazard Rating for spacing guidelines based on site conditions and residual slash amounts. Pull berms back on skid trails where ground conditions are appropriate. Cable corridors would be hand waterbarred and mulched, if needed. Additional mulch and waterbars may be needed after underburning.

Establish RCAs for all streamcourses. Ensure Riparian Conservation Objectives (RCOs) are met within RCAs. Follow "RCA Guidelines" for activities within RCAs (SNFPA ROD, page 42). The RCA widths are as follows:

- Perennial Streams- 300 feet each side, measured from bank full edge.
- Seasonal Flowing Streams- 150 feet each side, measured from bank full edge.
- Streams in Inner Gorge- Top of inner gorge.
- Meadows, Lakes, and Springs- 300 feet from edge of feature or riparian vegetation, whichever is greater.

To minimize the spread of fire into riparian vegetation during prescribed fire activities, no direct ignition would occur within the 100-foot and 50-foot "riparian buffer," unless otherwise agreed to by a hydrologist, soil scientist, or aquatic biologist. Fire may back into the 100-foot and 50-foot "riparian buffer." No pile burning would occur within the 100-foot and 50-foot "riparian buffer." Direct ignition may occur within the 25-foot riparian buffer.

On all slopes, maintain 60 percent effective soil cover. Retain as much existing coarse woody debris as possible during tractor pile and underburn operations.

To reduce the potential for adverse cumulative watershed effects, implement state certified Best Management Practices (BMPs) (USDA 2000).

Transportation System, Road Maintenance, and Safety

Abate dust caused by commercial vehicle traffic on native and aggregate surfaced roads. Use dust palliatives such as lignin sulfonate or magnesium chloride to reduce the need for water, unless otherwise agreed. Include appropriate timber sale contract provisions.

Maintain haul roads before, during, and after use. Place emphasis on post haul maintenance of road surface and the surface drainage crossings to reduce erosion potential. Clean all operation activity debris from ditches and culvert inlets. Use timber sale contract provisions.

Fall dead and/or unstable trees hazardous to safe operations along roads used during project implementation.

Pilot cars are required on Mosquito Ridge Road (96 Rd.) from mile post 1.5 to mile post 19.0 for all combination vehicles that off-track more than five feet on a 100-foot radius curve; Forest Order 17-95-172. Place notice in bid prospectus.

Keep roads open and clear of operations for public and administrative uses. Designate the following roads "KO" (keep open) on the Contract Area Map: 96, 44, 43, 43-02, 33. Include appropriate timber sale contract provisions.

Prohibit timber haul and support operations on the portions of Road 43-02 also designated as Western States Trail event route (known as the Duncan Trail, #13E17) between the intersections with Road 96-40-06 to the termini at Road 44. Designate this segment of road 43-02 as "P" on the Contract Area Map. Include appropriate timber sale contract provisions.

Collect Road Maintenance and Surface Replacement Deposit on haul routes where it is impractical or unfeasible for the contractor to perform those actual required maintenances. Include timber sale contract provisions.

Return all Maintenance Level One roads to closed, long term storage condition after use by contractor by physically closing roads with log and earthen barriers and stabilizing road surfaces with waterbars and appropriate drainage.

Scenery and Recreation

Duncan Trail #13E17 (known as the Western States Trail event route for the 100 mile endurance ride and run recreation events), and sections of Roads 43-02 and Road 43-8:

Some forest visitors traveling along the Duncan Trail #13E17 (Western States event route) expect high levels of scenic quality. Natural appearing, continuously forested landscapes greatly add to the recreation experience when traveling the route. The Tahoe National Forest Land and Resource Management Plan has recognized these values in this area, providing direction for a Partial Retention Visual Quality Objective (VQO). The VQO would be applied to the immediate foreground (300 feet) from the Duncan Trail/43-02 Roadway. The Partial Retention VQO (Forestwide Standard & Guideline 18) scenery objective allows management activities that are visually subordinate to the surrounding characteristic landscape.

<u>Treatment Areas 66 and 71 along the 43-02 Road (Duncan Trail, #13E17):</u>

Designate skid trails at trail crossing so that skidding is done away from the 43-02 road/trail.

Skidding may be done to cross the trail at locations approved by the recreation staff.

Create a 25 foot (+ or -) special area of management on both sides of the 43-02 road/trail to protect visual landscape. Where there are dense stands within the 25-foot buffer, recreation staff to assist marking crew with marking of selected trees.

Provide signing to trail users when operations are adjacent to the 43-02 road/trail.

First mile of the 43-02 road/trail would be used for a haul route. When hauling is completed, the road would be restored to original condition and the water bars would be replaced.

No operations on the following weekends due to recreations events in the area:
Western States Run: Memorial Day Weekend, June 26, 2010 and June 25, 2011. Tevis Cup Horse Ride: Memorial Day Weekend, July 24, 2010, and July 16, 2011.

Management Requirements for Road 43:

The project areas adjacent to the 43 Road within Management Area 99 (Mosquito) fall under the TNF LRMP allocation of Partial Retention VQO. Portions of tractor thinning Treatment Areas 65, 66, and Underburning Treatment Area 1002, fall within the immediate foreground of this roadway and are near or adjacent to the Duncan Trail (Western States Trail event route).

The desired condition for these foreground viewsheds are to appear continuously vegetated and include small, irregularly shaped openings that can be created to emphasize size and species diversity. The area would be selectively thinned so that groupings of brush, hardwoods, and older tree species, are enhanced.

Scenery Requirements for Thinning and Slash Treatment:

1. Within the immediate foreground (300 feet) of the 43-2 (Western States Trail event route, also known as the Duncan Trail, #13E17) roadway, emphasize size and species diversity, large tree character, irregular spacing, and patches of sapling, shrub, and hardwood species within the immediate foreground viewing area. Emphasize varying the spacing guidelines so the thinning treatment has natural diversity rather than a uniform appearance. The present guidelines allow for 25 percent variability. Use this variability to provide diversity in spacing. Some areas should look open and park-like while other stands would look closer together. Emphasize leave clumps on the roadside edge. Favor clumps that are healthy and isolated from other stands to avoid ladder fuel situations.

2. Within 150 feet of Roads 43-2 and 43-8, stumps shall be as close to the ground as possible and no higher than eight inches except where ground conditions and rocks make this requirement impossible. In these cases, stump height would be as low as possible considering obstacles and safety.

3. Within 150 feet of Roads 43-2 and 43-8, handpile and treat (chipping or pile burning) visible slash from harvest activities immediately or within one year. Any slash not treated by chipping or hand-piling and burning, shall be piled a minimum of 150 feet from road or trail corridors. Untreated hand piles are to be located in areas least visible to the public. Should hazard tree

removal be needed within the Partial Retention zones along road or trail corridors, this post-sale activity should include treatment for unutilized material.

4. Landings are to be located a minimun of 300 feet from Roads 43-2 and 43-8. Locate skid trails and temporary road construction in least visible locations within the immediate foreground (300 feet) of the road or trail corridor.

5. Within 150 feet from the 43-2 and 43-8 roads, or the trail corridor, tree marking paint shall be in positions least visible to the public.

6. Maximize protection of non-activity vegetation during harvesting and slash treatment.

Scenery Requirements for Underburning:

1. Within immediate foreground (300 feet) of Duncan Trail 13E17 (Western States Trail event route)/Road 43-02 (stands 1003 and 1004) and in stand 1002 adjacent to the 43 Road, plan and implement the burning prescription to ensure low-intensity flame to minimize high bole scorch and crown foliage killing.

2. Plan unburned, random-sized islands to achieve a burned-to-unburned mosiac which reduce the visual impacts of the blackened areas. In the immediate foreground (300 feet) of the 43-2 and 43-8 roadways, plan smaller-sized underburn areas which would also minimize the visual effects of burning.

Wildlife

No vegetation treatments would be conducted within California spotted owl and northern goshawk Protected Activity Centers (PACs). Implement a LOP in stands 76, 77, and 78 prohibiting vegetation treatments within a quarter-mile of the activity center during the breeding season: March 1 through August 15.

Retain four or more of the largest snags per acre in mixed conifer habitats and six or more of the largest snags per acre in red fir habitats. These snags would include decay classes three, four, and five, preferably in clumps where possible. Retain two to four large decadent trees per acre. (Refer to SNFPA FSEIS S&G #11, p. 51).

Retain 10 to 20 tons of down woody material (logs) in the largest size classes in decay classes one, two, and three. (Refer to SNFPA FSEIS S&G #10, p. 51).

Threatened and Endangered wildlife and plants species encountered during project layout and implementation would be protected by flagging and avoiding the occurrence. Insure occurrence is identified as a control area (CA) on the Contract Area Map and protected through timber sale contract provisions. Notify biologist of any suspected Threatened and Endangered species or noxious weeds.

Fuels

Whole-tree yarding will be required on tractor ground. Unutilized material yarded from Purchaser's operations should be piled for removal or burning. Include the "Fell" clause for small damaged trees on tractor ground in the contract.

Locate landing piles to minimize potential damage to residual trees during burn operations and possibility of fire spread outside the pile.

Lop and scatter activity generated slash to a depth no greater than 30 inches in cable treatment areas only.

Within Unit 66, machine pile downed woody material for burning.

Place all machine piles at least 10 feet away from the boles of retention trees to avoid damage. Utilize openings where they exist.

Locate and design landings to allow removal of biomass wherever possible.

Prohibit landing pile construction method of driving heavy equipment on piled material.

Construct fuel breaks down to mineral soil at a distance no less than 24 inches around all tractor/grapple piles.

Construct fuel breaks down to mineral soil at a distance no less than eight feet around all whole-tree yarding piles.

Cover all piles with no less than 16 square feet of water/snow proof material to facilitate ignition.

Vegetation

All conifers stumps (except incense cedar) 14" and greater will be treated with a borax fungicide to prevent development of infection centers of annosus root disease (*Heterobasidion annosum).*

Minimize damage to residual trees during all phases of implementation.

Consult with the Silviculturist when preparing the burn plan regarding acceptable mortality.

Fall conifers away from riparian vegetation to reduce the risk of injury to sensitive species and/or their habitats.

Weeds

Clean all equipment that operates off roads before it enters the project area if it is coming from areas infested with noxious/invasive-exotic weeds (see TNF Weed S&G booklet-FY 2001).

Clean equipment that is operating off roads before it moves from an infested area within the project to another area (within or outside the project area).

Ensure that all plant material used for erosion control and/or road maintenance is weed-free (including straw and mulches as well as propagative parts such as seed).

Monitor project area for invasion of new noxious weeds. Report new occurrences to the TNF weed personnel.

Cultural Resources

Management Requirements of cultural resources includes, but is not limited to activities associated with tractor and cable logging systems. Sites will be designated by a Heritage Resource Specialist on the ground prior to implementation of project activities. It is required to protect cultural resources that have been identified with flagging, as well as those identified on maps provided by the Heritage Resources staff. Timber Sale Administrator and/or Archaeologist will walk all sites with the purchaser prior to start of felling activities.

Proposed logging camps and other staging areas need to be cleared with a Heritage Resource Specialist prior to use.

Management of Linear Features:

Directionally fell trees parallel to or away from linear features (ditches etc.). On a case by case basis it may be necessary to breach Linear Features to accomplish timber harvest. Existing breaches will be utilized whenever possible. In other cases linear features will be filled or covered with cull logs and/or slash for a temporary crossing. New breaches to linear features will be identified by the Heritage Resource Specialist and should be at a minimum of 150 feet apart. The new breaches must be rehabilitated to their original form after harvest activities are complete. Any material placed in the ditch must be removed after harvest activities are complete.

During cable logging operations, full suspension should be utilized over linear features. If full suspension is not possible then woody material will be placed in such a way to protect the resource, and removed after logging operations have ceased.

The Trap Line Ditch is a recorded archaeological site; as such **no** new breaches will be permitted. If necessary cull logs and slash may be used to protect and maintain the form of the ditch. Trees may then be skidded over the location and the materials used for crossing will subsequently be removed. These locations will be designated by the District Archaeologist.

Management for Felling and Removal of Hazard Trees within Sites:

Some sites may have hazard trees inside of them. These sites will be dealt with on a case by case basis. Falling and removal of hazard trees within a sites boundary will adhere to the following protection measures:

1. Prior written permission from the Forest Heritage Program Manager is required before any tree is removed.

2. Only salvage and hazard trees will be removed from sites.

3. Trees will be fully suspended while being removed from the site. Removal of trees inside of sites is limited to hand bucking and carrying, one pass with a rubber tired loader, use of crane/self loader, and helicopter.

4. An Archaeologist must be present during felling and removal of trees.

5. Resulting slash will be removed from the site.

Management of Sites and Features for Controlled Burning:

Sites and other documented features will be protected from adverse effects of controlled burning. On a case by case basis, controlled burning may be permitted within some sites. A Heritage Resource Specialist will be contacted during the planning phases and prior to any controlled burns.

Fire control lines will be constructed around the perimeter of sites requiring protection. Fire control lines will not be constructed through any site.

CHAPTER 3

ENVIRONMENTAL CONSEQUENCES

This chapter discloses the potential consequences or impacts of the alternaitve described in Chapter 2. Chapter 3 provides the scientific and analytical basis for the comparison of the environmental consequences of the alternatives summarized in Chapter 2. The information included was utilized to determine if it was necessary to prepare an environmental impact statement or a finding of no significant impact. The specialist's reports, mentioned and/or incorporated by reference in this document, contain detailed analysis of the consequences by alternatives. They are located in thte project file and are available upon request.

This format is somewhat of a departure from many previous environmental assessments, which described the consequences in depth by alternative for each resource area (i.e., botany, fisheries, fuels, range, vegetation, wildlife, etc). Previous environmental assessments were very lengthy and included information that was not relevant to the issues. This format displays a comparison of the consequences, and provides brief, yet sufficient, evidence and analysis to determine whether to prepare an environmental impact statement or a finding of no significant impact. The specialist's reports, mentioned and/or incorporated by reference in this document, contain detailed analysis of the consequences by alternatives. They are located in the project file and are available upon request.

Effects Relative to Significant Issues

The only significant issue for this project is to fully analyze the project implementing the 2001 SNFPA ROD, and developing an alternative that accomplishes this. The proposed action (Alternative 1) is designed to enhance the growth of trees: (1) to increase the large tree component and associated canopy cover of the treated stands more rapidly than if left in an untreated condition; (2) reduce stand densities to increase resilience and reduce overcrowding and subsequent tree mortality; and (3) increase pine and Douglas-fir components of the tree species mix on south slopes and reduce the amount of white fir.

Thinning from below, retaining large fire-resistant trees, and reducing ground fuels would encourage development of forest conditions toward desired conditions for Old Forest Emphasis Areas. The proposed fuel treatments would reduce the potential for destructive wildfire, improve fire suppression safety and efficiency, and increase the feasibility of a future prescribed fire program aimed at establishing a more frequent, less intense fire regime. A landscape level approach was designed to reduce the risk of rapid fire spread and its potential impacts to human life, old forest values, property, and other unique features that currently exist within the analysis area.

Alternative 2 is the No Action alternative. This alternative does not implement any of actions proposed. Forest vegetation would continue in its current condition and trend. Fuels would only be modified through wildfires. This does not follow the direction of the Tahoe LRMP.

Alternative 3 responds to the significant issue by fully analyzing the modification of the original

proposed action to retain higher levels of basal area in the larger trees than the Proposed Action (Alternative 1). Alternative 3 would remove no trees greater than or equal to 20 inches in diameter and is designed to respond to concerns regarding the potential impacts of removing trees up to 30 inches in diameter, and reducing canopy cover on habitat for the California spotted owl.

Effects Relative to Finding of No Significance Impact (FONSI) Elements

In 1978, the Council on Environmental Quality published regulations for implementing the National Environmental Policy Act (NEPA). These regulations (40 CFR Parts 1500-1508) included a definition of "significant" as used in NEPA. "Significant," as used in NEPA, requires considerations of both *context* and ten elements of *intensity* of a proposed action.

This section discloses environmental consequences of the proposal in relation to whether there may be significant environmental effects as defined at 40 CFR 1508.27. The eleven elements of this definition are critical to reducing paperwork through use of a "finding of no significant impact" (FONSI) when an action would not have a significant effect on the human environment, and is therefore, exempt from requirements to prepare an environmental impact statement. More detailed analysis of the potential effects are available in the resource specialist reports and other supporting documentation located in the project record. Significance as used in NEPA requires considerations of context and the ten elements of intensity as follows:

(a) Context: Significance of an action must be analyzed in several contexts such as society as a whole (human, national), the affected region, affected interests, and the locality. Significance varies with setting. In the case of a site-specific action, significance would usually depend upon the effects in the locale rather than in the world as a whole. Both short- and long-term effects are relevant.

The local context of the Proposed Action is limited to the southwestern portion of the Tahoe National Forest, approximately 15 miles northeast of the community of Foresthill, just north of Greek Store. Proposed treatments include harvest on acres of national forest lands. The proposed treatments focus on thinning over-crowded trees and reducing fuels. These actions would take place in a single location, primarily during late summer through fall and extend over a period of less than three years. In the context of seasonality and duration of activities, analyses prepared in support of this EA (Biological Evaluations, Management Indicator Species Assessment, and Weed Risk Assessment, hereby incorporated by reference, and available on request) indicate that the Proposed Action would not pose significant short-term or long-term effects.

(b) Intensity: Refers to the severity of impact,…and the following should be considered in evaluating intensity:

1. Impacts both beneficial and adverse.

Effects determinations are summarized in supporting analysis documents and/or in the remaining sections of this chapter. All analyses prepared in support of this document considered both

beneficial and adverse effects, but all effects determinations were made on the basis of only adverse effects. The effects are discussed below.

Direct and Indirect Effects to Forest Vegetation:

The direct effects of implementing the Proposed Action are the beneficial decrease in canopy cover, stand density, and basal area of the thinned stands from a forest health standpoint along with an increase in the quadratic mean diameter of the stands. Species composition in the stands would be directly affected with a decrease in shade-tolerant white fir and incense cedar and an increase in shade-intolerant species such as sugar and Ponderosa pines. Oak trees would also be enhanced with crown thinning around the oaks allowing them to maintain stand dominance.

The vegetation management objective is to maintain this heterogeneity while reducing the risk of insect/pathogen drought-related mortality by managing stand density levels. Conifer tree health would be improved, the stand structure diversity enhanced, and species composition managed (less white fir and more pine species) while maintaining the largest most fire resistant trees. The emphasis is to retain clusters or groups of trees and maintain at least 50% canopy cover in the stands identified as old forest. Some of the stands are open and near 40% cover currently. The goal is to not go below 40% in these areas. The desirable forest conditions are characterized by more open stands of large fire resistant trees with reduced ladder and surface fuels while providing habitat for plant and animal species. This prescription is designed to meet the standards and guidelines described in the Sierra Nevada Forest Plan Amendment ROD, Appendix A, Section D.

The prescription of the Proposed Action would emphasize vertical and horizontal heterogeneity and retain higher basal area and canopy cover in the larger (generally greater than 20 inches diameter though 30 inches is the upper diameter limit for tree removal) more fire resilient trees. The emphasis is to retain the *clumpiness* of the stands and an element of trees that are defective with broken tops and other characteristics that are beneficial to wildlife. Clusters or groups of large trees would be retained as well as the late seral heterogeneity of the overstory. The Proposed Action would thin 1728 acres (1486 acres with tractors and 242 acres with cable operations). Prescribed burning of 577 acres of wild stands would reduce surface and ladder fuels and reduce the density of small trees as well. The stand conditions listed below represent an average; conditions within each unit vary due to the clumpy nature of the stand.

Table 10. Pre- and post-treatment basal area (BA), trees per acre (TPA), and tree canopy cover by stand

Stand #	Logging System	Existing Basal Area Sq/Ft/AC	40% of Existing BA	Post Thin BA[3]	Existing Trees per Acre	Post Thin TPA	Existing QMD*	Post Thin QMD**	Existing Canopy Cover %	Post Thin Canopy Cover
65	T	174	70	70	348	159	9.8	9	48-76	50
66	T	374	150	167	248	109	16.6	17.8	31-73	50
67	T	172	69	112	256	144	15.3	15	50	50
68	T	120	48	98	240	198	9.6	10	48	40
69	C	119	48	89	243	168	9.8	14.2	48-62	50
70***	C	352	141	211	493	93	11.4	10	38	40
71	T	156	62	72	248	112	10.0	12.3	73	50
72	T	64	26	58	104	69	10.6	12.4	44	40
73	T	200	80	160	408	285	9.2	9.3	65	50
74	T	81	52	52	200	91	8.6	10.2	42	40
75	T	129	52	106	56	48	20.6	22.4	33	40
76	C	235	94	94	240	91	13.4	11.0	70	50
77	T	235	94	94	240	91	13.4	11.0	70	50
78	T	192	77	77	128	68	16.6	13.2	44	40
79	T	162	65	141	92	73	17.7	19.1	39	40
133	T	150	60	91	160	92	12.4	12.6	44	40
134	T	102	41	51	187	124	9.9	11.9	35	40
135	T	221	88	89	224	210	13.4	13	82	50
136	T	221	88	89	224	210	13.4	13	82	50

*Quadratic Mean Diameter
**This project proposes to thin from below, increasing the 10" and greater diameter classes. Instances of lower post thinning qmd are due to the relative increase in the number of sub-merchantable trees after the thinning from below has occurred in the 10" and greater diameter classes.
***The originally published data for stand 70 was erroneous. Unit 70 was evaluated July 28, 2009 and plots were installed to calculate the currently listed values.

The commercial thinning on the tractor and cable ground, and the prescribed burning in the wild stands would connect and compliment all of the treatments creating a spatial pattern designed to reduce rate of fire spread and fire intensity at the head of the potential wildland fire.

The greatest benefit from thinning would be in the increased tree vigor creating a healthy forest that could better withstand drought conditions. Indirect effects of the Proposed Action are the reduction in inter-tree competition that would permit individual trees greater access to light, water, and nutrients, resulting in observable growth response for height and diameter, especially in smaller diameter classes that have been released from competition from brush species, hardwoods, and conifers. Since the Treatment Areas would have improved growing conditions, the overall resistance to environmental stress including insect attack, drought, or disease would improve. As a result, mortality levels would decrease.

Oliver (1997) points out, "…that thinning dense stands increases growth on the remaining trees and reduces mortality is well-established in the literature." One objective of the Last Chance Project is to "thin from below" or "low thinning" and to release the dominant and co-dominant trees by removing the lower crown classes. The philosophy of low thinning according to Daniel, Helms, and Baker (1979) "is that the lower crown classes use significant amounts of water and nutrients and thus [is] detrimental to the growth of the upper crown classes." This thinning effort focuses on removing trees in the suppressed and intermediate crown classes; the expectation is that leave trees would be spaced at 25 feet between the co-dominant and dominant trees. The results: trees would be well spaced, inter-tree competition would reduce vigor would increase, and individual tree growth would increase.

[3] Basal Area adjusted to be at least 40% of existing basal area.

The direct impacts of Alternative 3 would be continued forest decline resulting in tree mortality from density induced insect activity. All potential stands were initially evaluated to be treated under Alternative 3. This initial evaluation included looking at 1728 acres (1486 of tractor thinning and 242 of cable thinning). The stands were modeled using the FVS model and the acres quickly dropped to 846 acres due to the 20 inch upper diameter limit. Out of 846 acres evaluated, only two stands (198 acres) would yield enough volume per acre to make an entry economically feasible. Treatment Areas 67 and 133 are considered for treatment with Alternative 3.

Alternative 3 would not connect the treatments and would not create a spatial pattern designed to reduce rate of fire spread and fire intensity because fewer acres are treated and the Treatment Areas are scattered. The need for action to reduce the potential effects of a wildfire would not be met.

The benefit from thinning would be realized on 198 acres rather than 1728 acres with Alternative 3. The reduction in inter-tree competition, improved growing conditions, and the overall resistance to environmental stress would improve on 198 acres or less than 11 percent of the area. Mortality levels would not decrease on 1530 acres.

The direct impacts of the No Action Alternative would be continued forest decline resulting in tree mortality from density induced insect activity as well. Trees would continue to die creating more surface fuels, adding to potential fire spread. Black oak would be removed from the ecosystem due to crown competition of conifers. The Silviculturist Report is available at the District Office and contains all of the vegetation analyses.

Direct and Indirect Effects to Cultural Resources:

In general, fire passing though heavy fuels could have deleterious effects on Cultural Resources. This is particularly applicable to wooden buildings or structures; as well as features where vegetation is helping hold up rock walls. Intense heat from a ground fire could damage certain types of tool stone materials such as obsidian; cause spalling on bedrock associated features; and melt or severely damage certain types of historic artifacts.

Although not all of the aforementioned conditions apply to the project area, the reduction of fire risk through project implementation would remove some of the risks to Cultural Resources within the project area. Overall, thinning and a reduction of fuels in the project area are seen as beneficial effects for Cultural Resources.

Direct and Indirect Effects to Threatened, Endangered, and Sensitive Species:

The Biological Evaluation for the Last Chance Project established that there are no threatened, endangered, or proposed wildlife, fish, nor rare plant species present within the project area. Three Forest Service sensitive species are known to occur within the Last Chance Project. The three sensitive species are the California spotted owl, Northern goshawk, and the California and the American marten. A Biological Evaluation for birds, mammals, invertebrates, amphibians,

fish, and rare plants was prepared for the Last Chance Project, which is hereby incorporated by reference.

The Proposed Action (Alternative 1) and Alternative 3 would not mechanically treat fuels or harvest merchantable trees within Protected Activity Centers (PACs) of the spotted owl and goshawk. By avoiding mechanical treatments in PACs, it is expected that the proposal would result in no adverse impacts on owl and goshawk reproduction, neither short nor long-term since critical nesting areas would be undisturbed. In addition a Limited Operating Period would be implemented within ¼ mile the known nest sites of the spotted owl and goshawk.

Disturbance would be associated with fuels reduction activities in foraging habitat. The three Last Chance Project Area SPLATs surround the California spotted owl PAC located near Frazier Creek. The overall foraging habitat quality and quantity would not be degraded or reduced. In the long-term, these species and their habitat would benefit because the action alternatives would treat the present fuel conditions using current knowledge, science, and techniques proven to reduce the risk of catastrophic wildlife. Fire suppression has allowed forested habitats to become more dense with shade-tolerant species, develop higher canopy closure, and increase the snag and downed log levels higher than would be expected with a natural fire regime. Fire suppression has set up the conditions for uncharacteristically large and high intensity fires. Large-scale catastrophic wildfire presents one of the greatest threats to late-seral stage forests in the Sierra Nevada (Verner et al. 1992; Davis: University of California, Centers for Water and Wildland Resources 1996). When late-seral stage forests are lost to catastrophic wildfire, it may take up to 250 years to develop back into the old forest condition. This is both a direct and long term adverse affect to old forest associated species such as the California spotted owl and the Northern goshawk. The short term temporal disturbance of fuel treatment activities in 254 acres of suitable owl and goshawk foraging habitat would have a non-significant impact. The silviculture prescription is to thin a total of 224 acres of late seral closed-canopy coniferous forest to a 25 by 25-foot spacing and not reduce the canopy closure below 50 percent. This would not reduce the existing tree size class below five. For the WFR6 stand, the canopy closure would be reduced from 75 percent to 60 percent which would maintain the existing CWHR vegetation type.

In addition to reducing the risk of catastrophic wildfire and sustaining existing old forest stands, fuel treatment activities would enhance foraging opportunities for the spotted owl and goshawk by opening the understory, which allows for greater mobility beneath the canopy and also increases prey detection. This would indirectly benefit these species.

No adverse effects to foothill yellow-legged frogs would occur with the implementation of the preferred alternative. All RCA guidelines identified in the project file would be followed.

Direct and Indirect Effects to Management Indicator Species:

Management Indicator Species (MIS) for the Tahoe National Forest are identified in the 2007 Sierra Nevada Forests Management Indicator Species (SNF MIS) Amendment (USDA Forest Service 2007). The MIS Analysis prepared for the Last Chance Project, which is hereby incorporated by reference, identifies the following MIS with habitats that could be potentially

affected by the project: the SNF MIS Amendment identifies bioregional scale habitat and/or population monitoring for the MIS for ten national forests, including the Tahoe National Forest (USDA Forest Service 2007). The habitat and/or population monitoring requirements for Tahoe NFs MIS are described in the Sierra Nevada Forests Bioregional Management Indicator Species (SNF Bioregional MIS) Report (USDA Forest Service 2008) and are summarized below for the MIS being analyzed for the Last Chance Project. The applicable habitat and/or population monitoring results are described in the SNF Bioregional MIS Report (USDA Forest Service 2008) and are summarized below for the MIS being analyzed for the Last Chance Project.

Habitat monitoring at the bioregional scale is identified for all the habitats and ecosystem components, including the following analyzed for the Last Chance Project: early seral coniferous forest; mid seral coniferous forest; late seral open canopy coniferous forest; late seral closed canopy coniferous forest; and snags in green forest.

Population monitoring is conducted at the bioregional scale for mountain quail, blue grouse, California spotted owl, American marten, northern flying squirrel, and hairy woodpecker. Distribution population monitoring consists of collecting presence data for the MIS across a number of sample locations over time (also see USDA Forest Service 2001, Appendix E).

The mountain quail was selected as the MIS for early and mid seral coniferous forest (ponderosa pine, Sierran mixed conifer, white fir, red fir, and eastside pine) habitat in the Sierra Nevada. Currently there are 383 acres of early seral and 1,731 of mid seral coniferous habitat types within the project area. In the early seral coniferous habitat types (SMC2M, SMC2P, SMC1P, MCP), it is estimated that 55 acres would be treated by tractor logging, two acres by a skyline cable, and 13 acres would be underburned. In the mid seral coniferous habitat types (RFR4M, WFR4M, WFR4P, SMC4D, SMC4M, SMC4P, SMC4S), it is estimated that 985 acres would be treated by tractor logging, 201 acres by a skyline cable, and 532 acres would be underburned. It is anticipated that treatment activities would not degrade or reduce the current available acres in early and mid seral coniferous habitat and would not alter the existing trend in early and mid seral coniferous habitat.

The sooty grouse, also known as the blue grouse, was selected as 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. There are a total of 315 acres of late seral open canopy coniferous forest habitat types (WFR5P, SMC5P, SMC5S) in the Last Chance Project. It is estimated that 282 acres would be treated by a ground-based logging system. Tractor logging on 282 acres of late seral open canopy coniferous habitat types would remove only small and medium size trees. By removing the small and medium size trees, these treatment stands reduce the existing canopy closure slightly and would not affect the existing large tree component. The understory shrub canopy closure and structure would remain unchanged as well as the existing tree size class, and tree canopy closure class would remain unchanged.

The California spotted owl, American marten, and flying squirrel, was selected as an MIS for late seral closed canopy coniferous forest (ponderosa pine, Sierran mixed conifer, white fir, and red fir) habitat in the Sierra Nevada. There are a total of 254 acres of late seral closed canopy coniferous forest habitat types (WFR6, WFR5D, WFR5M, SMC5M) in the Last Chance Project.

It is estimated that 183 acres would be treated (thinned) by a ground based logging system, 40 acres by a skyline cable system, and 33 acres would be underburned. The silviculture prescription is to thin a total of 224 acres of late seral closed canopy coniferous forest to a 25 by 25-foot spacing and not reduce the canopy closure below 50 percent. This would not reduce the existing tree size class below five. For the WFR6 stand, the canopy closure would be reduced from 75 percent to 60 percent which would maintain the existing CWHR vegetation type. Underburning 27 acres would not affect the existing tree size class and canopy closure.

The hairy woodpecker was selected as the MIS for the ecosystem component of snags in green forests. Medium (dbh between 15 to 30 inches) and large (dbh greater than 30 inches) snags are most important. All existing snags would be protected during the four different treatment methods, except those snags that pose a hazard to the treatment activities. It is expected that there would be no measurable difference in the number of snags and large down logs from the existing condition to the post treatment condition.

Direct and Indirect Effects to Soil and Water Resources:

Forest management activities have the potential to affect the hydrologic, soil, and aquatic resources by causing soil disturbance, altering vegetative cover, and changing local drainage patterns. The effects of the proposed management activities are most closely related to the forest health and fuel reduction techniques used. Ground-based mechanical systems have the highest potential impacts. Applying the Forest Plan Standards and Guidelines and effective Best Management Practices (BMPs) would reduce the magnitude of the effects to soil, water, and aquatic resources. In addition, management requirements were developed to avoid sensitive watershed areas or minimize soil/water/aquatic concerns. The primary concern to water quality is the impairment of beneficial uses due to an increase of fine sediment caused by accelerated erosion from the proposed projects. The risk of direct effects to forest soils, water quality, and aquatic species would be low, because project design minimizes activities that might otherwise have an impact to these resources.

Effectiveness of the BMPs in mitigating direct and indirect effects is largely related to proper implementation and the magnitude of climatic events during the first several seasons after project completion. There is a risk that heavy precipitation or rain on accumulations of snow could overwhelm erosion control structures and render them ineffective. The increased sediment delivery to channels would occur only during rare events and for short periods of time where overland flow from disturbed areas occurs. BMPs have been selected using specific information regarding soil, slope, geology, and climate conditions typically found in the Last Chance Project area.

The following section describes the effects of the proposed integrated vegetation management project in terms of direct and indirect effects.

a. <u>Underburning and hand cut/tractor pile/burn</u> does have potential direct effects. The greatest risk to the soil and hydrologic resources can occur when underburning volatilizes the soil nutrients and when mineral soils are exposed and erosion may occur. Fuels reduction through

hand cut/tractor pile/burn would result in exposing bare mineral soil, no less than a minimum of 60 percent effective soil cover, with a possible hydrophobic layer under the burn piles.

The proposed underburning and tractor pile and burn activities would follow the Last Chance Riparian Conservation Area (RCA) Guidelines for "Prescribed Fire Requirements" while meeting the Forest Plan soil cover requirements and should not lead to the indirect effect of accelerated soil erosion.

b. Thinning involves the use of mechanical, ground-based equipment, and aerial-based equipment (skyline yarding system). The potential direct effects of aerial-based thinning on soils include reduction in soil cover when logs are yarded, mainly within the skyline corridors, and the compactive impact on soil of the landing locations and associated temporary roads. The potential direct effects of mechanical, ground-based equipment on soils include a reduction in soil cover; an increase in compaction due to the building of new and the reopening of existing, temporary roads, skid trails, and landings; soil displacement during skidding operations; and a loss of nutrients and organic material through removal of small material, such as tree tops and limbs. The potential direct effects of the thinning on hydrology and water quality would depend on how much ground is detrimentally compacted, how much cover is removed, steepness of the treated slopes, and the proximity to stream channels.

The use of a feller-buncher/skidder logging system would result in the short-term reduction of ground cover on the skid trails and landings. The residual tree canopy would quickly deposit needle/leaf material providing beneficial ground cover. Compaction would be reduced by placing skid trails a minimum of 75 feet apart, operating when soils are dry, and subsoiling after operations are complete. Nutrient loss from the proposed operation would be minimal, as some limbs and treetops would normally be left in place. Thinning would promote growth, needle cast, and may create small openings for grass and nitrogen-fixing shrubs that could enrich the soil. Regrowth of biomass and nitrogen-fixing plants would bring the overall nutrient pool back to current levels in 10 to 20 years. Nutrient losses from the proposed mechanical thinning treatment would not affect long-term soil productivity. Ground-based equipment would be operating on slopes with a gradient of generally less than 30 percent. The slope limitations for each unit were determined based on soil erosion hazard rating, topography, and proximity to streams. There should be minimal alteration of drainage patterns, because runoff would be dispersed by implementation of effective erosion control structures on roads, skid trails, and landings. The thinning operation as proposed should have little direct effects on soil productivity, water quality and/or quantity or flow regime.

The potential indirect effects of the ground-based thinning operation on soils include increased risk of erosion due to isolated removal of soil cover and increased compaction resulting in greater overland flow caused by reduction in infiltration and soil water storage. The ground-based thinning operation has the potential to indirectly affect hydrology and water quality by increasing water yields, peak flows, and the timing of runoff by compacting forest soil and decreasing transpiration. The amount of cover removed should not increase the risk of erosion. Maintaining slash on skid trails and implementing effective erosion control structures would reduce erosion from compacted skid trails. The thinning operation as proposed, both ground-based and aerial-based, should result in a minimal increase in the risk of erosion. The treatment

prescriptions as proposed would not create openings and would not remove the amount of basal area necessary to generate increases in water yield or peak flow. The hydrologic effects in areas treated with the primary prescription are expected to be minimal. The effects of compaction on water yield should be minimal when management recommendations are combined with falling to the lead wherever possible. Tops and branches that are left in the woods in the aerial-based harvest areas would be distributed over the landscape and decrease overland flow of water. Grass, shrubs, and herbaceous ground cover would quickly establish or reoccupy harvested areas. Remaining canopy cover and expected revegetation would aid in reestablishing infiltration rates. Roots of residual and newly established vegetation would hold soil masses together and provide for erosion control.

The direct and indirect effects of constructing new, temporary roads would be the removal of the topsoil layer and compaction of the road surface. This could increase and redistribute the surface drainage and has the potential to increase erosion and sediment delivery to streams downhill of the road. New road cuts have the potential to affect hydrologic function by disrupting and increasing the surface drainage and by interrupting the subsurface water flow. The effects of temporary roads would decrease after subsoiling and closing the road.

Direct and Indirect Effects to Fuels and Fire Behavior:

Effects to fire behavior from the three alternatives as modeled in FFE/FVS are represented by three outputs. Outputs predict existing and future potential wildfire effects under moderate and severe conditions, as defined in FFE/FVS.

1. Surface Flame Length (feet). Surface flame lengths are representative of fireline intensity and may be used to interpret the feasibility and probable success of suppression tactics (Rothermel, 1983). Generally, fires with surface flame lengths less than four feet may be directly attacked by ground forces. Fires with surface flame lengths from four to eight feet may be attacked with fire engines and bulldozers. Fires with surface flame lengths exceeding eight feet present serious control problems including tree torching, crowning and spotting.

2. Minimum Wind Speed Required to Initiate Tree Torching (miles per hour). Wildfires require a combination of fuel and wind characteristics to move from surface fuels into the branches and canopies of trees. Generally, higher canopy base heights (the distance from surface fuels, including understory vegetation to the lowest tree branches) require higher wind speeds to spread the fire into tree branches and tops.

3. Tree Mortality (expressed as a percent of the stand's total basal area). Immediate mortality of trees by wildfire occurs when a critical volume of foliage is consumed, or the cambium layer beneath the bark is destroyed. FFE/FVS predicts probability of mortality based primarily on a trees size, species and foliar characteristics in relation to the modeled fire intensity (USDA Forest Service Gen Tech. Rep. RMRS-GTR-116. 2003).

Alternative 1 – Direct Effects.

Thinning, Whole Tree Yarding and Machine Piling (Tractor Harvest Unit 66): Thinning, whole-tree yarding and surface fuels piling and burning as described in the proposed action reduce average surface flame lengths from 4.8 to 2.9 feet (40 percent), suggesting a higher probability of success for suppressing wildfires during initial attack. Average minimum wind speed required to initiate tree torching increases from 12.5 miles per hour (mph) to 74.4 mph, suggesting a very low probability of sustained tree torching or crown fires. Average tree mortality is reduced by half, from 83.2 percent to 42.0 percent.

Thinning and Whole Tree Yarding (Tractor Harvest Units): Thinning and whole-tree yarding as described in the proposed action does not significantly change FVS/FFE predicted surface flame lengths or tree mortality. Average minimum wind speed required to initiate tree torching increases from 30.2 to 45.4 mph (33 percent), suggesting a reduced probability of sustained tree torching or crown fires.

Thinning and Prescribed Burning (Cable Harvest Units): Thinning and Prescribed Burning (Cable Units) as described in the proposed action reduce average surface flame lengths from 7.3 to 3.5 feet (52 percent), suggesting a higher probability of success for suppressing wildfires during initial attack. Average minimum wind speed required to initiate tree torching increases from 7.7 to 45.7 mph, suggesting a very low probability of sustained tree torching or crown fires. Average tree mortality is reduced by almost half, from 86 percent to 45.5 percent.

Prescribed Fire Only Treatment Areas: Prescribed Burning in these areas as described in the proposed action does not significantly change FVS/FFE predicted surface flame lengths. Average minimum wind speed required to initiate tree torching increases from 32.1 to 94.4 mph, suggesting highly reduced probability of sustained tree torching or crown fires. Average tree mortality is reduced from 72 percent to 16.7 percent.

Alternative 1 - Indirect Effects.

Thinning with Follow up Fuels Treatments: Removal of residual harvest associated fuels as well as a portion of existing surface fuels (in Tractor Unit 66 and in the Cable Harvest/Prescribed Fire Units) is expected to result in a significant decrease in severe fire behavior potential. Ladder fuels, tight crown spacing, and concentrations of downed woody materials will be reduced or eliminated, greatly reducing the likelihood of sustained crown fires. FFE/FVS predicts positive effects to last for approximately ten years from the time of treatment. Additionally, establishment of strategically placed area treatments (SPLATs) are predicted to favorably affect large fire behavior well beyond the treatment area.

Prescribed Fire Only: FFE/FVS simulation of anticipated conditions and results indicate an overall positive impact towards reduction of the surface and ladder fuels necessarily present to initiate and sustain crown fire behavior. Typically wildfires in this area escape initial attack and become large stand replacing events only under severe weather and fire behavior conditions. Such conditions as well as an unchecked buildup of a highly flammable understory vegetation layer have become more commonplace throughout the Western Sierra Nevada, resulting in an

overall upward trend in unnaturally severe wildfires. Underburning within the Last Chance Project will reduce the potential impact of this trend.

Alternative 2 – Direct Effects.

There would be no change in the existing condition. FFE/FVS predicted surface flame lengths would exceed the direct attack capabilities of wildfire suppression resources. Ground fires would spread into tree crowns under low wind and in some areas, no wind conditions. Resultant tree mortalities exceed 70 percent, indicating stand replacing fire behavior.

Alternative 2 - Indirect Effects.

Vulnerability of the area to large destructive wildfire would not change. Control efforts by ground suppression forces would be more difficult and dangerous, requiring more indirect attack strategies and subsequent increase in burned acres. SNAMP objectives for research and collaborative management would not be fully realized.

Alternative 3 – Direct Effects.

Thinning and Whole Tree Yarding (Tractor Harvest Units 67 and 133): Thinning and whole-tree yarding as described in this action results in a small reduction in FVS/FFE predicted surface flame lengths and most tree mortality percentages. Average minimum wind speeds required to initiate tree torching increase slightly, suggesting a falling probability of sustained tree torching or crown fires in the treated areas.

Thinning and Prescribed Burning (Cable Harvest Units): Thinning and Prescribed Burning does not occur in this action.

Prescribed Fire Only Treatment Areas: Direct effects of Prescribed Burning in this alternative are the same as described in the proposed action.

Alternative 3 - Indirect Effects.

Thinning and Whole Tree Yarding: Removal of residual harvest associated fuels in two areas of the project area is not expected to result in a significant reduction in severe fire behavior potential. Ladder fuels and tight crown spacing will be reduced only in the treated areas, and concentrations of downed woody materials will remain the same or increase. The likelihood of sustained crown remains largely unchanged in the treatment areas, decreasing slowly as the residual trees grow and canopy base heights increase naturally.

Prescribed Fire Only: Indirect effects of Prescribed Burning in this alternative are similar to those described in the proposed action.

Direct and Indirect Effects to Air Quality:

Emissions estimates, (USDA Forest Service Logging Operations Emissions Calculations), from harvesting and prescribed burning under Alternative 1 (Proposed Action), are:

- 11.8 tons, oxides of nitrogen (NOx)
- 9.9 tons, Volatile Organic Compounds (VOC)
- 56.5 tons, particles with a diameter of 10 micrometers or less (PM10)

Under Alternative 2 (No Action Alternative), no emissions would occur; however, the indirect effect of the no action alternative is the potential for emissions from uncontrolled, unwanted wildfire would increase over time. Negative effects on future air quality are likely to be greater without fuels reduction treatments.

Emissions estimates (USDA Forest Service Logging Operations Emissions Calculations) from harvesting and prescribed burning under Alternative 3 are:

- 7.7 tons, (NOx)
- 6.7 tons, (VOC)
- 38.3 tons, (PM10)

Alternatives 1 and 3 have the potential to indirectly affect air quality. Treatments under the proposed action have the potential to reduce or prevent large, uncontrolled wildfires and their subsequent air quality impacts. While uncontrolled wildfire emissions are highly variable and conditional, they would most likely be reduced under these alternatives.

Equipment emissions (including dust) are not expected to produce any large or lasting direct effect on air quality primarily due to the remoteness of the project area and specified road maintenance and equipment emissions standards. Prescribed burning emissions are managed through close coordination with the Placer County Air Pollution Control District (PCAPCD) to assure optimal metrological conditions for smoke dispersal.

2. The degree to which the Proposed Action affects public health or safety.

System Roads:

Hazard trees would be removed along the project haul roads within the project area, which are expected to reduce the risk to the contractor's operations and the general public to an acceptable level. Hazard trees to be removed are dead, dying, and/or damaged trees or portions of trees that have the potential to reach the road when they.

Air Quality:

Potential impacts of the action on air quality include: emissions from motorized equipment, dust from harvest operations, and smoke from controlled burning. The Last Chance Integrated Project is located in a remote and unpopulated part of Placer County, California. The Desolation

Wilderness (a Class One Air-shed) is approximately 20 miles southeast of the proposed project. Synoptic winds in the region are generally northwesterly (from the northwest), with an additional component of more southerly winds in the winter with the weakening of the Pacific High Pressure System. This pattern is evident in monthly Reno Nevada Wind Roses. Within the central Desolation Wilderness, diurnal patterns will be channeled by the upper Rubicon River Valley, and there may be some penetration into the area of San Joaquin Valley emissions via the American and Rubicon Rivers. Potential local transport routes into the Desolation Wilderness include San Joaquin Valley emissions transported directly via diurnal upslope/downslope flow and valley flow in American and Rubicon River Valleys, mixed upwards with afternoon mixing and transported via prevailing upper level westerly winds, or trapped regionally under a persistent subsidence inversion. This transport condition, from source regions to the west in the California Central Valley, occurs mainly in the summer. Locally, eastern Wilderness locations may be predominantly influenced by emissions within the Tahoe Basin. Highest summertime measured concentrations are associated with regional forest fire events (http://www.coha.dri.edu/index.html). Currently, Placer County is within federal attainment standards for PM10, PM2.5, carbon monoxide, nitrogen dioxide, sulfur dioxide, and lead (http://www.epa.gov/).

Currently, Placer County is not within California state attainment standards for Ozone or PM10**.** Ozone is a severe eye, nose, and throat irritant and increases susceptibility to respiratory infections. It is an oxidant, and can cause substantial damage to synthetic rubber, textiles, and other materials. Ozone also produces leaf discoloration and cell damage in plants. Ozone is not emitted directly, but is formed by a photochemical reaction in the atmosphere. Ozone precursors, which include VOCs and NOx, react in the presence of sunlight to form ozone. Because photochemical reaction rates depend on air temperature and the intensity of ultraviolet light, ozone is primarily a summer air pollution problem. The ozone precursors VOC and NOx are emitted by mobile sources as well as by stationary combustion equipment. In the Alternatives 1 and 3, specific sources for ozone and PM10 include vehicle traffic on area roads, motorized harvest equipment, prescribed fire operations, and dust associated with project implementation. Total calculated NOx and ROG emissions for the Last Chance Project average 11.8 and 9.9 tons, respectively. Without mitigation, PM10 emissions could exceed 56 tons over the life of the project (USDA Forest Service Logging Operations Emissions Calculations). Since these emissions would be spread over several years, implementation would not approach Placer County's ozone emission maximum standard of 25 tons per year.

Mitigation measures for dust and engine emissions, and close coordination with the Placer County Air Pollution Control District (PCAPCD) in burning operations are predicted to maintain Environmental Protection Agency (EPA) National Ambient Air Quality Standards (NAAQS) and PCAPCD emissions standards.

Economics:

Average values for the timber were used for economic evaluation and feasibility of the proposed action. The Forest Service modeling demonstrates a net positive value in revenue even though current market conditions are weak due to high fuel costs and a downturn in construction and housing development. Under the Proposed Action, Treatment Areas include timber volume

removal on approximately 1,728 acres (1,486 ground base system and 242 skyline cable system). Approximately 10.5 mmbf (20,995 ccf[4]) would be harvested, of which 9.7 million board feet (mbf) to be harvested with ground base systems and 800 mbf to be harvested with a skyline cable system.

The proposed action has a positive net present value of $248,380.00. The project would utilize the residual value to complete project related work including small stem removal, tractor piling, and road reconstruction.

3. Unique characteristics of the geographic area such as proximity to historic or cultural resources, park lands, prime farmlands, wetlands, wild and scenic rivers, or ecologically critical areas.

There are no parklands, prime farmlands, wetlands, ecologically critical areas, inventoried roadless areas, or wild and scenic rivers within the project area.

Cultural Resources:

The project area is near historic and/or prehistoric sites, but project actions have been designed to avoid cultural resource sites eligible for inclusion in the National Register of Historic Places, with the result that there would be no direct or indirect affects to any cultural resources eligible for inclusion in the National Register. Project actions would fully comply with the National Historic Preservation Act (NHPA), and implementing programmatic agreements (PAs).

4. The degree to which the effects on the human environment are likely to be highly controversial.

The Proposed Action is consistent with the management direction in the TNF LRMP (1990), as amended by the 2004 Sierra Nevada Forest Plan Amendment (USDA Forest Service 2004). Potential adverse effects have been minimized to the point where there are few effects to draw controversy. Public involvement efforts did not reveal any significant controversies regarding environmental effects of this proposal.

System Roads and Trails:

Both Alternatives 1 and 3 propose to decommission 26 existing system roads. All of these roads are currently closed and are not receiving motorized traffic. Decommissioning the 26 closed roads has no affect on open routes available for motorized vehicle use and poses no change to the type of motorized uses allowed.

Both Alternatives 1 and 3 propose management activities adjacent to the Duncan Trail, 13E17, used for the annual Western States Trail events. The Western States Trail Foundation (equestrian ride) and The Western States Foundation (foot race) have contributed $25,000, through a collection agreement, to the Forest Service for trail construction, reconstruction, and maintenance for this section of trail. The trail work was completed along the east boundary of

[4] Ccf equals 100 cubic feet

Treatment Areas 1000, 1001, 65, 1002 and along the 43-02 road, also designated as the Duncan Trail 13E179 (also known as the Western States Trail event route for both of the Foundations), in Treatment Areas 66, 71, and 1003. The Forest Service would meet the Foundations' expectations to protect the integrity and their investment of this trail segment during burning and harvesting activities. Both Foundations would be kept informed of the proposed project activities. In addition, the harvesting activities would not interfere with the planned events dates. The 43-02 is also a Forest Service system road and segments of this road would be used as a haul route.

Recreation:

This would be the 54th year for the Western States Trail Foundation Tevis Cup Ride and the 35th year for the Western States Foundation Western States Endurance Run. Both events are 100 miles from Squaw Valley to Auburn and are to be completed in 24 hours. These events are world renowned and bring participants from all over the world. The limit is 250 entrants for the equestrian riders and 370 for the runners. The first 50 miles are on National Forest System land and are authorized under special use permit.

The Foundations have a long standing cooperative working relationship with the Forest Service in support of the trail system, recreation opportunities, and harvesting activities, but in the past, have appealed some of the harvesting proposals such as in Duncan Canyon after the Star Fire in 2001 which the Western States Trail goes through. The Foundations have indicated that the Last Chance Project is not highly controversial in terms of effects on their interest in the trail and its associated activities.

5. The degree to which the possible effects on the human environment are highly uncertain or involve unique or unknown risks.

The Proposed Action is consistent with the management direction in the TNF LRMP (1990), as amended by the 2004 Sierra Nevada Forest Plan Amendment (USDA Forest Service 2004). It implements management requirements designed to reduce the potential for adverse effects. Local expertise in implementation of these types of projects minimizes the chance of highly uncertain effects or effects that involve unique or unknown risks. Proposed activities are routine in nature, employing standard practices and protection measures, and their effects are generally well known.

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.

A precedent would not be set for future decisions with significant effects. The project in itself does not establish a precedent for future actions. Any future decisions would require a site-specific analysis to consider all relevant scientific and site-specific information available at that time. The follow-up fuels treatments would take multiple entries to achieve desired conditions. Maintenance treatments, such as prescribed burning, would be employed to maintain the fire resiliency and prevent excess fuel accumulation. The fuels reduction activities proposed under this project would allow for fuels to be treated more efficiently in the future, but they do not

create a situation that requires future action. Any future projects would need a separate decision as required under NEPA.

7. Whether the action is related to other actions with individually insignificant but cumulatively significant impacts.

In order to understand the contribution of past actions to the cumulative effects of the proposed action and alternatives, this analysis relies on current environmental conditions as a proxy for the impacts of past actions. This is because existing conditions reflect the aggregate impact of all prior human actions and natural events that have affected the environment and might contribute to cumulative effects. A cumulative effect is the consequence on the environment that results from the incremental effect of the action when added to the effects of other past, present, and reasonably foreseeable future actions, regardless of what agency or person undertakes the other actions and regardless of land ownership on which the actions occur.

This cumulative effects analysis does not attempt to quantify the effects of past human actions by adding up all prior actions on an action-by-action basis. There are several reasons for not taking this approach. First, a catalog and analysis of all past actions would be impractical to compile and unduly costly to obtain. Current conditions have been impacted by innumerable actions over the last century (and beyond), and trying to isolate the individual actions that continue to have residual impacts would be nearly impossible. Second, providing the details of past actions on an individual basis would not be useful to predict the cumulative effects of the proposed action or alternatives. In fact, focusing on individual actions would be less accurate than looking at existing conditions, because there is limited information on the environmental impacts of individual past actions, and one can not reasonably identify each and every action over the last century that has contributed to current conditions. Additionally, focusing on the impacts of past human actions risks ignoring the important residual effects of past natural events, which may contribute to cumulative effects just as much as human actions. By looking at current conditions, we are sure to capture all the residual effects of past human actions and natural events, regardless of which particular action or event contributed those effects. Third, public scoping for this project did not identify any public interest or need for detailed information on individual past actions. Finally, the Council on Environmental Quality issued an interpretive memorandum on June 24, 2005 regarding analysis of past actions, which states, "agencies can conduct an adequate cumulative effects analysis by focusing on the current aggregate effects of past actions without delving into the historical details of individual past actions."

The cumulative effects analysis in this EA is also consistent with Forest Service National Environmental Policy Act (NEPA) Regulations (36 CFR 220.4(f)) (July 24, 2008), which state, in part:

> "CEQ regulations do not require the consideration of the individual effects of all past actions to determine the present effects of past actions. Once the agency has identified those present effects of past actions that warrant consideration, the agency assesses the extent that the effects of the proposal for agency action or its alternatives will add to, modify, or mitigate those effects. The final analysis documents an agency assessment of the cumulative effects of the actions considered (including past, present, and reasonable

> foreseeable future actions) on the affected environment. With respect to past actions, during the scoping process and subsequent preparation of the analysis, the agency must determine what information regarding past actions is useful and relevant to the required analysis of cumulative effects. Cataloging past actions and specific information about the direct and indirect effects of their design and implementation could in some contexts be useful to predict the cumulative effects of the proposal. The CEQ regulations, however, do not require agencies to catalogue or exhaustively list and analyze all individual past actions. Simply because information about past actions may be available or obtained with reasonable effort does not mean that it is relevant and necessary to inform decision making. (40 CFR 1508.7)"

For these reasons, the analysis of past actions in this section is based on current environmental conditions.

Design features included in the proposed action would avoid, minimize, or reverse adverse cumulative watershed effects and minimize impacts to rare plants, wildlife, aquatic species, and other sensitive resources to the extent that any residual effects would not be cumulatively significant. Biological Evaluations and a Watershed Effects Report that disclose cumulative effects, as well as direct and indirect effects, are in the project file and available from the District office.

i) Cumulative effects to soil and water resources.

The direct and indirect effects of combined past, present and proposed management activities create a cumulative impact on soils. The cumulative impact on soils is best analyzed in terms of the overall inherent productivity of the soils and is typically reflected in the growth and yield of trees on a site. Soil compaction caused by ground-based equipment tends to accumulate within the watershed over time. Compaction decreases tree growth by restricting root growth and decreasing available soil moisture. Compaction also disrupts the continuity and volume of soil pore space. Soil pores are the major structural component of soil organism habitat. Soil organisms are responsible for developing critical properties that underlie basic soil fertility and productivity. These biological communities result from complex interactions and require anywhere from a few years to several hundred years to develop. Compaction or alteration of the surface soil layers can have detrimental effects on soil organism populations. No quick remedies are available if extensive damage to the soil system occurs.

Based on recent Forest-wide monitoring observations of ground-based mechanized and helicopter logging systems, landings are expected to be 1/4 to 1 acre in size and severely compacted. The highest impact from helicopter yarding is located at the landing. Main skid trails used during the ground-based skidding would cover between 5 and 10 percent of the mechanical treatment area and would be compacted to varying degrees. The skid trails would be more compacted and disturbed near the landing and less compacted and disturbed the further from the landing the skidding occurs. Main skid trails are most highly compacted. The density of skid trails would be higher near the landing where they converge. The secondary skid trails (trails that usually only receive 1 or 2 passes with skidding equipment) would cover an additional

10 to 15 percent of the area. Soil compaction and disturbance is usually slight to moderate on these trails.

Proposed activity areas were field reviewed to determine existing compaction levels. The compaction hazard rating of these soils range from generally low (28 percent), moderately low (25 percent) to moderate (22 percent), so detrimental levels of compaction are only anticipated where machine traffic is highly concentrated, such as landings and heavily used skid trails. It is anticipated that some new detrimental compaction will occur, monitoring on the Plumas National Forest has shown that an average of 8-10 percent new compaction is added with each reentry with ground based equipment into an activity area. Given that existing detrimental compaction in areas with a previous management history is less than 5 percent. Even with an increase of 10 percent compaction with this project the activity areas would be consistent with the 15 percent LRMP porosity standard. Also given the fact that the soils in the activity areas have loamy textures, the overall direct effects of this project on soil productivity should be negligible. Typically old skid trails and landings are reused when possible. There could be a small net benefit if old landings are reused and then mitigated. The activity areas would be consistent with the SQAS for porosity. Project management requirements are designed to reduce the effects of the project to the extent possible, while still achieving resource objectives. These include keeping skid trails at least 75 feet apart, reusing suitable existing landings and skid trails whenever possible, operating off of the main skid trials only after the soil is dry, and tilling and mulching in selected areas. The ground and aerial thinning activity areas are expected to meet the LRMP standard for porosity, for the reasons described in the preceding paragraphs.

Ground-disturbing activities can cause both direct and indirect effects that persist through time. The cumulative result of all these effects is the potential to adversely affect downstream beneficial uses of the water. Cumulative watershed effects (CWE) analysis may reveal that even though the proposed activities themselves may not be sufficient to substantially impact the watershed, when analyzed in connection with past and future activities, they may become a cause for concern.

The Threshold of Concern (TOC) and Equivalent Roaded Acres (ERA) by Drainage are delineated in the table below. Alternative 2, the No-Action Alternative, provides the baseline ERA for the Last Chance Project.

Table 11. Cumulative Watershed Effects Analysis Results by Alternative Percent Equivalent Roaded Acres (ERA)

			ALT. 1	**ALT. 2**	**ALT. 3**
			(<30")	**(Existing)**	**(<20")**
Drainage Name	**Acres**	**% TOC**	**% ERA**	**% ERA**	**% ERA**
Deep Canyon	5,343	11	9.4	3.7	4.9
Grouse Creek	5,264	11	8.9	4.1	4.6
Peavine Creek	5,445	11	4.3	4.3	4.3
Screwauger Creek	8,537	12	3.6	3.6	3.6

Alternative 2 (No Action Alternative) represents the existing condition in the Drainages including activities on private land. No Drainages exceeded the TOC for the existing condition.

Alternative 1 represents the Last Chance project proposed action (including foreseeable future actions) with a maximum harvest diameter of 30 inches in diameter at breast height and Alternative 3 represents the maximum harvest diameter of 20 inches in diameter at breast height.

The RCAs in all Drainages were set to reduce the risk of sediment delivery to the streams. Implementing the preferred action alternative, with the specified management requirements, would result in a low risk of negative cumulative watershed effects.

There are 2,644 acres of perennial and intermittent RCAs and 2,483 acres of ephemeral RCAs (totally 5,127 acres) within the two seventh field HUC watersheds encompassing the Last Chance Project Area. The proposed ground-based harvest activities, cable harvesting, and prescribed fire would comply with the Clean Water Act and EOs 11988 and 11990 and would have minimal, if any, adverse direct or indirect effects on hydrology and water quality.

A complete discussion of the CWE analysis can be found in the Appendices of this document. Forest Service and private timber sales plus all private lands with Timber Harvest Plans filed for future sales were included in the CWE analysis. All projects proposed by the Tahoe National Forest in the Last Chance Project Scoping Letter were included in this CWE.

ii) Cumulative effects to wildlife, aquatic species, and threatened, endangered, or sensitive plant species.

The Biological Evaluation for the Last Chance Project established that there are no threatened, endangered, or proposed wildlife, fish, and rare plant species present within the project area; therefore, the Biological Evaluation determined that there were no direct, indirect, or cumulative effects for any Threatened, Endangered, or proposed species.

The Biological Evaluation determined that implementation of the Action Alternatives both 1 and 3 would not directly, indirectly, or cumulatively affect the sensitive species or sensitive plants addressed for the Last Chance Project.

A Sensitive Plant Biological Evaluation Analysis was prepared for the Last Chance Project, which is hereby incorporated by reference. Botanical surveys were conducted during the flowering season of 2007 and no sensitive plants were located in Treatment Areas. It was determined that there would be no effect to sensitive plants.

The Management Indicator Species Analysis for Alternatives 1 and 3 determined that implementation of the Action Alternative would not directly, indirectly, or cumulatively affect the selected MIS. Refer to the MIS Analysis prepared for the Last Chance Integrated Vegetation Management Project.

In order to understand the contribution of past actions to the cumulative effects of the proposed action, alternative 1, the no action alternative 2, and alternative 3 which was developed from issues and concerns from the public, this analysis relies on current environmental conditions as a proxy for the impacts of past actions. This is because existing conditions reflect the aggregate impact of all prior human actions and natural events that have affected the environment and

might contribute to cumulative effects.

This cumulative effects analysis does not attempt to quantify the effects of past human actions by adding up all prior actions on an action-by-action basis. There are several reasons for not taking this approach. First, a catalog and analysis of all past actions would be impractical to compile and unduly costly to obtain. Current conditions have been impacted by innumerable actions over the last century (and beyond), and trying to isolate the individual actions that continue to have residual impacts would be nearly impossible. Second, providing the details of past actions on an individual basis would not be useful to predict the cumulative effects of the proposed action or alternatives. In fact, focusing on individual actions would be less accurate than looking at existing conditions, because there is limited information on the environmental impacts of individual past actions, and one can not reasonably identify each and every action over the last century that has contributed to current conditions. Additionally, focusing on the impacts of past human actions risks ignoring the important residual effects of past natural events, which may contribute to cumulative effects just as much as human actions. By looking at current conditions, we are sure to capture all the residual effects of past human actions and natural events, regardless of which particular action or event contributed those effects. Third, public scoping for this project did not identify any public interest or need for detailed information on individual past actions. Finally, the Council on Environmental Quality issued an interpretive memorandum on June 24, 2005 regarding analysis of past actions, which states, "agencies can conduct an adequate cumulative effects analysis by focusing on the current aggregate effects of past actions without delving into the historical details of individual past actions."

Cumulative effects analyzed here are the sum total of past, present, and reasonably foreseeable future impacts on suitable old forest habitat for the California spotted owl, goshawk and the American marten resulting from the Last Chance Integrated Vegetation Management Project. The cumulative effects spatial boundary encompasses approximately 23,465 acre area that includes four 7th field sub watersheds, of which 7,159 acres on national forest lands are currently suitable old forest habitat. This analysis area was chosen to include the effects of timber harvests, fire and mining on nearby national forest and private lands as well as the expected dispersal distances of the territorial old forests associated with PC001 known to occur in this area. The temporal boundary is 37 years dating from 1972 when reliable documentation of forest disturbance events are recorded to ensure that this analysis captures (1) the effects of timber/vegetation management, mining, and wildland fire on old forest habitat. The estimated timeframe for planted areas to begin providing suitable foraging habitat (CWHR types 4M and 4D) in this analysis area could range from 70 to 100 years because of the poor soil productivity.

Past disturbance records date back to 1972 within the 23,465 acre analysis area. On Forest Service lands the disturbance events include but are not limited to; timber harvesting consisting of overstory removal, clearcutting, thinning, sanitation, salvage, wild fire, and hydraulic mining.

At present, there is an on-going hazardous fuel reduction project south of the Last Chance project area, known as the Spruce Hazardous Fuel Reduction Project. It encompasses 630 acres along Mosquito Ridge Road and around the Greek Store site. There are 120 acres of suitable old forest habitat withn the Spruce Hazardous Fuel Reduction Project. Approximately 60 acres of the suitable habitat has been treated and still remain suitable. The Spruce project was 50%

completed prior to 2009, but there is an estimated 315 acres left to treat which includes 60 acres of suitable old forest habitat. Another project in this analysis area is the Cross Roads Hazardous Tree Removal. The Cross Roads Project proposes to remove roadside hazard trees for a total of 233 acres along portions of Mosquito Ridge Road and along portions of the 43 Road. There is no suitable old forest habitat in the Cross Roads Project. The Peavine Plantation Mastication Project masticated 257 acres of 10 to 20 year old plantations in 2008 and 2009. There is no suitable old forest habitat in the Peavine Plantation Mastication Project. It is estimated that it may take 60 to 75 years for these 257 acres to develop into suitable old forest CWHR habitat 4M and 4D because of low site productivity. Pine Nut Vegetation management Project is proposed for 2013 and would thin conifers by ground based systems, aerial cable systems, underburning and mastication.

Future foreseeable projects include the Pine Nut Vegetation Management Project within the 23,465 acre analysis area. The Pine Nut Vegetation management Project is proposed for 2013 and would thin conifers by ground based systems, aerial cable systems, underburning and mastication. The Pine Nut Project would have an estimated analysis area of 7,680 acres, treat 1,300 acres that would produce 8 million board feet.

There are 1,480 acres of private land within the 23,465 acre analysis area. It is estimated that there are currently 284 suitable old forest acres on private lands. Activities on private lands are regulated by the state and are outside of the jurisdiction of the Forest Service. There is one filed Timber Harvest Plan (THP) on private lands within the analysis area. Siller Brothers Industries filed a Timber Harvest Plan in 2008 on the 100 acres they own within the analysis area, of which 33 of these acres are suitable old forest habitat. The 100 acres owned by Siller Brothers have been treated 2 times since 1990 and it is likely that on this third entry the 33 acres of suitable habitat will be reduced in quality. Lone Star Forest Industries own 740 acres and 640 acres are own by various individuals not associated with the timber industry. Lone Star has made it known that they do not intend to file a THP in the forseeable future as is the case with the individual land owners.

There are currently 7,159 acres of suitable old forest habitat (CWHR types 4M, 4D, 5M, 5D, and 6) in the 23,465 acre analysis area. Since 1972 its estimated that on National Forest lands 2,286 acres of suitable old forest habitat was treated through vegetation management practices and its habitat quality reduced to unsuitable. On private lands within the analysis area it is estimated that 970 acres of suitable old forest habitat was treated through vegetation management practices and its habitat quality reduced to unsuitable. It is estimated that on National forest lands fire rendered 453 acres unsuitable and on private lands fire rendered 75 acres unsuitable. This was a direct loss of habitat. Hazard tree removal in Cross Roads Projects would not remove suitable habitat because this type of treatment would not remove sufficient trees to alter stand-level canopy cover and large tree size. The vegetation treatment methods prescribed for the Last Chance Project would treat 629 acres under Alternative 1, and treat 122 acres under Alternative 3 of suitable owl habitat. Because of the project design and silvicultrual prescription, these acres would not render be unsuitable habitat since this type of treatment would not remove sufficient trees to alter stand-level canopy cover and large tree size. This same vegetation treatment prescription was implemented for the Spruce Fuels Reduction Project where 120 acres of suitable old forest habitat will be entered and treated but because of the project design, would not

render these acres unsuitable habitat. In addition, within the analysis area there are currently 1,440 acres of 10 to 25 year old plantations that are expected to grow into suitable old forest habitat in an estimated 60 to 75 years. In the future this would add additional suitable old forest habitat.

The short-term loss of suitable old forest habitat has already occurred through past timber/vegetation management specifically regeneration cutting and harvest on private lands. This short-term loss is expected to be regained in the long term as plantations and shelterwood, seedtree and over-story removal areas mature into suitable foraging habitat. Approximately 7,159 acres of existing suitable old forest habitat on national forest lands within the cumulative effects analysis area would not be affected by any vegetation projects because of the silvicultral prescription and project design. It is anticipated that 33 acres of suitable old forest habitat on private will be rendered unsuitable. As the combination of masticated plantations, shelterwood, seedtree and over-story removal areas mature into suitable foraging habitat there would be a cumulative net increase of 2,286 acres of suitable old forest habitat in the long term. Therefore, implementation of the proposed action would not result in adverse cumulative effects on old forest habitat.

iii) Cumulative effects to forest vegetation.

Cumulative Effects of Alternative 1 – The cumulative effects analysis for vegetation includes a land area encompassing the project boundary. The area of cumulative effects was bounded in this manner because unlike wildlife, vegetation is stationary. There are approximately 2,000 acres within the project area.

Thinning: Thinning and understory treatments would reduce both ladder and crown fuels in all thinning units, and increase crown base height in units that would be underburned or cut/pile/ burned. Treatments would also address the immediate fuels hazard in these stands. Increased sunlight and decreased vegetation competition for water and soil nutrients would help these trees to become healthier and more vigorous, and thus persist longer than without this treatment.

Tree health and vigor would improve by thinning. This would also increase resistance to insects and diseases, improve growth, lessen density related mortality, and where appropriate, promote a more diverse stand structure.

Canopy Cover: In open stands or stands that are at or near 40 percent canopy cover, canopy would maintain at least 40 percent. Canopy cover would meet or exceed 50 percent canopy cover in stands designated as old forest vegetation type (4M, 4D, 5M, 5D, and 6).

Past, Present and Foreseeable Future Projects: In order to understand the contribution of past actions to the cumulative effects of the proposed action and alternatives, this analysis relies on current environmental conditions as a proxy for the impacts of past actions. This is because existing conditions reflect the aggregate impact of all prior human actions and natural events that have affected the environment and might contribute to cumulative effects. Portions of this 2,000 acre area were previously analyzed under the Cavanaugh Multi-Resource Management Project, Environmental Impact Statement, 1996. Under the Cavanaugh EIS, two timber sales were

awarded, but only one had timber harvest activities occur. There are currently no private land ownership related timber harvest plans, but we could expect adjacent landowners to conduct harvest activities within 5 to 20 years. Future actions on lands managed by the Tahoe National Forest could include more commercial thinning to the south and east of the project area.

There are no known irreversible or irretrievable effects to vegetation if this project is implemented.

Cumulative Effects of Alternative 2 – The cumulative effects of Alternative 2 would be that current trends would continue. Thinning, cut/pile/burn, and underburning would not reduce the risk of extreme fire behavior within and adjacent to the Wildland Urban Intermix, nor would stand health improve in overcrowded stands in the near future. In the absence of disturbance such as wildfire, black oak would continue to decline because of lack of sunlight. Structural diversity would slowly improve as large trees die and create gaps for regeneration. Because of the limited amount of light reaching the forest floor, most regeneration would be shade tolerant species such as white fir and incense-cedar. Both of these species are less able to tolerate drought or fire than the less shade tolerant pine or Douglas-fir. Tree mortality in overcrowded natural stands would lead to increased surface fuel loadings over time, as stand densities continue to increase over time.

Canopy Cover: While canopy cover would increase in some areas and decrease in others, generally there would be a slight decrease in canopy cover over time in the absence of wildfire or other widespread natural disturbance.

Past, Present and Foreseeable Future Projects*:* Same as Alternative 1.

There are no known irreversible or irretrievable effects to vegetation if this project is implemented.

Cumulative Effects of Alternative 3 – Thinning would be realized on 198 acres, rather than 1,728 acres. The reduction in inter-tree competition, improved growing conditions, and the overall resistance to environmental stress would improve on 198 acres, or less than 11 percent of the area. Mortality levels would not decrease on 1,530 acres.

Forest health would decline on 1,530 acres, resulting in tree mortality from density induced insect activity. Trees would continue to die, creating more surface fuels, adding to potential fire spread. Black oak would be removed from the ecosystem due to crown competition of conifers. Structural diversity would slowly continue as large trees die and create gaps for regeneration.

Desired condition to connect the treatments would not be achieved nor create a spatial pattern designed to slow fire spread and reduce fire intensity, because fewer acres would be treated and the treatment areas are scattered. The need for action to reduce the potential effects of a wildfire would not be met.

Past, Present and Foreseeable Future Projects: Same as Alternative 1.

There are no known irreversible or irretrievable effects to vegetation if this project is implemented.

iv) Cumulative effects to Wildland Fuels and Fire Behavior:

Cumulative Effects of Alternative 1 - The combined effects of thinning, ladder fuels removal, surface fuels treatment and prescribed burning have the greatest potential to positively change future wildfire behavior. Modifying forest structure and treating surface fuels create fire resilient forests (Pollet and Omi, 2002; Graham et al., 2004) and restore the ecological characteristics associated with high frequency, low to moderate severity fire regimes (Kilgore, 1973; Martin, 1991). This alternative supports the SNAMP objectives of research and adaptive management.

Cumulative Effects of Alternative 2 - Fire resiliency in the area would not change from current conditions. Surface and ladder fuels would continue to build, increasing the future probability of dangerous, destructive wildfires. The Tahoe National Forest Fire Management Plan (TNF FMP) requires "All wildfires will be fully controlled using the appropriate suppression action(s)." High costs of wild fire suppression emergency rehabilitation and restoration would continue to rise. There is a cumulative impact from the loss of and/or damage to natural resources associated with large fires and suppression actions. The SNAMP objectives of research and adaptive management would not be met.

Cumulative Effects of Alternative 3 - The effects of prescribed burning have potential to positively change future wildfire behavior in and near the treatment areas. Reducing ladder and surface fuels increase fire resiliency and restores ecological characteristic associated with high frequency, low to moderate severity fire regimes. While this alternative supports the SNAMP objectives of research and adaptive management, it does not fully meet fuels treatment objectives.

v) Cumulative effects to Air Quality:

Cumulative Effects of Alternative 1 - There is a cumulative increase in emissions associated with this project and others on the Tahoe National Forest and private lands within the PCAPCD. This is mitigated by using the following Best Available Control Measures (BACMs)

1. Mechanized equipment will meet established emission standards.
2. Airborne dust will be reduced or eliminated through roads maintenance standards.
3. Burning will be conducted under optimum meteorological conditions and coordinated with the PCAPCD.

Cumulative Effects of Alternative 2 - Cumulative emissions associated with this project would not occur. Potential for air quality degradation from future wildfires would not change.

Cumulative Effects of Alternative 3 - The effects are the same, to a lesser degree as the Proposed Action.

vi) Cumulative effects to System Roads:

Approximately 45 miles of thirty-four National Forest System roads in the project area would be used and maintained in Alternative 1, and eight roads totaling 12.6 miles would be used and maintained in Alternative 3. The maintenance is designed to reduce the risks and potential negative effects these roads may have on water quality, hydrologic conditions, and to address user safety. The maintenance has no effect on the areas currently accessed nor does it change the character of the road system. One road, about 1.6 miles long, would be reconstructed to repair the surface drainage features and repair the erosion damage to the road surface. The maintenance and repairs of the roads, before, during, and after haul, not only help reduce the negative effects on the environment but also helps extend the serviceable life of the roads.

26 National Forest System roads totaling over 7.9 miles would be decommissioned and removed from the system inventory. All 26 are currently Maintenance Level One roads that are closed roads: roads in long term storage. No vehicle traffic is occurring on any of these roads. All of these roads have been managed as closed roads since the last time they were used for timber haul. No long term vegetation management need has been identified. Decommissioning these 26 roads would have no effect on current public vehicle access or use. None of these roads have been identified as possible OHV route additions to the Forest Travel Management Plan now underway. Decommissioning these roads may affect the opportunity to consider them for future designated routes as additions to the OHV trail system. All 26 are short, dead end spur roads averaging about a quarter mile long. The roads open to the public for motorized traffic remain the same for Alternatives 1, 2, and 3.

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 historical resources.

Project implementation would have no impact on districts, sites, highways, structures, or significant scientific resources. A record search, field survey, resource inventory, and Heritage Resource Inventory Report TNF02147/ R2007051700040 has been completed for this project, under provisions of the Programmatic Agreement with the Advisory Council on Historic Preservation and the California State Historic Preservation Office (SHPO), in compliance with Section 106 of the Historic Preservation Act. Assessment of historical and cultural resources within the project area indicates implementation of this project would not affect any heritage resource eligible for listing on the National Register of Historic Places, nor would it cause loss or destruction of any significant cultural or historical resources. Known prehistoric or historic sites would be protected through project design or flag and avoidance during project implementation. If any new heritage resources are discovered during project implementation, operations would cease in the area of new discovery until adequate protection measures were agreed upon with SHPO.

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.

No federally listed species or critical habitat exists within the project area.

10. Whether the action threatens a violation of Federal, State, or local law or other requirements imposed for the protection of the environment.

Alternatives 1 or 3 would not threaten a violation of Federal law or requirement imposed for the protection of the environment. All alternatives are fully consistent with the Endangered Species Act (see No. 9 above). This EA is also in full compliance with the National Environmental Policy Act of 1969, the BLM Federal Land Policy and Management Act of 1976, the BLM Sierra Management Framework Plan as amended 1988, and the California Public Resources Code (Section 5019). Alternatives 1 and 3 are fully consistent with the Supplemental Sierra Nevada Forest Plan Amendment Record of Decision (2004), and with the Tahoe LMP as amended by the Sierra Nevada Forest Plan Amendment Record of Decision (2001); both are consistent with the National Forest Management Act (NFMA) of 1976. NFMA requires all projects to be consistent with the following elements: (a) resource protection; (b) vegetation manipulation; (c) silvicultural practices; (d) even-aged management; (e) riparian areas; (f) soil and water; and (g) diversity.

(a) Resource Protection **–** The integrated design of the action alternatives, including the Standard Management Requirements listed elsewhere in this document, the attached appendices, or in the project file, provide for protection of forest resources, including riparian resources, terrestrial wildlife, aquatic and plant species and their habitat, cultural resources, air quality, soil productivity, and recreational and visual quality resources.

(b) Vegetation manipulation **–** The proposed thinning will enhance wildlife habitat and reduce stand density to a level that will improve the long-term health of the stands, and, in combination with the reduction of ground fuels, will reduce wildfire hazard and reduce potential loss of forest habitat from catastrophic wildfire.

(c) Silvicultural practices **–** No timber harvesting would occur on lands classified as not suited for timber production. Standard management requirements related to the use of mechanical harvesting equipment in thinning units are designed to protect soil productivity, riparian resources and water quality, fish and wildlife, recreation, and aesthetic resources.

(d) Even-aged management **–** No group selection harvest or other forms of even-aged management are proposed by any of the alternatives.

(e) Riparian areas **–** Sierra Nevada Forest Plan Amendment (SNFPA) guidelines would be applied to the treatment of Riparian Habitat Conservation Areas (RCAs) as appropriate to protect riparian resources. All the proposed treatments in RCAs are designed to minimize disturbance of riparian vegetation, soils, and other aquatic habitat elements. A riparian conservation objective (RCO) analysis and guidelines (Appendix C) has been developed for this project, consistent with

SNFPA ROD standard and guideline 92 (SNFPA ROD, page 62).

(f) Soil and water – Working cooperatively with the California State Water Quality Control Board, the Forest Service developed pollution control measures, referred to as Best Management Practices (BMPs), that are applicable to National Forest System lands. The BMPs were evaluated by State Water Quality Control personnel as they were applied on site during management activities. After assessment of the monitoring data and completion of public workshops and hearings, the Forest Service's BMPs were certified by the State and approved by the Environmental Protection Agency (EPA) as the most effective means to control non-point source pollution.

The land treatment measures incorporated into Forest Service BMPs evolved through research and development measures, and have been monitored and modified over several decades with the expressed purpose of improving the measures and making them more effective. On site evaluations of the control measures by State regulatory agencies found the practices were effective in protecting beneficial uses and were certifiable for Forest Service application as their means to protect water quality. The Clean Water Act provided the initial test of effectiveness of the Forest Service non-point pollution control measures by requiring evaluation of the practices by regulatory agencies (State Board and EPA) and the certification and approval of the practices as the "BEST" measures for control.

BMPs are designed to accommodate site-specific conditions. They are tailor-made to account for the complexity and physical and biological variability of the natural environment. In the 1981 Management Agency Agreement between the State Water Resources Control Board and the Forest Service the State agreed that: "The practices and procedures set forth in the Forest Service document constitute sound water quality management and, as such, are the best management practices to be implemented for water quality protection and improvement on NFS lands." Further the Water Quality Control Plan for the Central Valley Regional Water Quality Control Board states "Implementation of the BMPs, in conjunction with monitoring and performance review requirements approved by the State and Regional Boards, is the primary method of meeting the Basin Plan's water quality objectives for the activities to which the BMPs apply."

The Regional Water Quality Control Board, Central Valley Region (CVRWQCB), on 28 April 2005, adopted Resolution No. R5-2005-0052 (Resolution) which provides for a conditional waiver of the requirement to file a report of waste discharge and obtain waste discharge requirements for timber harvest activities on U.S. Forest Service (USFS) lands within the Central Valley Region. The eligibility criteria for obtaining a conditional waiver are listed below.

To be eligible for coverage under this waiver category, the project has met the definition of timber harvest activities, and will comply with all of the applicable eligibility criteria and conditions.

Eligibility Criteria:

1. USFS has conducted a multi-disciplinary review of the timber harvest proposal, including review by watershed specialists, and has specified best management practices (BMPs), and additional control measures as needed, in order to assure compliance with applicable water quality control plans.

2. USFS has conducted a cumulative watershed effects (CWE) analysis and included specific measures needed to reduce the potential for CWEs in order to assure compliance with applicable water quality control plans.

3. USFS has allowed the public and other interested parties reasonable opportunity to comment on and/or challenge individual timber harvest proposals.

This project has complied with all the "Eligibility Criteria" and "General Conditions" specified in the Regional Board's Waiver.

(g) Diversity – Many of the standard management requirements and/or BMPs are designed to protect soil and water resources and therefore plant and animal habitats. These standard management requirements also contribute to the diversity of the project area by maintaining or enhancing these habitats. In addition, standard management requirements include measures to protect riparian vegetation, snags, down woody debris, unique and sensitive plants and fungi, threatened, sensitive and management indicator species and their habitats. Proposed thinning and ground fuel reduction treatments would improve forest health and contribute to reductions in predicted wild fire intensity. Reductions in fuel and increased tree growth as a result of thinning are expected to provide a more diverse landscape in the long-term and therefore improve the long-term sustainability of forest habitat diversity. None of the action alternatives will change any vegetation seral stages to a degree that would lead to a trend toward listing for any Forest Service Sensitive species or that would alter existing forest-wide trends of Management Indicator Species. (A seral stage map is available upon request from the project file). Implementing the Standard and Guidelines and Management Requirements for this project protects Forest Service Region 5 Sensitive species, Tahoe National Forest Management Indicator Species, and Watchlist Plants, and they limit the spread of noxious weeds and invasive species. All of these protect diversity within the project area.

Heritage Resources:

Section 106 of the National Historic Preservation Act of 1966 requires that: The head of any such Federal agency shall afford the Advisory Council on Historic Preservation established under Title II of this Act a reasonable opportunity to comment with regard to such undertaking. Placement of the Last Chance SNAMP Project Archaeological Report under provisions of the Programmatic Agreement with the Advisory Council on Historic Preservation and the California State Historic Preservation Office (SHPO) satisfies requirements of Section 106 of the National Historic Preservation Act.

Clean Air Act:

Pile burning and understory burning would not have a significant impact on air quality standards because of adherence to a Smoke Management Plan and a Burn Plan (consistent with the Clean Air Act).

R5 Forest Service Sensitive Species:

Direct, indirect, and cumulative effects to fish, wildlife, and rare plants are discussed in detail in the following project documents: (1) Biological Evaluation for Birds, Mammals, Amphibians, Reptiles, Fish, and Invertebrates, (2) Biological Evaluation for Plants and Fungi. These documents are located in the project file and available upon request from the American River Ranger District office. These effects are summarized in this document in Chapter III.

The Biological Evaluations describe in detail these effects by species. The Biological Evaluation contains the following determination statements from implementing Alternatives 1 and 3:

- No effect to the following sensitive wildlife: Bald eagle, American peregrine falcon, greater sandhill crane, Pacific fisher, Sierra Nevada red fox, California wolverine, pallid bat, Townsend's big-eared bat, western red bat, northwestern pond turtle, mountain yellow-legged frog, foothill yellow-legged frog, northern leopard frog, Great Basin ramshorn snail, Lahontan Lake tui chub, and hardhead.

- No effect to the following sensitive plants: (See list under Item 1, beneficial and adverse affects, above.)

- May affect, but is not likely to result in a trend toward federal listing or loss of viability for the following sensitive wildlife: California spotted owl, northern goshawk, American marten.

Weed Risk Assessment

A weed risk assessment has determined that there is a low risk for the introduction of new California State listed noxious weeds, but there is potential for an increased rate of weed spread as a result of implementing the action alternatives. Implementation of Alternatives 1 and 3 would reduce the amount of future ground cover, disturb soils/litter/duff soil cover, and result in conditions favorable for the establishment of noxious weeds in those areas. The current locations and distributions of weeds in the project area are unknown; therefore management requirements have been designed to reduce the probability for the spread of noxious weed species during project implementation.

Management Indicator Species

A Management Indicator Species (MIS) Assessment has been completed for this project. This report is incorporated by reference and available from the District office upon request. The species and their habitat that may be affected by this project include the: California spotted owl, American marten, fox sparrow, hairy woodpecker, mule deer, mountain quail, northern flying

squirrel, northern goshawk, and sooty (blue) grouse. This project will not reduce the existing quantity of habitat that is presently available to these species. The MIS analysis concluded that the effects of all action alternatives will not alter existing forest-wide trends of these MIS.

CHAPTER 4

AGENCIES AND PERSONS CONSULTED

California Department of Forestry and Fire Protection
University of Minnesota
University of California Cooperative Extension
Sierra Nevada Research Institute
University of California Center for Forestry
University of California Merced
Sierra Club
Placer County
State of California Resources Agency
Fish and Wildlife Service
Placer County Water Agency
Sierra Pacific Industries
Placer County Fire Safe Council
Marty Hartzell, Central Valley Water Quality Control Board
Western States Endurance Run Foundation
Western States Trail Foundation
Ms. Levina Suehead, Colfax-Todd Valley Consolidated Tribe
Ms. Brigette Zellner, Todd Valley Miwok-Maidu Cultural
Ms. Jessica Tavares, United Auburn Indian Community of the Auburn Rancheria
Lynda Shoshone, Washoe Tribe of Nevada and California
Jim Linsdau, Foresthill resident
Neil Cochran, Foresthill resident
Lawrence Jordan, Foresthill resident
Matthew McCafferty, Foresthill resident
George McCafferty, Foresthill resident
John Nemeth, Foresthill resident
Brian Narron, Colfax resident
Bill Pieper, Tevis Cup
Tom Christofk, Tevis Cup
Gil Yadon, Foresthill resident
Richard Rypinski, Sacramento resident
Chad Hanson, John Muir Project
Sue Britting, Sierra Forest Legacy
Steve Benner, Forest Issues Group
Russell Towle, Dutch Flat resident
Jerry Bloom, Nevada City resident
Chris Colson, California for Alternative to Toxics
Ed Pondofino, Carmichael resident
Joseph Griggs, Robinson Enterprises Inc.
George Terhune, interested member of the public
Linda Blum, Quincy Library Group

ADDITIONAL COMMENTS

Documents Incorporated by Reference, and/or Available Upon Request, or Attached as Appendices.

Project Maps (*Appendix A*)
Public Scoping Comments Summary (*Appendix B*)
Best Management Practices/Watershed Data (*Appendix C)*
Cumulative Watershed Effects Analysis *(in Appendix C)*
Riparian Conservation Area Guidelines *(in Appendix C)*
Riparian Conservation Objectives Analysis *(in Appendix C)*
Heritage Resources Report *(Administratively confidential)*
Fuels Specialist Report *(in Project File)*
Soils Specialist Report *(in Project File)*
Management Indicator Species (MIS) Assessment *(in Project File)*
Plant and Animal Biological Evaluations *(in Project File)*
Watchlist Plant Report *(in Project File)*
References/Citations *(in Project File)*
Silviculturalist Report *(in Project File)*
Weed Risk Assessment *(in Project File)*
Evaluation of Human and Ecological Risk for Borax Stump Treatments *(in Project File)*
Tahoe National Forest Sensitive Plant Standards and Guidelines *(Incorporated by Reference)*

REFERENCES CITED

Attainment Standards. http://www.epa.gov/.

Bahro, B., K. H. Barber, J. W. Sherlock, and D. Yasuda. 2007. Stewardship and Fireshed Assessment: a Process for Designing a Landscape Fuel Treatment Strategy. USDA. Forest Service General Technical Report. PSW-GTR-203: 41-54.

Bolsinger, C.L. 1988. The Hardwoods of California Timberlands, Woodlands, and Savannas. Resourc. Bull. PNW-RB-148. Portland, OR: USDA, Forest Service, Pacific Northwest Station. 148 p.

California Regional Water Quality Control Board.1998. Basin Plan for the Central Valley

Cluck, D. and Bill Woodruff. 2008. Evaluation of Stand Conditions in the Last Chance Sierra Nevada Adaptive Management Project (SNAMP) (FHP Report NE08-02). USDA Forest Service, Forest Health Protection. Pacific Southwest Region.

Daniel, T. W., J. A. Helms, and F.S. Baker. 1979. Principles of Silviculture. Second Edition. McGraw-Hill, New York. ISBN 0-07-015297-7 521 p.

Davis: University of California, Centers for Water and Wildland Resources. 1996. Sierra Nevada Ecosystem Project, Final Report to Congress.

Finney, M.A. 1999. Design of Regular Landscape Fuels Treatment Patterns for Modifying Fire Growth and Behavior. *Forestry Science*, 47(2):219-228.

Garrison, B.A., M. D. Parisi, K. W. Hunting, T. A. Giles, J. T. McNerny, R. G. Burg, K. J. Sernka, and S. L. Hooper. 2002. Training Manual for California Wildlife Habitat Relationships System CWHR database version 8.0. Ninth edition. California Wildlife Habitat Relationships Program, California Department of Fish and Game. Sacramento, California.

Graham, R.T., McCaffrey S, Jain TB. 2004. Science basis for changing forest structure to modify wildfire behavior and severity. Fort Collins, CO: U.S. Department of Agriculture, Forest Service, Rocky Mountain Research Station.

Griffin, J.R. and W.B. Critchfield. 1972. The distribution of forest trees in California. Research Paper PSW-82. Berkeley, CA: USDA, Forest Service, Pacific Southwest Forest and Range Experiment Station.

Kilgore, B.M. 1973. The ecological role of fire in Sierran conifer forests: its application to national park management. Quaternary Research 3: 496-513.

Martin, R. 1991. Vegetation and fuels management in the Upper Campus. (Personal communication at "Symposium on the Oakland-Berkeley Hills Fire of October 20, 1991",

University of California, Berkeley, November 4, 1991).

Mayer, K. E. and W. F. Laudenslayer. 1988. A Guide to Wildlife Habitats of California. Calif. Dep. For. Fire Prot., Sacramento. 166pp.

McDonald, P. M. 1990. *Quercus kelloggii* Newb., California black oak. Pgs. 661-671 in R. M. Burns and B. H. Honkala, tech. coords., Silvics of North America, Vol. 2, Hardwoods. USDA, For. Serv., Washington, DC. Agric. Handbook 654. 877 pp.

McDonald,P. M.; Tappeiner, J. C. 1996. Silviculture Ecology of Forest Zone Harwoods in the Sierra Nevada. Sierra Nevada Ecosystem Project. Davis: University of California, Centers for Water and Wild land Resources.

National Historic Preservation Act of 1966 (NHPA; Public Law 89-665 as amended; 16 U.S.C. 470 *et seq.*)

Oliver, William W. 1997. Maximum Stand Densities for Ponderosa Pine and Red and White Fir in Northern California. 18th Forest Vegetation Management Conference.

Oliver, W.W. 1995. Is Self-Thinning In Ponderosa Pine Ruled By *Dendroctonus* Bark Beetles? *In* Gen. Tech. Rep. RM-GTR-267.

Ozone: ***http://www.epa.gov/ozone/***

Pollet J, Omi P.N. 2002 Effect of thinning and prescribed burning on crown fire severity in ponderosa pine forests. *International Journal ofWildland Fire* 11, 1–10. doi:10.1071/WF01045

Reineke, L.H. 1933. Perfecting a stand-density index for even aged forests. Journal of Agricultural Research 46:627-638.

Rothermel, R.C. 1983. How to predict the spread and intensity of forest and range fires. USDA Forest Service Intermountain Research Station. Ogden, UT.

Sugihara, N. G. *et al.* 2006. Fire in California's Ecosystems. University of California Press, Berkeley, CA.

USDA Forest Service. Tahoe National Forest. 1990. *Tahoe National Forest Land and Resource Management Plan.* Nevada City, CA.

USDA Forest Service. 2000. USDA Best Management Practices.

USDA Forest Service Pacific Southwest Region. 2004. Sierra Nevada Forest Plan Amendment Final Environmental Impact Statement Record of Decision. Vallejo, CA.

USDA Forest Service. Pacific Southwest Region. 2007. Sierra Nevada National Forests

Management Indicator Species Amendment Record of Decision. Vallejo, CA.

USDA Forest Service. 2008. Sierra Nevada Forests Bioregional Management Indicator Species (MIS) Report: Life history and analysis of Management Indicator Species of the 10 Sierra Nevada National Forests: Eldorado, Inyo, Lassen, Modoc, Plumas, Sequoia, Sierra, Stanislaus, and Tahoe National Forests and the Lake Tahoe Basin Management Unit. Pacific Southwest Region, Vallejo, CA. January 2008.

Verner, J., K.S. McKelvey, B.R. Noon, R.J. Gutierrez, G.I. Gould, Jr. and T.W. Beck, Technical Coordinators. 1992. The California spotted owl: a technical assessment of its current status. Gen. Tech. Rep. PSW-GTR-133. Albany, CA: Pacific Southwest Research Station, Forest Service, U.S. Department of Agriculture; 285pp.