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Proposed Action

South Shore Fuels Reduction and Healthy Forest Restoration Project

South Shore from Heavenly Valley

Proposed Action for South Shore Fuel Reduction and Healthy Forest Restoration Project:

A Healthy Forest Restoration Act Project

Introduction

The Healthy Forest Restoration Act of 2003 (HFRA) authorizes fuel reduction projects on federal lands and provides a foundation to work collaboratively with at-risk communities to reduce wildfire hazards caused by fuel loads within the WUI that are above desired conditions defined by the Forest Plan. The Act requires federal agencies to consider recommendations made by at-risk communities that have developed community wildfire protection plans. The community of South Lake Tahoe is listed in the Federal Register as a community at-risk. The South Lake Tahoe fire Department, Lake Valley Fire Protection District, Tahoe Douglas Fire Protection District, and Fallen Leaf Fire Department have developed Community Wildfire Protection Plans (CWPPs).

Coordination and collaboration with Community Wildfire Protection Plans (CWPPs) are an important part of the HFRA analysis for this project. As stated above - Lake Valley, Douglas, and South Lake Tahoe - have CWPPs within the South Shore area. The Community Fire Safe Council worked with corresponding Fire District personnel to design these CWPPs for effective defensible space across all land ownerships, including National Forest System lands. The USDA Forest Service Lake Tahoe Basin Management Unit (LTBMU) collaborates with the Fire Districts and Fire Safe Councils to design fuel reduction activities that coordinate with the CWPPs and provide the defensible space identified in the CWPPs where it occurs on National Forest System land.

HFRA authorizes environmental analysis under the National Environmental Policy Act (NEPA) to proceed with Action and No Action alternatives if no significant issues are raised during scoping. HFRA also establishes an “Objection” process to resolve differences of opinion before a decision is signed, rather than the standard Appeal process for non-HFRA projects. The environmental analysis leading to either a finding of no significant impact (FONSI) or preparation of an Environmental Impact Statement (EIS) follows standard NEPA process and findings requirements. The purpose of HFRA is to promote collaboration to design an action alternative that resolves issues and reduces both time and expense for preparation of environmental documentation in order to proceed with projects to reduce hazardous fuels and restore forest health in a shorter timeframe and with lower costs to the taxpayer.

The CWPPs for the Lake Tahoe Basin were completed in 2004 in response to public concern over hazardous fuel conditions. These CWPPs prioritize hazardous fuel reduction projects in and adjacent to their communities over a ten-year period. Regulatory agencies in the Basin, including the Tahoe Regional Planning Agency (TRPA), Lahontan Regional Water Quality Control Board (LRWQCB), and California

Department of Forestry and Fire Protection (CDF), have cooperatively modified regulations and ordinances to facilitate hazardous fuel removal projects.

The LTBMU, state, and local agencies have reduced fuel hazards on approximately 13,000 acres from 2000-2006. In 2007, TRPA published their Fuel Reduction and Forest Restoration Plan for the Lake Tahoe Basin Wildland Urban Interface (WUI). This report synthesizes the CWPPs for the seven fire protection districts (FPD) to identify Basin-wide fuel reduction needs and the resources needed to implement a Basin-wide hazardous fuels reduction Plan. The TRPA report states "Although 13,000 acres have been treated in the Lake Tahoe Basin since 2000, increased efforts are needed to protect values at risk and restore forest health."

In addition to the 2007 TRPA report, several other studies identify the need to reduce hazardous fuel loads in the Lake Tahoe Basin. The Lake Tahoe Watershed Assessment (USDA Forest Service, PSW-GTR-175, 2000) found that current tree density is approximately four times that of 150 years ago and that there has been a pronounced shift away from pine and towards fir in younger trees. The proportion of less fire-resistant white fire and incense cedar has doubled over the past 200 years, while the component of more fire-resistant Jeffrey pine has declined by half. Watershed Assessment findings were that there have been few fires in the 20th century mostly due to excellent fire detection and suppression, with response time to human-caused fire is among the shortest in the Sierra Nevada. It was also noted that the Tahoe Basin has one of the highest fire ignition rates in the Sierra Nevada, concentrated around the urban interface. The Watershed Assessment projected that "should a fire escape initial control attempts under extreme wildfire conditions, at least 50 percent of the area in the resulting burn would likely be crown fire, with overstory tree mortality greater than 50 percent…. Even a small wildfire in the basin is potentially a significant event because of the juxtaposition of high ignition potential, high density and value of human developments, and high fuel hazard." The recommendation from this assessment was "A combination of increased fire prevention, education, and strategic fuel hazard reduction will be most effective at reducing the likelihood of damaging fire in the basin."

In 2004, the LTBMU prepared the South Shore Landscape Analysis (USDA Forest Service, 2004), which also identified a need for cost-effective vegetation treatments to reduce hazardous fuel loads, particularly in the WUI. Recommended outcomes are to achieve conditions that (1) reduce the size and severity of wildland fires, and (2) result in stand densities necessary for healthy forests during drought conditions. This landscape analysis warns, "The consequences of doing nothing will result in continued high vegetation densities and species composition that is out of balance…. This would lead to increases in surface, ladder, and crown fuels…with increased potential for insect infestation, disease outbreaks, and uncharacteristically severe wildfires."

The number one public concern in the Lake Tahoe Basin is the threat of catastrophic fire. The cessation of Native American burning practices and over 50 years of fire suppression in the Basin have resulted in dense forests susceptible to fires that would burn severely and result in a high incidence of tree mortality. The combination of large amounts of hazardous fuels and the Tahoe Basin having one of the highest ignition rates in the Sierra Nevada, particularly in urban areas, contributes to the risk of a devastating wildfire. Basin-wide fire modeling to evaluate the likely effects of unplanned fires on urban areas

has shown that the most severe fires, and therefore effects, would occur in lower elevation pine and mixed conifer forests. Crown fires are not easily controlled and could result in loss of private property, significant impacts on natural resources, including lake clarity, and adverse effects to recreational opportunities and tourism.

The goal of fuel reduction and forest health projects, including the South Shore Fuel Reduction and Healthy Forest Restoration Project, would be to reduce fuel hazards and to restore ecosystem health through cost-effective vegetation treatments. The primary management objective in the WUI would be reduction of hazard fuels in order to change fire behavior resulting in lower fire intensity and reduced rates of spread. While it is not possible to eliminate wildfire from the Sierra Nevada ecosystem, effective hazardous fuel reduction in the WUI Defense Zone provides space for fire suppression efforts to reduce the risk to communities from catastrophic wildfire.

Providing healthy wildlife habitat and restoration of a forest structure with increased resistance to drought, disease, and insects are secondary objectives that also reduce the rate of hazardous fuel build-up. Most CWPP projects would require two connected treatments, the first to remove trees and the second to reduce surface fuels.

Land ownership patterns in the Basin present a challenge to project implementation. Ninety-two (92) percent of the projects identified in the CWPPs have multiple ownerships (federal, state, local, and private). Approximately 65 percent have a combination of LTBMU and some other ownership. A successful fuels reduction program will require effective coordination among land management and regulatory agencies.

The South Shore Project Initiation letter established an interdisciplinary team of Forest Service specialists to evaluate opportunities to move from the existing conditions toward the conditions desired both in the Forest Plan as amended and in the communities in the South Shore area. Local Fire Districts (Lake Valley Fire Protection District, Fallen Leaf Fire Department, Tahoe Douglas Fire Protection District, and South Lake Tahoe Fire Department), TRPA, Lahontan Water Quality Control Board, the Washoe Tribe of Nevada and California, and the public provided input both during meetings and in writing to the IDTeam that was incorporated into the project design. The Proposed Action in this document is the product of that interdisciplinary team effort in collaboration with local Fire Districts, the Washoe Tribe of Nevada and California, TRPA, LWQCB, and the public.

A portion of the South Shore Project area is within the Angora Fire area. The fire burned at variable intensities, leaving some of the South Shore proposed units in a condition that requires fuel reduction treatments in order to attain desired conditions. Approximately 1800 acres burned at variable intensities that were identified for treatments by the South Shore project. During the 2007 field season, the Angora fire area will be evaluated to determine the extent of treatments needing to be included in the South Shore project.

Organization of this Proposed Action

A description of the organization of this Proposed Action follows to provide a description of the document to the reader:

- Project Area Description -- a description of the area and the project activities that are proposed.
- Scope of the Project -- gives overall acres and timeframes for the project.
- Need for Action -- details the existing conditions that cause activities to be proposed.
- Purpose – provides overall objectives for the project.
- Project Activity Design -- Information on the objectives and design features by the various resources: For each resource, the specific objectives are provided, followed by a narrative to explain or detail the design features to meet the objectives, and last is a listing of the design features.
    - Fuels and Vegetation
    - Urban Lots
    - Wildlife Habitat
    - Fisheries Habitat
    - Watershed, RCA/SEZ, and Water Quality
    - Soil
    - Sensitive Plant and Noxious Weeds
    - Recreation
    - Visual Quality
    - Transportation
    - Heritage Resources

Project Area Description

The South Shore Fuel Reduction and Healthy Forest Restoration Project known hereafter as South Shore Project extends from Cascade Lake on the northwest to the Heavenly Mountain Resort Special Use Permit boundary and the Nevada State line on the northeast, and from Lake Tahoe on the north to the LTBMU boundary on the south. The analysis area for this project totals 90,311 acres; table 1 lists the acres by ownership in the project analysis area.

Table 1 – Ownership and Forest Plan Land Allocation

Ownership	Acres*	Proposed treatment acres*
Total Project, all ownerships	90,311	
Private Ownership	10,386	0
Water and Other (State, County)	5,136	0
National Forest Ownership	74,789	12,225

Within the National Forest System land available for treatment the project proposes vegetative treatments within the WUI for 12,225 acres, or 38% of the National Forest WUI. All treatment is contained within the WUI, with 83% of treatments proposed in the Defense Zone, 10.5% of treatments proposed in the Threat Zone, and an additional 6.5% of treatments proposed for urban lots in the Urban Core. Within the project boundary, the Wildland Urban Intermix (WUI) includes all ownerships. The WUI contains several sub-classifications. The Urban Core includes areas of urban or suburban development, with the Defense Zone extending approximately ¼ mile from the Urban Core, and the Threat

Zone extending approximately 1¼ miles beyond the Defense Zone. Table 2 provides WUI zones by land ownership:

Table 2 - WUI Ownership

WUI Zone	Total Acres - All Ownerships	National Forest Acres	National Forest Acre Percentage
Total All WUI Zones	47,622	32,195	68%
Urban Core	16,074	1,532	10%
Defense Zone	18,990	18,114	95%
Threat Zone	12,558	12,549	99%

The South Shore project area is made up of a number of management areas that overlap the WUI and with each other, reflecting the complexity of the resource values and concerns within the Lake Tahoe basin. Table 3 provides the acres of treatment that would occur on National Forest ownership by Forest Plan management area within the project.

Table 3 - Forest Plan Land Allocation

National Forest Management Area Descriptions	Analysis Area Acres*	Proposed treatment acres*
USFS Wildland Urban Intermix (WUI)*	32,195	12,225
Defense Zone	18,114	10,145
Threat Zone	12,549	1,287
Urban Core	1,532	793
CA spotted owl protected activity centers (PACs)*	2,400	748
CA spotted owl home range core areas (HRCAs)*	8,000	2,842
Goshawk PACs*	3,505	1,527
Riparian Conservation Areas (RCAs)* (USFS Sierra Nevada Forest Plan Amendment buffers)*	74,789	6,934
Stream Environment Zones, (SEZ) by vegetation within RCAs*	6,850	1,275
Inventoried Roadless Areas*	32,306	644
Wilderness	10,999	0
Grass Lake Research Natural Area	356	0

*Not additive, acres of management areas overlap.

The South Shore analysis area contains 9 California spotted owl Protected Activity Centers (PACs), and 16 northern goshawk PACs. Within 6 of the California spotted owl

PACs and their corresponding home range core areas (HRCAs), fuel build-ups may require treatments to reduce hazards within the WUI to be consistent with Sierra Nevada Forest Plan Amendment (SNFPA)(USDA Forest Service, 2004) direction. Twelve of the northern goshawk PACs contain hazardous fuels that may also require treatments. The SNFPA allows treatments in PACs where needed to insure the overall effectiveness of fuels treatments in the WUI.

Within the South Shore project, there are also 6,934 acres within SNFPA Riparian Conservation Areas containing 1,275 acres of riparian vegetation types that would require added investment to meet Riparian Conservation Objectives and be consistent with regulatory agency memorandum of understanding requirements while reducing fuels.

This project proposes to treat lands adjacent to and within riparian conservation areas (RCAs) and streamside environment zones (SEZs). RCAs are a SNFPA defined buffer for streams, dependent on the stream type (perennial, seasonal, ephemeral) rather than soil or vegetation in the RCA area. SEZs are located within the RCAs and are defined by vegetation and/or soil types. There are fewer acres of SEZs than of RCAs, as is shown in Table 3 above.

Within the project boundary RCAs, there are 883 miles of streams, of which 219 miles provide seasonal and perennial stream habitat for fish. The majority of RCA treatments occur within ephemeral stream environments, however, treatments are also proposed to reduce fuels within seasonal and perennial RCAs. Table 4 shows miles of RCA stream type, and miles of fish habitat, and miles of stream type and fish habitats that would receive treatments:

Table 4 Treatment Stream Types

Stream Type	Total Miles within Analysis Area	Treatment Miles
Ephemeral Streams	652	86
Seasonal Streams	23	1
Perennial Streams	208	22
Fish Habitat	219	23

Desolation Wilderness is a land allocation that would not allow fuel treatments, and accounts for another 10,999 acres within the larger project area. Grass Lake Natural Research Area contains 356 acres also not available for treatment.

The total project area also contains portions of three Inventoried Roadless Areas (Dardanelles, 14,209 acres, with 229 acres of proposed treatment; Freel, 15,327 acres, with 151 acres of proposed treatment; and Pyramid, 3,735 acres, with 264 acres of proposed treatment) for a total of 33,272 acres of Inventoried Roadless Areas (IRA) with 644 acres proposed for treatments without new road construction. Although the 1984 California Wilderness bill released these Roadless Area Review and Evaluation (RARE

II) roadless areas, the 2001 Forest Service Roadless Rule provided direction to protect the roadless character of all areas identified in the RARE II inventory that remained roadless. The 2001 Roadless Rule is the current management direction; and treatments under this project would use only existing roads in any IRA.

The South Shore project area provides a diversity of recreation opportunities to the public, in both private and National Forest settings. The LTBMU has the fourth highest level of recreation visitor use of National Forests in Region 5. When considering land area per forest, the LTBMU has one of the highest densities of visitor recreation per acre in the entire National Forest system. Within the South Shore project area are the community of South Lake Tahoe, historic site attractions, resorts, and developed recreation facilities. Providing high quality recreation facilities and access to recreation opportunities on National Forest lands is an important management activity for the LTBMU. Dispersed recreation, including hiking and walking was identified as the most recorded primary activity on the LTBMU during the 2000-2001 National Visitor Use Monitoring survey. The juxtaposition of high recreation use and high levels of hazardous fuels presents risk from wildfire to both the recreation experience and to the forest resources from recreation uses. Due to the existing high levels of hazardous fuels, there is a greater risk of catastrophic results from fire uses connected to recreation as well as a greater risk of recreation visitor entrapment in case of wildfire.

The scenic resources of the South Shore project area are highly valued by the Forest's visitors and residents. National Visitor Use Monitoring surveys have identified that "viewing of National Forest lands" is the fourth most frequently recorded primary visitor activity on the LTBMU following hiking, skiing, and relaxing. Of these three primary visitor activities, scenic quality plays an intrinsic role in visitors' experiences and helps to define what "Tahoe" means to people. Fuel reduction activities would provide long-term benefits to scenery, both by removing dead vegetation and ladder fuels that currently impede attractive views of Lake Tahoe, aspen stands, meadows, and the forest. Fuel reduction activities would also provide for a reduction in wildfire intensity, leading to increased survival rates for larger trees and more rapid recovery of scenic quality in the event of wildfire.

Scope of the Project

The area available to be considered for treatments is constrained by other ownerships and land allocation objectives. The proposed action would apply only to National Forest System lands within the Lake Tahoe Basin Management Unit in the project area.

While the proposed action would reduce fuel loading in areas of WUI, the fuel hazard would only be reduced up to private land boundaries, and will not eliminate the threat to structures within private lands. To reduce fire hazard within private lands, the private landowners would need to assess fire hazards and treat their lands in tandem with the action proposed in the South Shore project. Private lands account for 10,385 acres of the project analysis area, including the community-at-risk of South Lake Tahoe.

The need for action and purpose for this project were generated from several sources. Two of the primary sources were: 1) community concerns about potential effects of wildfire in the Lake Tahoe Basin, as expressed in CWPPs cited previously in the

Introduction, and 2) the results found in the 2004 South Shore Landscape Analysis comparison of existing conditions with desired conditions from the LTBMU Forest Plan and the SNFPA.

Stewardship Fireshed Assessment (SFA) broad-scale planning in 2006 identified a total of 23,650 acres for the South Shore project area. The SFA identified treatments both within the WUI and strategically placed area treatments (SPLATs) behavior extending beyond the WUI. The SFA also included areas that have existing fuels reduction treatments for long-term fuels treatments and maintenance to provide long-term desired conditions for fuels and fire behavior. The SFA modeling also selected the South Shore treatment areas in the Defense and Threat zones.

The South Shore project proposes treatments in 12,225 acres on a four-year schedule, with initial treatments on approximately 3,000 acres per year within the WUI. Most of the South Shore project acres will require activities extending over a period of three to seven years to attain fuel reduction conditions that would remain within desired condition limits for a period of 15 to 20 years. Consistent with SNFPA direction, the South Shore project made refinements to WUI boundaries based on site-specific topography and other features that provide logical fire line placement during suppression, such as slope breaks, roads, and streams. Fallen Leaf Fire Department, South Lake Tahoe Fire Department, Lake Valley Fire Protection District and Tahoe Douglas Fire Protection District confirmed areas for treatments and identified the Highway 89 corridor as a high priority for fuel reduction to provide an emergency egress route during collaboration for design of the South Shore Project in January of 2007.

The LTBMU and TRPA four-year Aspen Community Mapping and Condition Assessment Project in 2006 identified further needs for the South Shore project. The Aspen Community project assessed the location, size, condition, and risk of loss for aspen stands on National Forest System (NFS) lands within the Lake Tahoe Basin. The assessment project identified and prioritized the need for vegetation treatments to improve stand condition and regeneration of aspen stands. In addition, the Forest conducted wildlife and botany surveys in ten randomly selected aspen stands determined to be at high or highest risk of loss and greater than 2 acres in size. The findings and recommendations developed (USDA Forest Service, GTR 178, 2006) by the Aspen Community Mapping and Condition Assessment Project will assist the Forest in determining appropriate vegetative treatment prescriptions for aspen stands within the analysis area. The results of the wildlife and botany surveys completed in 2002 will provide part of the monitoring program for aspen stands treated.

Need for Action

As identified in the South Shore Landscape Analysis, existing conditions within the project area raise the potential for fire to spread rapidly within the wildland urban intermix (WUI), communities, infrastructure, and other natural resources. Without treatment, hazardous fuels will increase annually, adding to an already high risk for catastrophic wildfire.

There is a need for action in the following existing conditions in order to meet Forest Plan desired conditions:

- Stand densities with closely spaced vertical fuels that do not meet Sierra Nevada Forest Plan Amendment (SNFPA, 2004) desired conditions of stands that "are fairly open and dominated primarily by larger, fire tolerant trees."
- Large quantities and high continuity of surface fuels (greater than 15 tons per acre)
- Low crown base heights (less than 12 feet).
- Lack of diversity in species, size, and age class ranges – a result of logging activities during the gold rush and Comstock Lode eras and fire suppression.
- Riparian conservation areas (RCAs) and stream environment zones (SEZs) have fuel loads that exceed SNFPA desired conditions of up to 3 snags per acre and 10 tons per acre of downed woody debris.
- Lodgepole pine and other conifer species have encroached on meadows and aspen stands

There is a need to remove hazardous fuels and thin dense stands to reduce the potential for catastrophic wildfire that could result in the potential for loss of human life and property, and produce degraded environmental conditions..

- There is a need to provide defense zones with fuel treatments that will reduce wildland fire spread and intensity sufficiently for suppression forces to succeed in protecting human life and property.
- There is a need to thin forest stands with densities generally between 160 and 350 ft^2 basal area per acre and fuel loads in excess of 15 tons per acre. The high levels of live and dead fuel accumulations are a major contributor to the increased risk of high severity catastrophic wildfires.
- There is a need to reduce stand density consistent with SNFPA (2004) requirements to change fire behavior and reduce the likelihood of active crown fire.
- There is a need to increase crown base height (above 12 ft).
- There is a need to reduce the continuity of surface fuels, and reduce the quantity of surface fuels below 15 tons per acre.
- There is a need to reduce hazardous fuels in order to lessen the risk of adverse effects to air quality from wildfire.
- There is a need to reduce hazardous fuels while meeting habitat condition requirements for sensitive species, as well as native and desired non-native plants and animals consistent with the Forest Plan as amended by SNFPA (2004) and TRPA regulations.
- There is a need to reduce risk for degradation of scenic resources from wildfire, and stabilize scenic resources over the long-term by increasing the stability of vegetative conditions to SNFPA (2004) desired conditions of stands that "are fairly open and dominated primarily by larger, fire tolerant trees."

There is a need to reduce stand densities to improve forest health and reduce insect and disease related tree mortality that coincides with competition-related stress.

- There is a need to increase spacing between trees to reduce competition for light, water, and soil nutrients in order to reduce mortality and increase resistance to drought, insects, and disease. Overly dense forest stands often suffer stress from

drought and competition for nutrients, which subjects them to widespread forest dieback from insects and diseases.

- There is a need to improve forest health by encouraging the development of a diversity in tree species, size, and age class ranges by thinning ladder fuels to favor larger, more fire-resistant tree species to become dominant as described in the SNFPA (2004).
- Reduction of stand densities also reduces the risk of high severity wildfires resulting from high tree mortality.

There is a need to thin and remove hazardous fuels within environmentally sensitive SEZs to allow riparian species to dominate this vegetation type, which would reduce the potential for catastrophic wildfire in riparian areas.

- Treatment is needed where fuel loads exceed the SNFPA (2004) desired conditions of up to 3-6 snags per acre and 10 tons of downed woody debris.
- There is a need to meet desired conditions for wildland fire behavior, rates of spread, and flame height while retaining large woody debris to provide fish habitat.
- There is a need to remove standing dead trees in excess of large woody debris recruitment needs.

There is a need to remove lodgepole pine and other conifer species that have encroached on meadows and aspen stands.

- There is a need to remove conifer encroachment from meadows in order to promote maintenance of meadows and aspen stands within the project area consistent with the TRPA and Pacific Southwest Research Station "Aspen Community Mapping and Condition Assessment Report" (USDA Forest Service, PSW-GTR-185)
- Removal of conifer encroachment is needed to provide important wildlife habitat for species that are dependent on meadow and/or aspen.
- Removal of conifer encroachment is needed to provide diverse scenic features valued by the public.

Implementation of the proposed hazardous fuel reduction treatments would generate the following needs for action in the project area:

- There is a need to prevent post-treatment establishment of user-created routes.
- There is a need to restrict recreation opportunities consistent with public safety during activities.

Purpose

The purpose of the South Shore Project is to implement vegetative treatments that would modify dense vegetation conditions on National Forest System lands, including Forest Service owned urban parcels containing Stream Environment Zones (SEZs) or parcels in excess of 5 contiguous acres in size.

The purpose of the project is to design treatments that will help restore a healthy, diverse, fire-resilient forest structure by reducing stand densities and fuel loads. The desired vegetative and fuels conditions would include stand densities that are within a range of 100-150 square feet basal area per acre. The project would retain tree species that are the most drought tolerant, and more resistant to insects, diseases, and air pollution. Treatments would also retain tree species that have higher rates of survival after wildfire. Desired surface and ladder fuels would be less than 15 tons per acre so that the probability of crown fire ignition is reduced. The openness and discontinuity of crown fuels both horizontally and vertically would result in very low probability of sustained crown fire.

Project purposes also include resource outcomes within fuels treatment areas or adjacent Forest lands consistent with the need to meet Forest Plan objectives listed below:

- Provide large woody debris sufficient for fish habitat while meeting desired conditions for wildland fire behavior, rates of spread, and flame height.
- Reduce encroaching conifers in aspen stands to reduce conifer competition and restore aspen dominance.
- Reduce encroaching conifers in meadows to restore meadow riparian species dominance.
- Reduce wildfire hazards to enhance habitat conditions to sustain sensitive species as well as native and desired nonnative (rainbow trout, for example) species of plants and animals.
- Restrict recreation opportunities consistent with public safety during treatment activities.
- Prevent post-treatment establishment of user-created routes.
- Reduce risk for degradation of scenic resources from wildfire, and stabilize scenic resources over the long-term through vegetative treatments that increase forest health and reduce mortality. Visual quality design to provide scenic integrity and stability are included as design features of the project activities.

Project Activity Design

The South Shore project features an integrated design to benefit a variety of resources while reducing fuel loading to move the project area towards meeting the desired conditions for the wildland urban intermix. The following section provides information on the objectives and design features included in the project for the various resources. The information is separated into the resource areas for ease in reading.

Fuels and Vegetation Treatment Objectives

- Reduce existing stand density of approximately 160-350 ft^2 basal area by removing live understory trees to achieve a residual stand density of 100 –150 ft^2 basal area per acre and removing standing and down dead trees to achieve a residual surface fuel load of 5 to 15 tons per acre in treatment areas. The resulting conditions are expected to increase forest health and cause a fire to burn at lower intensities and slower rates of spread compared to untreated areas.

- Treat fuels in a manner that reduces wildland fire intensity and rate of spread, (flame lengths at the fire's head are less than 4 ft under 90th percentile weather conditions) thereby contributing to more effective fire suppression capabilities and fewer acres burned.
- Strategically place treatment areas within threat zones to interrupt potential fire spread, referred to by the SNFPA as Strategically Placed Area Treatments, (SPLATs)
- Reduce encroaching conifers in aspen stands and meadows to restore riparian species dominance within these vegetation types.
- Follow SNFPA standards and guidelines (#'s: 10, 11, and 105) for vegetation treatments within aquatic, riparian, and meadow ecosystems.
- Use the LTBMU/Rocky Mountain Research Station General Technical Report-178 "Ecology, Biodiversity, Management, and Restoration of Aspen in the Sierra Nevada" and findings of the Aspen Community Mapping and Assessment Project in developing site-specific vegetation treatment recommendations for aspen habitat within the proposed action area.
- Design activities to be consistent with LTBMU restoration plans for the Big Meadow Creek, Taylor/Tallac Creek, Cold Creek/High Meadow, and Upper Truckee River watersheds in developing site-specific vegetation treatment recommendations for these watersheds within the proposed action area.
- Reduce the risk of effects to air quality from smoke generated by wildfire by reducing the available fuels and reducing the potential for active crown fire.
- Actively restore fire-adapted ecosystems by reducing unnaturally dense conditions as measured by an improving trend in fire regime condition class (for example, change fuels conditions that are currently class 3 toward condition class 2, or change fuel conditions that are currently class 2 into condition class 1).
- Consider cost-efficiency in designing treatments to maximize the number of acres that can be mechanically treated at lower costs under a limited budget. An example would be the use of whole-tree yarding methods instead of more expensive cut-to-length methods where environmentally and operationally feasible.
- Reduce hazards to residences and other resources at risk from wildland fire by creating defensible space around communities within the WUI on National Forest lands:
    - In the defense zone, including RCAs, reduce dead and live fuel loads to change fire behavior and reduce wildfire hazard.
    - In the threat zone, use SPLATS to reduce dead and live fuel loads in order to change fire behavior and reduce wildfire hazard. Activities may be located within RCAs in threat zones.

Fuels and vegetation treatment design features to meet the above objectives

Prescriptions would be designed to reduce hazards from existing fuels and modify fire behavior to provide defensible space for adjoining developed private lands. Vegetation treatments are also designed to restore riparian vegetation communities where applicable (aspen stands, meadows, etc.) through the removal of encroaching conifers. Options

would include ground-based mechanical treatments whenever soils, slope and road access allow, including SEZ areas. Hand treatments would be used where slopes or soil conditions are not suitable for mechanical treatments and where no road access exists.

Varying levels of stand treatment prescriptions would be based on land allocations and their desired future conditions as specified in the Forest Plan, as amended by the SNFPA Record of Decision (USDA Forest Service, 2004). See table 3 for the land allocations within the project area.

SEZs are biological communities that owe their characteristics to the presence of surface water and/or a seasonally high groundwater table (LWQCB, 2004). Primary design criteria for vegetation and fuels management within SEZs from TRPA (TRPA, code of ordinances, chapter 71.4C, Dec, 2004) include the following:

- All equipment shall be restricted from SEZs except for the following conditions:
    - Existing roads
    - Over-snow operations
    - End lining cable systems where equipment stays out of the SEZ
    - "Innovative technology" vehicles operating when soil conditions are dry enough so that the effects of these vehicles cause no greater soil or vegetation disturbance than over-snow tree removal.
- Work in SEZs would be limited to the time of year when soils are dry or when snow conditions are at depth to avoid compaction, which will be determined by the soil scientist and/or hydrologist .
- Trees not needed for stream shading or in-stream coarse woody debris would be directionally felled away from seasonal and perennial streams.

Design criteria for vegetation and fuels management within SEZs from the Forest Plan include:

- Hand piling and burning of slash would be located beyond 50 feet of any stream channel or standing water.
- Prescribed underburning would be designed to avoid adverse effect on soil and water resources. Flame heights would not exceed two feet within 50 feet of stream courses or on wetlands unless higher intensities are required to achieve specific objectives.

A combination of the following methods may be used to meet the fuels and vegetation objectives for the project area, including SEZs:

- Mechanical thinning of brush and trees, using cut-to-length or whole-tree operations.
- Hand thinning of brush and trees.
- Sawlog and biomass removal, with chipping and/or masticating of slash and brush.
- Removing infested, diseased, and dead trees, both standing and down, that are in excess of wildlife and soils retention needs.
- Prescribed pile burning and underburning subsequent to vegetation treatments.

The thinning operations used would be based on soil type, slope, and associated water quality concerns such as delivery of sediments to surface water. Hand thinning would be used in most areas where slopes are greater than 30% and ground-based mechanical thinning used primarily where slopes are less than 30%. Overall, mechanical harvesting

using ground-based equipment with follow-up biomass removal, chipping, mastication, or prescribed burning, would occur on about 6,800 acres. Hand thinning with follow-up fuels treatments would occur on about 5,500 acres. Table 5 below shows the approximate percentage by proposed thinning methods.

Table 5. Thinning Treatment Percentages

Proposed Thinning Treatment	Percent of Treatment Area
Whole Tree Yarding	29%
Cut to Length Upland	7%
Cut to Length - SEZ	9%
Hand Thinning – Upland	52%
Hand Thinning – SEZ	3%

Fuel treatments following thinning are not linked to the thinning method shown above in table 5; instead, fuel treatments are designed based on individual treatment unit requirements to meet fuels treatment objectives and desired conditions. Providing biomass would be preferred to burning whenever feasible, and could be supplied from a variety of the proposed treatments. Table 6 shows the approximate percentages for proposed fuel treatment methods.

Table 6. Fuels Treatment Percentages

Proposed Fuel Treatment	Percent of Treatment Area
Landing Pile Burning or Removal	1%
Chipping or Masticating	24%
Whole Tree Forwarding	9%
Hand Pile and Burn	52%
Under-burning	7%

Example of an overly dense stand with fuel ladders

The following general prescriptions would apply to the defense and threat zones where PACs, HRCAs, and other special wildlife areas are not located. In areas where special wildlife habitat is located, a modified prescription would be implemented as described in the Wildlife Habitat Design Features section of this document.

Mechanical Thinning - Uplands

The general prescription for ground-based mechanical treatments would be to remove primarily understory, and some overstory trees based on the desired residual stand density. Jeffrey pine would be favored for retention. All sugar pines larger than 6 inches will be retained unless a tree shows obvious signs of white pine blister rust as evidenced by dead branches in the crown with swelling on the branch at the point of death. To achieve the desired conditions for fuel loads and stand densities live and dead trees removed would range between 3 to 30 inches DBH. Live tree density would be reduced through an understory thin where mostly suppressed and intermediate crown class trees, along with some co-dominant trees, would be removed to reduce competition and improve vigor and growth of residual trees, enabling them to better resist insect attacks, disease and fire. Selection of trees to be thinned would begin with the smallest trees (suppressed and intermediate trees) and continue to remove trees of increasing diameter until the desired stocking level is reached. In some situations trees larger than 30 inches DBH may need to be removed for equipment operability. Snags and down logs would be removed as necessary to meet fuels objectives, beginning with the smallest diameter and

retaining the largest snags and down logs present to meet Forest Plan wildlife and soils requirements.

The type of mechanical equipment used for thinning operations would depend on vegetation removal needs, operational feasibility, and cost efficiency. They would include whole tree yarding using mechanical harvesters and whole tree skidding, and cut-to-length harvest with log-forwarding operations. Treated material would be removed either as saw logs (whole tree or cut-to-length), fuelwood, or biomass. Treated material not removed would be treated on site through prescribed burning, chipping, or mastication. Masticated or chipped material would be spread over the treatment area. Stumps of conifer trees, with the exception of incense-cedar, greater than 14 inches in diameter would be treated with an EPA registered borax compound such as Sporax for the prevention of the spread of annosus root disease. Sporax would be applied by hand in an approved granular form to cut stumps within the effective timeframe.

Existing landings would be used where available, where not available new landings would be constructed. New landings would average one acre or less in size and be no bigger than two acres in order to safely facilitate the handling and removal of biomass material in compliance with OSHA requirements. Constructed landings may require removal of trees larger than 30 inches DBH, but would be minimized with choice location of the landing. When operations have been completed rehabilitation of the landings would be implemented as determined by soil scientist or hydrologist. This would include measures to insure proper drainage and provision of sufficient ground cover.

Mechanical Thinning - SEZs

Mechanical thinning of SEZs would be implemented based on results from the Heavenly SEZ Demo project or other successful SEZ projects. Treatments would include the removal of primarily understory, and some overstory trees up to 30" DBH based on the desired residual stand density. Basal areas greater than 150 ft^2 and fuel loads in excess of 15 tons per acre may be prescribed in order to maintain the desired stream shading. Jeffrey pine and sugar pine would be favored for retention as well as desired riparian species such as aspen. To achieve the desired conditions for fuel loads and stand densities, dead and live trees removed would range between 3 to 30 inches DBH. Snags and down logs would be removed as necessary to meet fuels objectives, beginning with the smallest diameter and retaining the largest snags and down logs present to meet Forest Plan wildlife and soils requirements. Cut-to-length harvest with log-forwarding, or other low impact small skidder operations would be used for the thinning and fuels removal. Treated material would be removed either as saw logs, fuelwood, or biomass. In some areas including temporary roads, the remaining material would be masticated or chipped and spread, to provide ground cover and protect soil resources. Stumps of conifer trees, with the exception of incense cedar, greater than 14 inches in diameter would be treated with an EPA registered borax compound such as Sporax for the prevention of the spread of annosus root disease. Sporax would be applied by hand in an approved granular form to cut stumps within the time frame to be effective.

SEZs that have a mechanical thinning prescription, but are not within similar criteria for implementation based on results from the Heavenly SEZ Demo or other successful

mechanical SEZ projects, would be mechanically thinned with a different approved treatment design and/or with an approved monitoring plan designed to determine resulting ground-based impacts for those areas. The treatment design would be approved as a coordinated effort with TRPA and Lahontan. For some SEZs, the prescribed treatment may change to hand thinning and removal of material from the SEZ.

Hand Thinning - Uplands

For hand thinning treatments, trees up to 14" DBH would be removed based on achieving a desired residual trees per acre and/or basal area. In some stands, basal areas less than 150 ft^2 per acre may not be achieved due to the limitations of trees being removed with the maximum diameter limit. Hand thinned stand treatments include hand cutting of trees along with hand piling of material for burning, underburning, or mechanical chipping and mastication. Live trees removed would range between 1 to 14 inches DBH; dead trees would range between 1 to 20 inches DBH; and down logs would range between 3 to 20 inches in diameter. Hand treatments would receive follow-up treatments to remove a portion of the larger diameter understory trees where needed in order to achieve the desired stand densities as part of this project.

Hand Thinning - SEZs

Hand thinning in SEZs would include the same treatments as described for the uplands, but with prescriptions that also include basal areas and fuel loads that would maintain desired stream shading. Where possible without disturbance to the stream channel, ground fuels would be removed from the SEZ to be treated by hand pile and burning. Any prescribed underburning would be designed to avoid adverse effect on soil and water resources. Flame heights would not exceed two feet within 50 feet of stream courses or on wetlands unless higher intensities are required to achieve specific objectives.

Reforestation

There are areas in the project where promoting species diversity may prove beneficial for increasing insect and disease resistance as well as establishing a trend toward desired conditions. Reforestation may occur in areas where fuels treatments and thinning create openings after treatment.

Meadows and Aspen Stands

For meadows and aspen stands where lodgepole pine and other conifer species are encroaching, the prescribed treatment would include the removal of live conifers to increase the amount of hardwoods and other meadow vegetation that currently exists. The general prescription for hand treatments would primarily include removing all live conifers up to 14" DBH and falling and removing of all dead conifers up to 20" DBH. All dead and down conifers up to 20" DBH would also be removed. Mechanical treatments may include the removal of all conifers up to 30" DBH with the exception of trees greater than 150 years old exhibiting characteristics such as flat tops, large limbs, and large bark plates. Prescribed burning in meadows post thinning may also be included for treatment.

The vegetation treatments proposed within meadow ecosystems would result in:

- Average conifer crown closure less than 25%;
- Average riparian vegetation cover greater than 40%;
- Occurrences of both herbaceous and woody species of varying heights;
- LWD retention of 10 to 15 tons per acre of the largest size classes with all decay classes represented; and
- Snag retention of up to 3 snags per acre of the largest sizes, in a range of decay classes, with retention of trees for future recruitment of dead trees and CWD.

The approximately 220 acres of vegetation treatments proposed within aspen stands would result in:

- Average conifer crown closure less than 25%;
- Average aspen crown closure greater than 40%;
- Aspen crowns comprising more than half the canopy;
- Aspen crowns overtopping conifer crowns;
- Aspen regeneration occurring or likely to occur with conifer encroachment not likely to occur or minimal within the next 10 to 20 years.

Aspen grove, desired condition

The LTBMU/Rocky Mountain Research Station General Technical Report-178 “Ecology, Biodiversity, Management, and Restoration of Aspen in the Sierra Nevada” and findings of the Aspen Community Mapping and Assessment Project (USDA Forest Service, PSW-GTR-185) would be used in developing site-specific vegetation treatment recommendations for aspen habitat within the proposed action area. Integrated project design would include site-specific BMPs for aspen.

Treatment Duration

Depending on individual conditions for treated stands, an increase in stand density and fuel load accumulation are expected to occur over time (15-20 years). While treatments from this project are expected to remain effective for 15-20 years, future treatments will be required to maintain stand densities and fuel loads within the range of desired conditions.

Summary of Fuels and Vegetation Treatment Design Features

- No activities are proposed within Wilderness
- Treatments would not create any new roads within Inventoried Roadless Areas
- Stands would be prioritized for treatment by the proximity to places where people live and work (Defense and Threat Zones of the WUI), existing fuel hazard levels, and other resource concerns such as watershed recovery, wildlife habitat requirements, and visual quality objectives.
- Stands identified for treatment are overly dense forest stands with fuel accumulations at levels greater than the desired condition.
- Stands are designated for mechanical or hand fuels treatments based on soil type, slope of treatment stands, and associated water quality concerns such as delivery of sediments to surface water.
- Treatment methods would depend on the vegetation removal needs, to include: whole tree yarding, cut-to-length, biomass chipping, mastication, and prescribed burning.
- Prescribed burning would be used to reduce fuels, slash created by treatment activities, and to re-introduce fire's ecological function.
- Scheduling of prescribed burn activities would comply with air quality standards and restrictions.
- RCAs/SEZs, including meadows and aspen stands, needing fuels treatments would be evaluated for mechanical treatments or receive hand treatments.

Example of previously treated area

Urban Lot Resource Objectives

Urban lots are small parcels of undeveloped forest land acquired by the Forest Service, usually located within or directly adjacent to developed subdivisions. The average size of these urban forest parcels is 0.3 acres. Treatment objectives include:

- Reduce the potential for catastrophic wildfire.
- Provide defensible space to adjoining private lands consistent with SNFPA standards for fire behavior and safety for fire suppression personnel.
- Restore riparian vegetation communities (Aspen stands, willow, etc.) through the removal of encroaching conifers.

Treatment activity design features to meet urban lot objectives

Urban lots with SEZs where conifer encroachment and fuels build up exists and urban parcels in excess of 5 acres contiguous land base exhibit the same fuel loads and need for treatment as other areas in the Lake Tahoe Basin are included for treatment in the South Shore Project area. Removal of hazardous fuels and thinning of dense stands is needed to reduce the potential for catastrophic wildfire and to provide defensible space to adjoining private lands. Thinning and removal of live conifers encroaching into SEZs, and removal of hazardous fuels are needed to reduce the potential for negative effects of a catastrophic wildfire in these environmentally sensitive areas. Treatment prescriptions would have the same objectives as in other parts of the project area: modify fire behavior, provide defensible space for adjoining developed private lands, and where applicable, restore riparian vegetation communities (Aspen stands, willow, etc.) through the removal of encroaching conifers. Treatment options would consider ground based mechanical treatments whenever slope and access allow (including SEZ areas).

Mechanical and hand thinning of both uplands and SEZs would follow the same design features as described for vegetation and fuels objectives. Hand thinning of urban lots may remove trees up to 30” DBH where necessary to meet fuels objectives and fuelwood utilization is feasible. On urban lots where fuelwood access is limited or impossible, hand thinning would be limited to trees up to 14” DBH.

Due to the close proximity of homes, roads, utilities and other improvements associated with development, dead, dying, and diseased trees of all sizes often present a hazard to life and property. All trees identified as a hazard to life and property would be removed regardless of diameter, including trees greater than 30” DBH.

Summary of urban lot design features

- Treatment prescriptions would be designed to modify fire behavior to meet SNFPA (2004) desired conditions for Defense Zones.
- Remove encroaching conifers to restore riparian vegetation communities.
- Evaluate use of ground based mechanical treatments whenever soils, slope, and access allow (including SEZ areas).

Wildlife Habitat Objectives

- Use updated northern goshawk and California spotted owl land allocations on the LTBMU based on historic and current nest location and habitat information following SNFPA direction (2004; pp. 37-40).

California spotted owl

- Within the WUI defense zone, CA spotted owl and northern goshawk PACs, owl HRCAs, and TRPA goshawk disturbance zones may be treated as determined by surveys of existing vegetation conditions.
- PACs in the WUI threat zone would not be treated unless existing hazardous fuels conditions merit entering the PAC and further analysis shows a benefit to the species and its habitat within the PAC.
- Follow SNFPA (2004) standards and guidelines (#'s: 7, 33, 34, and 71-81) for vegetation treatments within northern goshawk and California spotted owl PACs and HRCAs.
- In areas where treatment stands are located in close proximity to one another, vegetation treatments within those stands would be separated in time where possible, rather than treated all at once, to provide refuge for wildlife during implementation (i.e., in a group of three PACs, treat only one of the three in any given year).
- Follow TRPA Code of Ordinances (2004) for habitat disturbance within disturbance zones designated for special interest species (Ch. 78.3.A).
- Use limited operating periods for special status species following LRMP (1988) and SNFPA (2004) direction as shown in Appendix A in areas where these species occur in the project.

- Use findings from the Northern Goshawk Nesting Territory Needs Assessment Project (completed Fall 2006) to prioritize vegetation treatments and recommend treatment prescriptions within goshawk PACs and TRPA goshawk disturbance zones.

Northern goshawk

- Use the TRPA bald eagle wintering habitat threshold area near Taylor Creek and Tallac Creek and LTBMU habitat evaluations (1994), perch sites (1997-8), and draft Bald Eagle Management Plan (2000) in developing site-specific vegetation treatment recommendations for bald eagle habitat within the proposed action area in the Fallen Leaf Management Area.
- Use known osprey nest sites to develop site-specific vegetation treatment recommendations for the retention and development of large, over-mature snags within the proposed action area in the Fallen Leaf and Echo Management Areas.

Current survey activity and analysis for design features to meet terrestrial wildlife habitat objectives

There are currently nine California spotted owl PACs and HRCAs and 14 northern goshawk PACs designated on the LTBMU within the South Shore Project analysis area.

The LTBMU proposes to conduct vegetation treatments within PAC, HRCA, and TRPA goshawk disturbance zone land allocations following current management direction, including SNFPA (2004) standards and guidelines. Within the WUI Defense Zone, PACs, HRCAs, and goshawk disturbance zones would be treated according to the design features below. In the WUI Threat Zone, HRCAs and goshawk disturbance zones may be treated when necessary to create or maintain effective distribution of SPLATs over the landscape. In the WUI Threat Zone, PACs would only be treated when existing hazardous fuel conditions merit entering the PAC and analysis shows a benefit to the species and its habitat within the PAC.

In areas where PACs are located in close proximity to one another, vegetation treatments within those PACs would be separated in time, rather than treated all at once, to provide refuge for the relevant species during implementation. The LTBMU proposes to treat more than 5% per year and/or 10% per decade of PAC acres on the Forest for both California spotted owl and northern goshawk, but does not expect to exceed bioregional standard and guidelines given in the SNFPA (USDA Forest Service, SNFPA 2004 ROD pg. 78-81) for Sierra Nevada national forests (pers. comm. Patricia Krueger, USFS Regional Office, 2006).

In 1987, TRPA designated a 2,473 acre bald eagle wintering habitat threshold area around Emerald Bay, Cascade Lake, Tallac Creek, and Taylor Creek. The TRPA bald eagle threshold is supported by the 1988 Forest LRMP (p.III-24). In 1994 the LTBMU evaluated potential bald eagle perch sites along the Lake Tahoe shore zone from Camp Richardson to Tallac Point; as a result, seven dominant trees were selected for pruning and tree retention for this species. Bald eagle habitat use surveys conducted in the Fallen Leaf Management Area in 1997 and 1998 further identified perch sites in the 1994 evaluation area, in Taylor Creek wetland, along Taylor Creek, and around Fallen Leaf Lake. In 2000, the LTBMU produced a draft Bald Eagle Management Plan (May 2000) addressing habitat use for this species in the proposed action area and elsewhere in the basin. The FWS has not yet commented or ratified the draft management plan. The LTBMU proposes to conduct vegetation treatments, as determined by surveys of existing vegetation conditions, within the TRPA bald eagle winter habitat threshold area near Tallac Creek and in the Fallen Leaf Management Area following current management direction and consistent with the habitat evaluations completed in 1994, the perch sites identified in 1997-8, and the draft Bald Eagle Management Plan (2000).

The LTBMU proposes to identify and retain suitable large trees within stands historically or currently used by osprey for perching or nesting. Osprey nest surveys conducted annually in the Lake Tahoe basin since 1990 by California Department of Parks and Recreation, TRPA, and the LTBMU will be used to identify historic and current osprey nest trees and stands. All known standing osprey nest trees within the proposed action area will be retained. Future recruitment of large trees suitable for osprey perching and nesting on the forest is a management concern. Future recruitment of suitable osprey nesting and perching trees would be addressed by identifying and retaining an average of at least 3 suitable, large trees per acre in treatment stands located adjacent to Fallen Leaf Lake and Lower Echo Lake.

The LTBMU proposes to conduct vegetation treatments, as determined by surveys of existing vegetation conditions, within aquatic, riparian, and meadow ecosystems following current management direction. The Forest conducts willow flycatcher, wetland bird, and/or fish and invertebrate species surveys in these habitats annually. The Forest also recently completed Multi-Species Inventory and Monitoring (MSIM) project surveys, which surveyed several suites of wildlife and botany communities during a four-year period. The results of these survey efforts will be used to assist in designing the location, extent, timing, and prescription of vegetative treatments proposed by the forest and in monitoring the response of terrestrial and aquatic wildlife and botany communities to the treatments.

Special Status Wildlife Species

Wildlife objectives and design features for this project are centered on land allocations for consistency with regional and forest management direction; TRPA disturbance zones for TRPA wildlife resource management provisions; and on ecosystem types to address the interconnectedness of natural resources within the primary objective of the project (hazardous fuels reduction). The project would affect vegetative characteristics of focal wildlife species habitats on the forest. Special status, or focal, wildlife species for the South Shore Project area include those listed as threatened (T), endangered (E), candidate (C), or de-listed (D) by the U.S. Fish & Wildlife Service (FWS); sensitive (S) or management indicator species (MIS) by the LTBMU Forest Plan (USFS); and special interest species (SIS) by the Tahoe Regional Planning Agency (TRPA). Limited operating periods (LOPs) would apply, following the recommendations of the Forest Biologist, consistent with SNFPA (2004), LRMP (1988), and TRPA Code of Ordinances direction for wildlife species as presented in Appendix A.

Osprey

Wildlife Habitat Design Features

- Conduct vegetation treatments in up to ~1100 acres within northern goshawk Protected Activity Centers (PACs) and up to ~525 acres within California spotted owl PACs that, where possible, result in at least: 1) two tree canopy layers; 2) dominant and co-dominant trees with average diameters of 24 inches DBH; 3) 60 to 70 percent canopy cover; 4) an average of five to eight snags (five in eastside pine and mixed conifer, six in Westside pine and mixed conifer, and eight in red fir forest types) per acre larger than 20 inches DBH and of variable decay classes; and 5) 15 tons of coarse woody debris (CWD) per acre larger than 20 inches in diameter (at the large end) and of variable decay classes.
- Conduct vegetation treatments in up to ~2340 acres within California spotted owl Home Range Core Areas (HRCAs), and ~ 230 acres of TRPA goshawk disturbance zones that, where possible, result in at least: 1) two tree canopy layers; 2) dominant

and co-dominant trees with average diameters of 24 inches DBH; 3) 50 to 70 percent canopy cover; 4) an average of three to six snags (three in eastside pine and mixed conifer, four in Westside pine and mixed conifer, and six in red fir forest types) per acre larger than 20 inches DBH and of variable decay classes; and 5) 10 tons of coarse woody debris per acre larger than 20 inches in diameter (at the large end) and of variable decay classes.

- Conduct approximately 165 acres of vegetation treatments within the TRPA bald eagle wintering habitat area near Taylor Creek and Tallac Creek adjacent to wetland, wet meadow, and open water habitats that result in: 1) late successional forest type, with an emphasis on Jeffrey pine-dominated stands; 2) retention of trees that are larger in diameter and taller than the dominant tree canopy, with an emphasis on trees greater than 40 inches diameter at breast height (DBH) and greater than 98 feet tall and on dead topped trees with robust, open branch structures; 3) an average of six snags per acre larger than 20 inches DBH and of variable decay classes.

Bald Eagle

- Conduct approximately 720 acres of vegetation treatments within osprey stands adjacent to Fallen Leaf Lake and Lower Echo Lake that, where possible, result in: 1) retention of all known standing osprey nest trees; and 2) retention of an average of three trees per acre that are larger in diameter and taller than the dominant tree canopy, with an emphasis on dead topped trees with robust, open branch structures.

Saxon Creek deadfall

Fisheries Habitat Objectives

- While habitat for Lahontan cutthroat trout exists in the project area, there are no known populations of Lahontan cutthroat trout in the project area. SEZ fuels reduction treatments in identified Lahontan cutthroat trout habitat are designed to avoid negative habitat effects and meet Endangered Species Act (ESA) requirements.
- Reduce the hazard levels for high severity wildfire in RCA/SEZs.
- Provide stream shading and large woody debris hiding cover for high quality trout habitat. This may include the addition of felled trees in reaches that are lacking large woody debris.
- Where MIS fish species are present (for example, rainbow trout, brook trout) ensure SNFPA standards and guidelines for habitat are met.
- Maintain or enhance connectivity within and between watersheds to provide physically, chemically, and biologically unobstructed movement of riparian and aquatic dependent species needed for their survival, migration, and reproduction.
- Retain vegetative cover to ensure that daily mean water temperatures do not increase and provide high quality habitat for trout species.

Current survey activity and analysis for design features to meet fisheries habitat objectives

Large woody debris surveys are underway for the streams within the South Shore Project area, including 113 miles of streams where treatments are proposed. Surveys identify areas where fisheries habitat may be directly or indirectly improved through fuels treatments. In addition to large woody debris surveys, fish crews are conducting biological surveys where data gaps are present in the current GIS layer. These surveys

are being conducted to maintain consistency with the forest plan, and to identify any previously undetected MIS trout species and/or Lahontan cutthroat trout sites.

Fisheries and Aquatic Habitat design features

- Use hand treatments in riparian conservation areas/stream environment zones needing fuels treatments or evaluate for the time of year for mechanical treatments to avoid impacts to fish migration and/or spawning.
- Remove fuels in streamside zones with an overload of standing and down fuels, such as stream reaches that exceed 75% stream shading from dead and down or ladder fuels, while maintaining enough shade to ensure that daily mean water temperatures do not increase.
- For streams lacking large woody debris for fish habitat, place trees larger than 12" DBH into the stream, in locations prescribed by the LTBMU Fisheries Biologist.
- Leave large woody debris in stream channels unless channel stability needs dictate otherwise (LRMP STD/GD 15).
- Maintain shaded bank conditions on trout streams by retaining at least 50% of the stream bank site potential for herbaceous and shrub cover and at least 25% of the site potential for tree cover. Where natural tree cover is less than 20%, 80% of the potential would be retained. Thirty-five to 70% of the stream would be shaded from 11:00 AM to 4:00 PM. (LRMP STD /GD 20).

Saxon Creek stream shading

Watershed, RCA/SEZ, and Water Quality Objectives

- Meet the riparian conservation objectives of the forest plan, as amended by the SNFPA (2004).

- Reduce risk of wildland fire effects to watershed conditions and provide the water quality and soil productivity necessary to support ecological functions and beneficial water uses.
- Meet California State water quality standards.
- Minimize the number of watersheds that exceed the threshold of concern due to fuels treatments.
- Minimize the addition of equivalent roaded acres in the watersheds currently over-threshold from existing development and other land disturbances.
- Avoid disturbance of the connections between floodplains, channels, and water tables to distribute flood flows and sustain diverse habitats.
- Reduce the risk for wildfire effects to soils in order to maintain soils with favorable infiltration characteristics and diverse vegetative cover to absorb and filter precipitation and sustain favorable conditions for stream flows.
- Reduce the risk of wildfire effects to in-stream flows in order to sustain desired conditions of riparian, aquatic, wetland, and meadow habitats (i.e., reduce the risk of increasing sediment regimes that would be expected to occur from wildfire).
- Reduce the risk of wildfire effects to the physical structure and condition of stream banks and shorelines in order to minimize erosion that would be expected to occur from wildfire.
- Avoid disturbance in special aquatic habitats (such as springs, seeps, vernal pools, fens, bogs, and marshes) in order to perpetuate their unique functions, biotic communities, and biological diversity.

Treatment activity analysis and design features to meet watershed and riparian conservation objectives

The watershed analysis contained in this Proposed Action was conducted as preliminary input to project design. Through an iterative process, this information was used to select treatment methods and to schedule treatments in order to reduce the potential cumulative watershed effects of the Proposed Action. Human activities have the potential to impact the hydrologic and erosive response of the land on which they take place. Individual activities may be limited in area or time, but the cumulative impact of numerous activities within a particular watershed may have adverse impacts on water quality, soil infiltration, soil erosion, and hydrologic characteristics of the watershed including flood plain connectivity. For this reason it is important to analyze the overall cumulative impacts of land use, including the expected impact of the proposed activities, during project design.

In order to analyze cumulative watershed effects, the spatial scale for project analysis includes all 21 of the USGS Hydrologic Unit Code watersheds at the 7th field level (HUC 7) within this land area. The threshold of concern (TOC) of each Hydrologic Unit Code 7 (HUC7) watershed was calculated in the South Shore Landscape Analysis (2004) based on land capability classes and allowable impervious cover from Bailey (1974). The TOC is a measure of watershed sensitivity and the amount of impervious cover that a watershed can accommodate before an adverse response may be expected. If the TOC is exceeded, there is a greater risk of increased peak flows, degradation of water quality, channel incision, and other adverse watershed impacts.

The spatial "footprint" of existing buildings, roads, and other impervious structures was combined with the equivalent roaded acres (ERAs) of past fuels treatments, restoration

projects, and other activities within each watershed to assess the current Risk Ratio (ERA/TOC) of each watershed. The projected ERA of each proposed treatment unit in the South Shore Project was added to the existing ERA for a given watershed and used to calculate the resulting Risk Ratio for each year. Additional information on the methodology used to analyze the existing watershed condition is found the Appendix B.

Impacts to HUC7 watersheds that are over their TOC or will go over their TOC due to the proposed treatments would be further analyzed using a combination of GeoWEPP modeling and field evaluations. Similarly, any HUC7 watershed whose Risk Ratio is increased by more than 20% due to the proposed treatments, regardless of the current Risk Ratio, would be analyzed with WEPP and/or field evaluations. GeoWEPP allows spatially explicit GIS based information to be used in the Water Erosion Prediction Project (WEPP) model. The WEPP model is a physically based erosion prediction model that has been validated for numerous field sites. The parameters used in the WEPP model will be based on field observations of the South Shore stands, as well as existing data from previous fuels reduction treatments. The field evaluations will also include site specific assessments using the California Interagency Erosion Hazard Rating system (FSH 2509.22).

Treatment design results

An iterative process was used to schedule the treatment units in order to minimize the impacts on any particular watershed and minimize the number of watersheds that exceed the threshold of concern due to fuels treatments. Urban development and the associated impervious cover have exceeded the threshold of concern in the case of Bijou Frontage, Heavenly Valley Creek, Lower Upper Truckee, and Osgood Swamp. The worst-case scenario for fuels treatments occurring in a single year in all of these watersheds was estimated to increase the Risk Ratio by no more than 12% for total treatment acres. With multi-year scheduling to provide a time interval for recovery, the estimated increase in Risk Ratio above the current value for these watersheds is not expected to exceed 7%.

In order to compare estimated effects between treatments and wildfire events, the treatments were compared to wildfires of two different intensities. Due to the existing heavy fuel conditions, a wildfire would be expected to burn with moderate to high severity. Accordingly, the effects of both a moderate and high severity wildfire were analyzed using the lowest possible impacts associated with each. Wildfire acres were held equal to the total treatment acres for purposes of comparison. The resulting increases in Risk Ratio associated with the proposed treatments are relatively small compared to the potential increases associated with wildfires of equal size. The Risk Ratio for a high severity fire covering the same area as the proposed treatments results in Risk Ratios between 87% and 529%. A low to moderate wildfire of the same size is estimated to bring watersheds within the project area to between 67% and 331% of TOC. Table 7 compares the projected differences of risk between treatment and wildfire for the watersheds within the project area.

A further comparison of watershed recovery capacity between fuel treatments and the two severity classes of wildfire provided additional information to evaluate the project design. For comparison modeling of natural recovery of both treatment and wildfire impacts we assumed to have a straight-line recovery of hydrological response to base-line existing

conditions over a period of 20 years. This assumption has two effects: 1) it provides a reasonable time for fuel treatment recovery, and 2) it overestimates wildfire recovery rates and therefore underestimates the impacts of fire. The assumption of a 20-year recovery period provides a conservative estimate for use in comparison of treatments to wildfires. This analysis provided a basis to schedule fuel treatments to reduce impacts and a conservative comparison of wildfire impacts.

However, wildfire also introduces a greater level of uncertainty to watershed effects due to the high variability of several factors: fire severity, amount of remaining soil cover, formation of hydrophobic soils, available seed and re-sprouting sources, and remaining vegetative cover. Additional physical factors such as the timing and amount of precipitation following wildfire, the topographic shape of the watershed, soil types, and geographic features change erosion effects as well. Table 7 compares projected Risk Ratios for watersheds with fuels reduction activities and expected Risk Ratios from wildfires of two severities on the same acreage.

Table 7. Modeled Watershed Threshold of Concern

HUC 7 Watershed Name	Existing Threshold of Concern (TOC)	Total Treatment Acres	Risk Ratio from Treatment	Risk Ratio from Low/ Moderate Fire Severity	Risk Ratio from High Fire Severity
Angora Creek	84%	1550	99%	245%	374%
Benwood Meadow	195%	156	211%	279%	346%
Big Meadow Creek	83%	389	142%	331%	529%
Bijou Frontage	170%	255	171%	183%	193%
Camp Richardson Frontal	84%	1032	102%	144%	192%
Cold Creek	75%	50	78%	82%	87%
Echo Creek	75%	247	85%	222%	340%
Glen Alpine Creek	35%	93	36%	67%	94%
Grass Lake	47%	621	85%	259%	429%
Headwaters Trout Creek	20%	837	76%	185%	317%
Lower Trout Creek	85%	827	104%	126%	159%
Lower Upper Truckee River	131%	936	137%	172%	204%
Middle Upper Truckee River	79%	1102	95%	195%	287%
Osgood Swamp	120%	582	134%	177%	222%
Saxon Creek	50%	1022	70%	145%	220%
Tallac Creek	36%	876	62%	153%	246%
Taylor Creek	48%	1510	84%	168%	263%

Riparian conservation objectives

The Riparian Conservation Objectives in the Sierra Nevada Forest Plan Amendment (2004) are incorporated in the design for the project. These objectives address provision of beneficial uses for water resources, geomorphic and biological characteristics of

aquatic features, suitable stream habitat features (including large woody debris), and physical and biological characteristics of riparian areas.

Summary of Watershed and Riparian Design Features

- Treatment units would be scheduled to reduce the Risk Ratio by providing watershed recovery time between treatments within the same watersheds.
- No construction of new permanent roads.
- Close and stabilize temporary roads, skid trails, and landings to provide drainage and prevent water accumulation on the roadbed and sedimentation into stream channels at the conclusion of the project. (See transportation section for additional information.)
- Use equipment that is lighter on the land, rubber-tired equipment, equipment that operates on a bed of slash, and other innovative technologies that reduce impacts to soils.
- Implement Best Management Practices during activities.
- Use chipping and/or mastication to provide soil cover for bare areas such as temporary roads and landings.
- Flag and avoid equipment use in and adjacent to special aquatic features (springs, seeps, vernal pools, fens, and marshes), use hand treatments in these areas.
- Use mechanical treatment techniques that are successful in the Heavenly Valley Creek SEZ Demonstration project, the Celio Ranch Project (private land), or other successful projects that occur in riparian conservation areas and SEZs.

Soil Resource Objectives

- Maintain soil productivity while meeting vegetation treatment objectives.
- Reduce the potential for negative impacts to the soil resource from high intensity wildfire by using vegetation treatments to reduce fire intensity that affects soil productivity.

Soil resource design features

Removal of hazardous fuels and thinning of dense stands is necessary to reduce the risk of catastrophic wildfire, which can significantly impact soil productivity. Wildfires remove litter and duff layers that protect soils from the erosive forces of water and wind, and removing plant nutrients from the soil system. The intense heat generated by wildfires can also burn organic compounds in the soil below the ground surface, further reducing nutrient stores and creating water-repellent soil layers. When water-repellent conditions are created, infiltration is inhibited, resulting in increased runoff and increased erosion potential, with impacts to soil productivity and water quality.

Vegetation treatments would be designed to minimize adverse effects to soils, maintaining productivity as described in the Region 5 Soil Quality Standards. The Region 5 Best Management Practices (BMPs) (USDA Forest Service, 2000) for roads and equipment use for tree and fuel removal would be employed to prevent detrimental erosion. BMPs specific to prescribed burning would be used to prevent negative effects to soils from prescribed fire duration or intensity. Operating heavy equipment on dry

soils would reduce the potential for compaction and puddling. Extensive areas (e.g. temporary roads, large landings) of detrimentally compacted soils resulting from project activities would be treated to reduce compaction.

Hand treatment and piling would reduce fuel hazards on slopes over 30% and soils with a high erosion hazard rating. Mechanical treatments would be used on soils with a low to moderate erosion hazard rating and on slopes less than 30%. Where soils have a high erosion hazard rating on slopes less than 30%, mechanical treatments may be limited to cut-to-length operations.

Soil type and slope data were analyzed to determine areas that are suitable for mechanical treatments. Soil type and erosion hazard ratings will be verified by field surveys during the summer of 2007, and treatment methods adjusted if needed.

Summary of soil resource design features

- Operate heavy equipment on dry soils and treat extensive areas of detrimentally compacted soils (temporary roads and large landings).
- Use mechanical treatments to reduce upland hazardous fuels on slopes less than 30% and less sensitive soils.
- Use hand treatments to reduce hazardous fuels within sensitive soils and slopes greater than 30%.
- Reduce erosion potential through use of BMPs.
- Plan prescribed fire to ensure that fire intensity and duration do not result in detrimentally burned soils.

Sensitive Plants and Noxious Weed Objectives

- Minimize negative impacts to sensitive plants and their habitats from fuel reduction activities.
- Reduce the likelihood of introduction or spread of noxious weeds within the treatment areas.

Sensitive Plant and Noxious Weed Design Features

- Survey and locate sensitive plants and noxious weeds prior to project implementation.
- Flag sensitive plant locations where occurrences are identified during current surveys, or found during implementation, where they may be negatively affected by project activities.
- For mechanical treatments, protective boundaries would include a flagged buffer around sensitive plant locations, to provide for equipment operations without disturbance to plant populations.
- Hand treatments would be used to reduce fuels in sensitive plant locations.
- No burn piles would be located within the flagged sensitive plant area.
- For vegetation treatments (i.e., conifer removal) that are proposed adjacent to fens or wet meadows where sensitive plants are likely to occur, site-specific measures would be followed to prevent negative effects to these sensitive plants.

- Flag and avoid or treat noxious weed locations where feasible prior to project implementation.
- Implement noxious weed prevention practices, such as washing equipment if the previous location is either unknown or is infested with weeds, in compliance with the state and SNFPA (2004) standards.

Recreation Objectives

- Ensure public safety during fuel reduction activities with temporary area closures and information/regulatory signs when and where equipment and activities would pose a hazard to the public.
- Prevent post-treatment establishment of user-created routes within treatment areas.
- Reduce hazardous fuels within and surrounding Special Use recreation sites within the South Shore area, including resorts, recreation residence tracts, and day use areas such as Baldwin Beach.
- Minimize disturbance to peak season use at developed recreation sites, such as campgrounds, recreations residences, and resorts.
- Provide environmental education regarding: 1) the need for and expected benefits from fuels reduction, 2) the activities that are expected to occur, and the appearance of activities as they are in progress, and 3) the effect of fuel reduction activities on recreation opportunities.

Recreation background and design features to meet the above objectives

With the fourth highest level of recreation visitor use of National Forests in California (Region 5), the LTBMU has one of the highest densities of visitor recreation per acre in the entire National Forest system. In order to minimize impacts to the LTBMU recreation resources within the proposed fuels reduction treatment areas, the following recreation design features would be integrated into the project.

Temporarily close public access to dispersed recreation opportunities

When necessary to ensure public health and safety, public access to dispersed recreation opportunities would temporarily change at locations undergoing fuel reduction operations. A Forest Order would be issued to enforce the temporary area closures and provide public safety. Management activities would be planned to minimize the duration of closures when public access closures to dispersed campgrounds, trailheads, and trails are needed to protect the public from hazards associated with fuel reduction treatment activities. Potential closures would be scheduled to avoid peak use periods when practical, and to allow visitors access to nearby opportunities (i.e., only those recreation resources immediately undergoing work would be closed – not an entire area). Additionally, recreation closures would be planned in advance and the public would be notified.

Prevent post-treatment establishment of user-created trails

As a result of fuel reduction treatments, areas that were once too dense to allow off-highway vehicle (OHV), over snow vehicle (OSV), or mountain bike use may become open enough to appear attractive for unauthorized use. Regulatory signage would be clearly posted to notify users of designated limitations. Where unauthorized access is clearly tempted by changed forest conditions, such as areas between existing trails or between an existing trail and destination point, strategically placed barriers such as boulders and felled logs would be incorporated to direct users onto designated trails. The Forest Service has completed Road and Trail Access and Travel Management (ATM) Plans for the project area, with the exception of the Fallen Leaf area (scheduled for 2008). The Fallen Leaf Lake, Freel, and Meiss Road and Trail ATMs identify existing authorized and user-created roads and trails, analyze resource impacts, and prescribe trail improvements, re-routes, adoption of key non-system trails, and removal of undesirable trails. The resulting trail system will promote responsible land stewardship and will meet the majority of users' needs, as well as result in a reduction in the number of user-created trails. The South Shore project would be consistent with the Road and Trail ATM Plans. Establishment of user-created trails resulting from South Shore project fuels reduction work would be monitored following treatment implementation. Law enforcement patrol of these areas and restoration of any user-created trails will occur within funding limitations.

Remove hazard fuels within and surrounding Special Use permitted recreation sites

Special Use-permitted recreation residences and resorts are located within the project area and within the WUI. The proposed fuel reduction project would treat hazardous fuel loading within resort permit boundaries as well as areas adjacent to these boundaries to reduce the risk of fire spreading within these properties. For example, the South Shore project would treat hazardous fuels loading within resort permit boundaries at Camp Richardson as well as areas adjacent to these boundaries to reduce the risk of fire spreading within these properties. Fuel reduction treatments are also proposed within the special use permit area of Baldwin Beach day use area. Fuel conditions that exceed desired conditions within project area recreation residence tracts would be treated to meet project objectives.

Schedule fuel treatments in and adjacent to developed recreation sites to minimize user disturbance

When practical, the timing of fuel reduction operations in and adjacent to recreation sites would be scheduled to avoid periods of peak visitor use, approximately June 25 – September 15.

Provide environmental education

The public's understanding of both the reason for treating fuel conditions in the forest and the logistics of what that treatment means for their recreation access is critical to the overall success of the fuel reduction efforts. Environmental education strategies, messages and materials would be prepared and actively shared to support the project's success.

Summary of recreation design features

- Implement temporary area closures to recreation access for areas where activities are in progress.
- When practical, schedule treatments to avoid peak visitor use recreation times in developed recreation areas.
- Provide environmental education and notification to the public for the project.
- Include fuel treatments on Forest Service lands within and surrounding special use permit properties, and schedule treatment timing to minimize user disturbance.
- Use a combination of signage and physical barriers to prevent post-treatment establishment of user-created routes within treatment areas.

Visual Quality Objectives

- Modify vegetation structure in a manner that reduces the potential for wildfire to result in the loss of more than 50% of largest trees within a given stand. This change in scenic stability would increase the probability to perpetuate the valued scenic attributes of an openly spaced, forested landscape in the future and would trend toward SNFPA desired conditions of a "large tree" dominated landscape character.
- Treatment prescriptions would be consistent with Adopted Visual Quality Objectives identified in the LTBMU Forest Plan.
- Where feasible, locate mechanical treatment landing areas beyond sight from major travel routes (for example US 50, Highway 89, Pioneer Trail).
- Visually blend staging areas, including landings, temporary roads, or other cleared areas into the surrounding landscape at completion of the project.

Scenic design features to meet visual quality objectives

The proposed fuels reduction project occurs within areas of the Forest that are highly valued by the Forest's visitors and residents. Within the project area, visual quality objectives (VQO) of Retention and Partial Retention are identified in the Forest Plan. The Retention VQO provides for management activities on National Forest Lands that are not visually evident. Under Retention, activities may only repeat form, line, color and textures that are frequently found in the characteristic landscape. The Partial Retention VQO provides for management activities that remain visually subordinate to the characteristic landscape. Activities under Partial Retention may repeat form, line, color, or texture common the characteristic landscape, but changes in their qualities of size, amount, intensity, direction, pattern, and duration must remain visually subordinate to the characteristic surrounding landscape.

Supporting mapping of the South Shore Landscape Analysis identifies scenic classes. Class One landscapes have higher scenic attributes (attractiveness, visibility, etc.) than Class Two landscapes. Both Class One and Two landscapes represent areas of high scenic value.

In order to reduce impacts to the LTBMU scenic resources within the proposed fuels reduction treatment areas, scenic design features would be integrated into the project. Treatment prescriptions would be refined as specific stand condition exams are completed and the opportunities to enhance scenic attributes through changes in forest structure are defined. In general, the more an area is valued for its scenic resource, the more effort would be required to reduce the visual impacts of project activities. For visual quality design features see Appendix C.

Efforts would be taken to ensure that visual evidence of disturbance is reduced as quickly as possible within foreground visibility zones. If air quality standards can be met and burn days are available, hand-piles would be burnt within three years of project implementation. Landings and temporary roads would be blended into the surrounding landscape at the completion of the project. Mastication and/or chipping would be one method used to provide cover and reduce evidence of vehicle access and mechanical fuels reduction activities at completion of the project.

Summary of VQO/scenic design features

- Schedule treatments to disperse visual impacts spatially in the landscape and over time.
- Retain up to 15% of existing 4”-10” DBH trees and shrubs within foreground view treatment areas; create irregular spacing and clumping distribution between trees and groups of trees within foreground views. Clumps of understory vegetation would vary in size from 50 – 2000 square feet based on fuel conditions and consultation with the project landscape architect and fuels specialist. Distances between retained understory vegetation would vary from 90 – 600 feet based on fuel conditions and consultation with the project landscape architect and fuels specialist. Prescribed surface fires would be designed to retain this pattern of selected understory vegetation following biomass removal activities, as well as to reduce evidence of tree scorching within foreground views.
- Retain largest non-hazard tree snags at a rate of 3-6 per acre where possible.
- Minimize cut stump heights and locate burn piles so as to minimize visibility within foreground views from travel routes.
- Provide cover on landings, temporary roads, or other cleared areas to blend these areas visually into the surrounding landscape at completion of the project.
- Use fuel treatments to increase scenic viewing opportunities where existing fuels concentrations prevent attractive views, for example, views of meadows, views of Lake Tahoe, and views of aspen.
- Locate mechanical treatment landings beyond foreground views and beyond views from major travel routes (for example, US 50, Pioneer Trail, and Highway 89) where feasible.

Transportation and Access Objectives

- Transportation system would be to Forest Service design standards to support fuels reduction activities and equipment.
- Temporary roads would be located on existing roadbeds to minimize new ground disturbance where possible.

- Prevent post-treatment establishment of user-created routes within treatment areas.

Background and design features to meet transportation objectives

The LTBMU inventoried all roads on National Forest System lands in the summer of 1998. This road network totals approximately 418 miles. Data were collected and used to conduct a risk analysis of each road's potential to affect water quality, with results of this risk analysis documented in a map.

The Lake Tahoe Basin Management Unit developed an *Access and Travel Management Plan* (ATM) for all Forest Service roads in the Lake Tahoe Basin. Implementation of the Roads ATM began in 1998, and is projected to be complete in 2008, with a transportation system in desired condition. There are 90 miles of system road in the South Shore Project area. Although road reconstruction or maintenance would be needed for operability, the fuels reduction project will not add new permanent road mileage to the transportation system. It will be consistent with the road management accomplishments and water quality objectives defined in the ATM and Roads Analysis Report (2000).

Most of the South Shore project would be accomplished on the existing permanent road system, with a minor amount of temporary roads. The South Shore project would not require construction of any new permanent roads. Table 8 below provides the approximate proportions of road usage for the project.

Table 8 – Projected Roads for the South Shore Project

Road Type	Percentage of Total Miles Needed
City Streets	4%
County Roads	22%
Forest Service Roads	66%
Temporary/Spur Roads	8%

Preliminary indications are that approximately half of the temporary roads that would be needed for the South Shore project are located on old roadbed prisms of existing temporary roads that would be used. These are likely to need some reconstruction. The reconstruction needs vary between roads, but may include installation of drainage structures to prevent surface water runoff, road widening for vehicle access, and road surface stabilization. The road widening may include removing trees larger than 30 inches DBH.

There are mechanical treatment areas identified in the project area that will require new construction of temporary roads or skid trails. Approximately half of the temporary roads would need to be constructed for thinning operations. These areas would require falling and removal of trees creating openings wide enough for vehicle access. This may require removal of trees larger than 30 inches DBH. All temporary roads would have structures

to prevent surface water runoff, and road surface stabilization as needed. Temporary road BMPs will be implemented during and at the completion of the project. These roads will be closed and stabilized to provide drainage and hydrologic function after project completion. Barriers will be installed at strategic locations after fuel treatments to prevent the development of user created trails that are not a current designated route. Waterbars or other drainage structures would be installed to provide proper drainage. Other rehabilitation may include provision of sufficient ground cover or use of a sub-soiler to reduce compaction, and would be implemented as determined by soil scientist and/or hydrologist.

Road adjacent to meadow and forest

Summary of transportation design features

- Maintain and/or restore roads to FS standards that support equipment and trucks needed for activities. These standards are tailored to protect soil and water quality resources from the impacts of specific classifications of equipment use.
- Close and stabilize temporary roads and skid trails after fuel reduction activities to provide drainage and hydrologic function.
- Implement road BMPs during and at the conclusion of project activities.
- Strategically establish barriers along open areas adjacent to road or trail access (boulders, split rail fence, and barriers/signs) to prevent user created trails that are not designated routes.

Heritage Resource Objectives

- Reduce the risk of negative wildfire effects to cultural resources.
- Protect cultural resources during treatment activities.

- Protect arborglyphs in aspen stands while reducing wildfire hazards and conifer competition.

Treatment activity design features to meet heritage resource objectives

Treatment of fuels adjacent to and within prehistoric and historic site boundaries is desirable to reduce the risk from the effects of high intensity wildfire provided the treatments do not have an adverse effect to the sites. This project would utilize the protection and stipulation measures outlined in the Region's (Region 5) Programmatic Agreement with the California State Historic Preservation Officer and the Advisory Council on Historic Preservation to protect and perform fuels treatment within site boundaries in hand thinning units. These same measures would be used to perform hand treatments within site boundaries in mechanical treatment units. This is expected to provide a uniform treatment of the area and would avoid untreated islands of hazardous fuels within prehistoric or historic resource sites.

Linear prehistoric and historic sites are a potential barrier to treatment within mechanical treatment units. Wherever possible, integrity data will be collected for linear sites during the inventory and recording phase along with data on pre-existing breaches in the linear sites to facilitate evaluation of the sites for eligibility to the National Register of Historic Places and identification of locations where equipment may be able to cross these features.

The risk of loss of Aspen stands with historic arborglyphs could be reduced by treatments that remove invading conifer. Hand treatment and piling outside the stand would reduce fuel hazards and reduce conifer competition in these stands to increase the life and health of the trees that contain these arborglyphs. Low-intensity fire through the stands may be considered if the arborglyphs can be protected from the flames.

Summary of heritage resource design features

- Flag and avoid mechanical equipment within discrete sites.
- Use hand treatments to reduce wildfire effects within heritage sites.
- Evaluate linear features to establish possible crossing areas.
- Reduce conifer invasion in aspen stands.
- Protect arborglyphs during prescribed fire.

Aspen grove

Appendix A

Limited Operating Periods for Special Status Species in the Project Area

Focal Wildlife Species

Wildlife objectives and design features for this project are centered on land allocations to address regional and forest management direction; disturbance zones to address TRPA wildlife resource management provisions; and on ecosystem types to address the interconnectedness of natural resources within the primary objective of the project (hazardous fuels reduction). The project would affect vegetative characteristics of focal wildlife species habitats on the forest. Special status, or focal, wildlife species for the South Shore Project area include those listed as threatened (T), endangered (E), candidate (C), or de-listed (D) by the U.S. Fish & Wildlife Service (FWS); Forest Service sensitive (S) species, management indicator species (MIS) in the LTBMU Forest Plan (USFS); and special interest species (SIS) by the Tahoe Regional Planning Agency (TRPA).

All focal wildlife species will be included with the Biological Evaluation and Biological Analysis (BE/BA) for this project. Limited operating periods (LOPs) would apply, following the recommendations of the Forest Biologist, consistent with SNFPA and LRMP direction for wildlife species as presented below. The TRPA Code of Ordinances direction for wildlife species LOPs would also apply, as presented in Appendix A.

The implementation of LOPs for marten and/or fisher dens, great gray owl PACs, and Yosemite toad sites are unlikely as they have not been discovered, delineated, or are not known to occur within the Lake Tahoe basin.

Appendix A
Limited Operating Periods

REASON FOR RESTRICTIONS	LIMITED OPERATING PERIOD (LOP) AND IMPACTED ACTIVITY	ADJUSTMENTS ALLOWED
California Spotted Owl PAC	**March 1 through August 15** (SNFPA 2004) - no timber thinning, prescribed fire, restoration projects, or road or trail building within 1/4 mile of activity center.	SNFPA Standard and Guideline # 77 & # 78, Surveys confirming no nesting or occupancy by adults or juveniles allow LOP to be adjusted.
Northern Goshawk PAC	**February 15 through September 15** (SNFPA 2004, S&G # 77 & # 79) - no timber thinning, prescribed fire, restoration projects, or road or trail building within 1/4 mile of activity center.	SNFPA Standard and Guideline # 77 & # 78, Surveys confirming no nesting or occupancy by adults or juveniles allow LOP to be adjusted; coordination with TRPA.
Bald Eagle Wintering Areas - At designated wintering sites (Baldwin/Taylor Marsh, Pope Marsh)	**October 15 through March 15** - Restricts recreational access and management activities.	None, with the exception of emergency situations
Bald Eagle Nesting Sites	**March 1 through August 31** - no timber thinning, prescribed fire, restoration projects, or road or trail building within 1/2 mile of active nest site per TRPA regulations (Chapter 78, Code of Ordinances)	Surveys confirming no nesting or occupancy by adults or juveniles allow LOP to be adjusted.
Osprey	**March 1 through August 15 -** no timber thinning, prescribed fire, restoration projects, or road or trail building within 1/2 mile of active nest site per TRPA regulations (Chapter 78, Code of Ordinances)	Surveys confirming no nesting or occupancy by adults or juveniles allow LOP to be adjusted.
Willow Flycatcher Sites	**June 1 Through August 31** - no timber thinning, prescribed fire, restoration projects, grazing, utilities work, or road or trail building within suitable habitat surrounding active nest.	SNFPA Standard and Guideline # 58
Marten Den Site	**May 1 through July 31** (SNFPA 2004) - no timber thinning, prescribed fire, restoration projects, or road or trail building within 100 Acres (or 359 m buffer)	SNFPA Standard and Guideline # 88
Fisher Den Site	**March 1 through June 30** (SNFPA 2004) - no timber thinning, prescribed fire, restoration projects, or road or trail building within 700 Acres (or 950m buffer)	Not applicable based on survey results.
Great Grey Owl PAC	**March 1 through August 15** (SNFPA 2004) - no vegetation treatment and road construction (per SNFPA Standard and Guideline # 83)	SNFPA Standard and Guideline # 83

Yosemite Toad Sites	Not yet determined, has not been detected in surveys in recent history	Not applicable, based on surveys

Appendix B

Current Condition Factors Analyzed for Watershed Threshold of Concern

Roads

The length of roads in each watershed within the South Shore Project area was attained using the GIS layer provided for the project. The roads were assigned widths based on the criteria provided in the South Shore Landscape Analysis. Table 1 shows the assumed travel surface width and associated total width used to determine total acres of road. The travel surface width was multiplied by a factor of 1.25 for slopes less than 35% and 2.5 for slopes over 35% to account for the associated cut and fill slopes (South Shore Landscape Analysis, 2004). The full width of all roads, including cut and fill slopes, was treated as impervious cover. This provides a reasonable and conservative estimate of total acres of roads in each watershed.

Impervious Cover

Satellite imagery (IKONOS layer) was used to distinguish existing impervious cover (IC). This layer includes and overlaps most, but not all, of the roads contained in the current roads layers for the South Shore Project area. In order to account for all the roads, but avoid double counting, the impervious cover was erased using the roads layer with an appropriate buffer depending on the road type (Table 1). Unfortunately this process leaves slivers of IC polygons where the roads and IC layers do not precisely coincide. As a result, it is likely that the impervious cover calculated using the IKONOS data and the roads layer is a conservative (i.e., overestimate) of the actual impervious cover.

Past Treatments

In addition to the roads and IC calculated above, the impacts of past activities were evaluated. This was accomplished by multiplying the acres of impacted land by an ERA coefficient in order to assess the impact of the activities on the watershed. The ERA coefficients were based on the perceived impact of the activity relative to an acre of road and values found in the literature (Elder and Reichert, 2004; Jones and Stokes, 2004; Pioneer EA, 1996). For example, if a mechanical fuels treatment is assigned an ERA coefficient of 0.1, then 100 acres of this treatment would be equivalent to 10 acres of impervious surface or road. Although the ERA coefficients are qualitative and not spatially explicit, the ERA method for evaluating cumulative watershed effects provides a reasonable way to address the effects of multiple activities within a particular watershed.

Recovery

Many activities such as fuels treatments and wildfires produce a substantial initial impact but tend to recover with time. This process of recovery is generally addressed using simple linear models in which the impacts of the activity decrease linearly with time. It is generally found that the impacts on hydrologic and soil resources is minimal by 10-30 years after the activity has ceased for activities similar to those proposed for this project (USFS R5 Soil and Water Conservation Handbook, 1988; South Shore Landscape Analysis, 2004; Robichaud, et al., 2006). In this assessment, the impact of the activities decreased as the converse error function from their initial value (ERA coefficient x acres treated). This function provides a slightly faster recovery during the first years, leading to approximately 85% recovery by ½ the recovery period, and tapers off slowly to 99.5% recovery by the end of the recovery period. A recovery period of 20 years was used for all vegetation treatments.

Reasonably Foreseeable Future Actions

In addition to current conditions and the South Shore planned treatments, there are currently no known reasonably foreseeable future developments, projects, or activities that would adversely impact the watersheds within the South Shore Project area. Interagency communication would be ongoing in order to remain current on the status of projects that may impact the condition of the watersheds within the South Shore Project area.

Risk Ratio

The Risk Ratio of a particular watershed is defined as the equivalent roaded acres divided by the threshold of concern (RR=ERA/TOC). The resulting values of the above analysis are shown previously in Table 2. It is clear that the watersheds currently over the threshold of concern (RR>100%) are over their TOC due to the impervious cover associated with development in urban areas. The proposed South Shore Project treatments were distributed over a span of 4 years to minimize elevation of the risk ratio for any watershed. For those watersheds currently above the Risk Ratio due to impervious cover, the treatments were distributed to minimize the impacts and allow for maximum recovery before another treatment was scheduled in that watershed.

Appendix C

VQO and Scenic Design Criteria

VQO	SCENIC CLASS	VISIBILITY ZONE	TREATMENT DESIGN FEATURES
Retention	1	Foreground (up to ½ mile)	Retain up to 15% of existing smaller trees and shrubs; maintain irregular spacing and clumping distribution between trees and groups of trees. Retain largest non-hazard tree snags at a rate of 3-6 per acre where possible. Cut stumps at 6" maximum height. Avoid hand piles within 100 feet of travel routes. Screen hand-piles behind large trees within 100-200 feet of travel routes. Provide soil cover on staging areas, landings or other cleared areas to blend visually with the surrounding landscape.
Retention	2	Foreground (up to ½ mile)	Retain up to 15% of existing smaller trees and shrubs; maintain irregular spacing and clumping distribution between trees and groups of trees. Retain largest non-hazard tree snags at a rate of 3-6 per acre where possible. Cut stumps at 6" maximum height. Avoid hand piles within 100 feet of travel routes. Screen hand-piles behind large trees within 100-200 feet of travel routes. Provide soil cover on staging areas, landings or other cleared areas to blend visually with the surrounding landscape.
Retention	1& 2	Middle / Background	Retain up to 15% of existing smaller trees; maintain irregular spacing and clumping distribution between trees and groups of trees. Retain largest non-hazard tree snags at a rate of 3-6 per acre where possible. Cut stumps at 6" maximum height. Screen hand-piles behind large trees. Provide soil cover on staging areas, landings or other cleared areas to blend visually with the surrounding landscape.
Partial Retention	1	Foreground (up to ½ mile)	Retain up to 15% of existing smaller trees and shrubs; maintain irregular spacing and clumping distribution between trees and groups of trees. Retain largest non-hazard tree snags at a rate of 3-6 per acre where possible. Cut stumps at 6" maximum height. Avoid hand piles within 50 feet of travel routes. Screen hand-piles behind large trees within 50-200 feet of travel routes. Provide soil cover on staging areas, landings or other cleared areas to blend visually with the surrounding landscape.
Partial Retention	2	Foreground (up to ½ mile)	Retain up to 15% of existing smaller trees and shrubs; maintain irregular spacing and clumping distribution between trees and groups of trees. Retain largest non-hazard tree snags at a rate of 3-6 per acre where possible. Cut stumps at 6" maximum height Screen hand-piles behind large trees within 200 feet of travel routes. Provide soil cover on staging areas, landings or other cleared areas to blend visually with the surrounding landscape.
Partial Retention	1 & 2	Middle / Background	Retain up to 15% of existing smaller trees; maintain irregular spacing and clumping distribution between trees and groups of trees. Retain largest non-hazard tree snags at a rate of 3-6 per acre where possible. Provide soil cover on staging areas, landings or other cleared areas to blend visually with the surrounding landscape.