Exchequer Restoration Project
High Sierra Ranger District, Sierra National Forest
Fresno County, California
March 20, 2015

Introduction

The High Sierra Ranger District (HSRD), Sierra National Forest (SNF) is currently in the planning stages for the Exchequer Restoration Project (Project) to reduce hazardous fuels and restore ecological components.

The Project area, which includes the Exchequer Management Unit Group (MUG), McKinley Grove MUG, and a managed-fire area in the eastern portion, encompasses approximately 17,984 acres of the SNF in the southern Sierra Nevada Mountains; approximately 30 miles northeast of Fresno, California (see Figure 1). The Project area is located in all or portions of Township 9 South, Range 25 East Sections 32-34; Township 9S Range 26E Sections 31 and 34-36; Township 10S Range 25E Sections 3-4; 9-10; 15-16, 22, 27-29 and 34. Township 10S Range 26E Sections 1-3; 10-16; 21-24; 25-29; 34-36. Township 10S Range 27E Sections 5-8; 18-20; Township 11S Range 26E Section 1; and Township 11S Range 27E Section 6, of the Mt Diablo Base Meridian. The area ranges in elevation from 5,000 to 9,500 feet. The Project area is located immediately east of Camp Fresno and Dinkey Ranger Station. It encompasses McKinley Grove and is west of Buck Meadow Campground and Nelson Mountain. The Project area is entirely within the Dinkey Creek watershed.
Exchequer Restoration Project Boundary

Figure 1. Project Vicinity Map
Background

The Pacific Southwest Region (Region 5) leadership intent\(^1\) takes an "All Lands Approach" to ecological restoration. The regional leadership's intent is to work across boundaries with our partners in Region 5 to retain and re-establish ecological resilience of the land while expanding the pace and scale of ecological restoration; to include support and coordination for all California wildlands within and beyond Forest Service (or FS) boundaries; and to provide a wide range of ecosystem services. Through this approach, Region 5 intends to provide healthy and resilient landscapes that will have a greater capacity to survive natural disturbances and large scale threats to sustainability.

The 1992 SNF Land and Resource Management Plan (USDA FS 1992), as amended by the 2004 Sierra Nevada Forest Plan Amendment Record of Decision (SNFPA ROD, USDA FS 2004) and other documents (USDA FS 1995, 2001) (collectively referred to as SNF LRMP) and decisions, provide management goals and direction for the Project.

Collaboration and the Dinkey Collaborative

A collaborative group of diverse stakeholders assembled to direct the planning process to identify potential opportunities and locations for the next restoration project within the Dinkey Landscape Restoration Project (DLRP) area. This group is known as the Dinkey Collaborative, representing local landowners, Native American Tribes, forestry and timber industries, environmental groups, recreational groups, the San Joaquin Valley Unified Air Pollution Control District, California Department of Fish and Wildlife (CDFW), Highway 168 Fire Safe Council, and the SNF (see Project record for a complete list of members). Participants represent the interests of themselves and their interest groups, and collectively the interest of the public as a whole.

The DLRP was developed under the Collaborative Forest Landscape Restoration Program established by Title VI of the Omnibus Land Management Act of 2009\(^2\) (Public Law 111-11). The DLRP, which includes 154,000 acres on the HSRD and adjacent private lands, was one of the projects selected in 2010 to implement the collaborative, science-based ecosystem restoration of priority forest landscapes that in turn encourages ecological, economic, and social sustainability.

The Pacific Southwest Research Station (PSW) General Technical Report 220 developed by North et al. (2009) titled *An Ecosystem Management Strategy for Sierran Mixed-Conifer Forests* (PSW-GTR-220) (see Landscape Strategy below for more detail) was used in the development of the DLRP proposal and is an important reference document for consideration in planning, implementation, monitoring, and funding in the DLRP area. The Dinkey Collaborative identified the key elements of the purpose and need; and identified variables that would define a desired condition across different topographic and aspect zones (i.e., canyons, slopes, and ridges with northern or southern exposures). The Dinkey Collaborative also crafted a set of decision priorities that reflect the intent to create heterogeneity (i.e., diversity in plant size, type, and density) across the landscape while addressing public health and safety and restoration needs. Several additional documents, such as the PSW-GTR-237 *Managing Sierra Nevada Forests*  

\(^1\) A copy of Region 5 Ecological Restoration Leadership Intent (R5-MR-048) is available at http://www.fs.usda.gov/Internet/FSE_DOCUMENTS/stelprdb5351674.pdf

(North 2012), are important references for the Dinkey Collaborative projects as well. This collection of papers summarizes the state of the science in some topics relevant to this forest management approach, presents case studies of collaborative planning efforts, and field implementation of these new practices.

A cross-disciplinary approach is used for the collaborative process to generate comprehensive stakeholder participation and input. This process is used in defining approaches for implementing vegetation and fuels management and ecological restoration activities and methods. In general, the goal of the collaborative process is to reach a proposal everyone can accept. The end goal is to use ideas, input, and recommendations from the Dinkey Collaborative to develop a proposed action that would meet the purpose and need of the Project. Dinkey Collaborative members have discussed the Project in meetings since January 2014, including field visits and technical work groups, as either a full group or smaller subgroup to develop initial proposed actions for the Project. For more information of the Dinkey Collaborative and the planning process, see the Project record.

As part of the planning process, the Dinkey Collaborative has a subgroup called the Landscape Planning Work Group (LPWG). The LPWG conducted a landscape assessment of the DLRP area in which the Exchequer MUG was rated as the highest priority area to treat at this time, primarily to reduce hazardous fuels and restore ecological components, with a focus on the California spotted owl. This decision was based on the existing conditions in the Exchequer MUG having the most indicators furthest away from reference conditions (see Landscape Strategy below and Existing Conditions and Desired Conditions sections).

**Landscape Strategy**

The DLRP strategy identifies restoration treatments for the Project that are collaboratively developed, using PSW-GTR-220 and the PSW-GTR-237 as supporting documents. Using this strategy and the landscape assessment, the Project seeks to achieve multiple goals:

- reintroduce fire as an ecosystem process,
- reduce hazardous fuels,
- retain and promote large tree and denning/nesting structures needed by Pacific fisher and California spotted owl,
- promote stand and landscape heterogeneity, and
- provide sufficient regeneration of shade-intolerant tree species for the creation of future fire-adapted forests.

The DLRP strategy incorporates long-term ecological restoration and habitat improvements through management of the existing forest structure. This strategy was first suggested by Verner et al. (1992) to better preserve the viability of the spotted owl and other species dependent on old forest conditions. The goal of this strategy is to restore heterogeneity at the landscape scale to approximate but not strictly impose a historical condition and to create a mosaic of density and structure based on ecological processes influenced by aspect, slope position, site productivity, tree species, and unusual micro-site conditions. The most important of these historical processes is fire (North et al. 2009).
Existing Conditions

This section generally describes existing conditions for specific resources in the Project area to provide the basis for identifying needs. These include special status species and their habitats, forest structure, fire and fuels, watershed, meadow and riparian, and noxious weeds. Existing cultural uses, permitted rangeland management, cultural resources, and recreational and visual resources are also generally described. A full description of existing conditions associated with each resource will be documented in appropriate reports (e.g.: Biological Assessment [BA], Biological Evaluation [BE], etc.) during analysis.

Overall, the current landscape conditions in the Project area reflect a history of forest logging practices, gold and tungsten mining, human development (residential and commercial), grazing, recreational activities, and fire suppression. In some areas these activities have resulted in an increasingly dense forest with atypical stand structures and an unnatural composition of vegetative species. The natural resilience of the area has been diminished, and the forest is more vulnerable to a host of mortality factors, including uncharacteristic wildfire, insect and disease outbreaks, and stress from drought, logging, air pollution, and infrastructure.

Forest Structure

In the Project area, dense stands of young trees developed and persisted over the last century, an era of intensive fire suppression. The southern Sierra forest came to have mostly a low to moderately dense overstory of medium and large size trees creating a favorable environment for germination and growth of shade tolerant white fir and incense cedar. They outcompeted pines and black oak and reduced the space available for large trees. The dense stand conditions are resulting in insect and density induced mortality, especially of pine and oak species.

McKinley Grove

The McKinley Grove of Giant Sequoias is located in the southern portion of the Project area and encompasses approximately 300 acres. Past treatments include removal of encroaching white fir in the grove and covered approximately 100 acres. Fuels have accumulated over the years in the untreated areas.
Fire and Fuels

There are no recorded fires (1911 to present) over 10 acres in size within the Project area. There have been 103 fire starts since records were kept beginning in 1970. All starts were less than 10 acres in size, with 55 percent of starts being lightning caused and the balance being human caused. The Project area consists of greater than 90 percent of mixed conifer which has a median reference fire return interval of less than 35 years based on historic conditions. This shows that greater than 90 percent of the Project area is at greater than 66 percent departure from how fire would have burned in historic conditions. This departure from historic fire interval has led to an increase in fuel loading and a shift from fire adapted tree species to non-fire adapted species (mostly from pines to white fir). This departure will result in increased wildfire intensity. Once wildfire flame lengths are over about 12 feet, suppression efforts become less effective (and more dangerous), risk of crown fire is increased, and rates of spread are accelerated. Fire return interval has been calculated through research leading to data showing what the fire regime most likely was before the middle of the 19th century. A useful measurement from this data is the median reference fire return interval. This measurement may give a better approximation by giving the center distribution of estimated historic fire return intervals. Within the Project area the median reference fire return interval of 0 to 35 years consists of approximately 91 percent mixed conifer; the 35 to 100 year interval consists of approximately 0.25 percent of lodgepole pine; and the greater than 100 year return interval consists of approximately 8.75 percent of subalpine forest.

Roughly two thirds of the Project that is outside of the treated wildland urban interface (WUI) (about 10,000 acres) is predicted to have over 12-foot flame lengths in a wildfire. See Figure 2 for location of the WUI in the Project area.
Figure 2. Wildland Urban Interface in the Project area.
Special Status Species and Their Habitat

Terrestrial Wildlife

Of the 15 special status terrestrial wildlife species or habitat to potentially occur on the SNF, there are nine Forest Service Sensitive species that may be in the Project area: California spotted owl, American marten, Wolverine, Northern goshawk, Great gray owl, willow flycatcher, Pallid bat, Townsend’s big-eared bat and Fringe myotis; and one species listed as proposed (threatened): fisher. In the Project area, the first four species, the fisher and the bats may be found in mixed-conifer forest. The great gray owl and willow flycatcher are associated with meadows and meadow complexes that are 10 acres or greater in size.

Within the DLRP, the Exchequer MUG is one of the most productive areas for California spotted owl reproduction. The SNF has 234 designated spotted owl Protected Activity Centers (PACs) and 228 Home Range Core Areas (HRCAs). Within the Exchequer MUG there are all or portions of 17 PACs and 18 HRCAs designated for spotted owls which encompasses about 9,345 acres of habitat. There is one goshawk PAC within the MUG which encompasses about 200 acres and approximately 1,600 acres of moderate and high suitable habitat according to Keane’s goshawk model. See Figure 3 for locations of PACs and HRCAs in the Project area.

To date, there are all or portions of three fisher den buffers (HSF03, HSF08 and HSF25) that are in the Exchequer MUG. The fisher probabilities represent the probability of a fisher being found in habitat which is broken down by percentages within an area. Table 1 breaks down the fisher probabilities within the MUG by approximate acres.

Table 1. Fisher Probabilities in the Exchequer MUG.

<table>
<thead>
<tr>
<th>Fisher Probability (%)</th>
<th>Acres in Exchequer MUG</th>
</tr>
</thead>
<tbody>
<tr>
<td>0 – 19</td>
<td>10,915</td>
</tr>
<tr>
<td>20 – 39</td>
<td>2,022</td>
</tr>
<tr>
<td>40 – 59</td>
<td>1,477</td>
</tr>
<tr>
<td>60 – 79</td>
<td>2,017</td>
</tr>
<tr>
<td>80 – 100</td>
<td>1,553</td>
</tr>
<tr>
<td>Total</td>
<td>17,984</td>
</tr>
</tbody>
</table>

See Figure 4 for fisher probabilities within the MUG.

There is approximately 303 acres of foraging habitat and 674 acres of nesting habitat for the great gray owl within the Project area. Great gray owl surveys were initiated in 2014 and will continue in 2015. There is habitat for willow flycatchers in the Project area as well.
Figure 3. California spotted owl PACs and HRCAs in the Project area.
Fisher Probability within the Exchequer Project Area

Figure 4. Pacific fisher probability in the Project area.
Aquatic Wildlife

Of the 19 special status aquatic / riparian species or habitat identified to potentially occur on the SNF, two occur within the Project area: Yosemite toad (YT) (threatened) and Sierra Nevada yellow legged frog (SYLF) (endangered). In the Project area, generally suitable breeding habitat for the YT can include meadows and associated slow moving streams above 6,000 feet elevation. Terrestrial habitats can include surrounding terrestrial habitats out to 0.78 miles of occupied meadows (depending on landscape and dispersal barriers). Within the Exchequer MUG, there are currently four known YT occupied meadows including Exchequer and Cabin Meadows, about 3,925 acres of associated potential occupied terrestrial habitat, and 33 meadows considered potential suitable habitat including about 3,382 acres of associated terrestrial habitat. An additional seven meadows are occupied within the managed fire area with 3,913 acres of potential occupied terrestrial habitat, and 59 meadows with 4,034 acres of terrestrial habitat are considered potential suitable habitat within this boundary. Most of the Project area falls within proposed critical habitat for the YT.

Generally suitable habitat within the Project area for the SYLF includes permanent streams and wet meadows above 5,000 feet elevation with an 82 foot dispersal buffer. There are currently no known locations of SYLF within the Exchequer MUG with about 647 acres of potential suitable habitat. About 26 acres of occupied SYLF habitat are within the managed fire area with about 1,093 acres of suitable habitat. There is no proposed critical habitat for the SYLF in the Project area.

Botanical Species

Within the Project area, the following botanical species occur: *Meesia triquetra* (SNF Watch list moss) in the managed fire area (in Continental Meadow), two occurrences of *Hulsea brevifolia* (short-leaved hulsea) known; *Bruchia bolanderi* (Bolander's candle moss) (in managed fire area), *Peltigera gowardii* on western boundary in two creeks (Reese Creek and unnamed creek just south of Reese Creek). *P. gowardii* (veined water lichen) is an aquatic lichen with sporadic distribution in the Sierra Nevada and is found only in streams with proper conditions (appropriate substrate, even laminar flow, limited sediment input or pollutants, cool temperatures). There is significant rock outcrop/gravel pan habitat in the Exchequer MUG, with high probability of potential rock outcrop species that may be found in the future.

Watershed

Many stream channels in the Project area were dramatically altered by hydraulic mining in the late 1800s – early 1900s. Laurel Creek, Bear Creek, and Exchequer Creek are known to have had established claims and mining camps. Stream channel incision and placer deposits can still be seen. These areas cannot be restored to pre-mining conditions, and are now stabilizing at the new level.

Twenty-seven documented Watershed Improvement Needs (WIN) sites in the Exchequer MUG were visited and evaluated to determine restoration opportunities and erosion control needs. These sites are predominantly related to stream channel incision and headcuts (vertical stream instability that lowers the water table), but also include some road-related erosion issues.

Equivalent Roaded Acres (ERA) analysis of the existing condition indicates that cumulative watershed effects (CWEs) are generally not a concern in the Project area, although some subdrainages that overlap recent surrounding projects (Dinkey South, Eastfork and Bald Mountain) are over their lower threshold of concern.
Meadows and Riparian Areas

Meadows and riparian areas exist throughout the Project area. Several of these meadows have been encroached by conifers and have declining populations of quaking aspen. Willow and other herbaceous species also occur in these areas.

There are 111 mapped meadows in the Project area; 60 of them are less than one acre in size. An aerial photo analysis was performed on the meadows greater than five acres in size that are located inside the Exchequer MUG, to evaluate changes in meadow size over time (1940s to 2012). There were five meadows evaluated (see Figure 5). Based on this evaluation, conifer encroachment was identified in all five of these meadows. Field data was collected in these meadows to characterize the numbers and sizes of the trees and to identify locations of aspen clones. There are aspen clones located in two meadows (520M170 – Exchequer and 520M82).

Three of the five identified meadows for restoration have fens or a series of fens in them (520M170 [Exchequer], 520M129 [Bear Paw], and 520M126 [Gopher]); at least one of the meadows has bull thistle that needs concurrent treatment. There are two additional fens in the managed fire area (in Continental Meadow and 520M71). Fens are a specialized habitat within meadows fed by groundwater and contain unique soil and floristic characteristics.
Figure 5. Meadows proposed for treatment in the Project area.
Noxious Weeds
Bull thistle and wooly mullein are currently known to occur in the Project area. Noxious weeds have the potential to displace native plants causing additional fuels hazards and reducing the cover of native plants.

Rangeland Management
Livestock grazing occurs in the Project area which overlaps with the Dinkey Allotment. Cattle (cow/calf pairs) are permitted to graze during the summer season from June through September. Primary use by livestock is in the montane meadows where the forage is most abundant and in forested areas where understory forage is found. The grazing system in the Dinkey Allotment is generally considered a deferred season of use where lower elevation meadows are used initially followed by higher elevations as the season and range readiness of soils and vegetation progresses.

Cultural/Heritage Resources
The Project area has a rich history of human use. In accordance with the provisions of the National Historic Preservation Act, an investigation to identify historic properties in the Project area was completed. Over 70 archaeological and historic-era sites, mostly associated with the cultural history of Native People or with historic mining activities, are within the Project area.

Recreation Resources
The Project area experiences high visitor use throughout the year and is a popular destination for hunting, hiking, off-highway vehicle use, dispersed and developed camping. The area includes the McKinley Grove Picnic Site featuring an interpretive trail to view the Giant Sequoias, the scenic McKinley Grove Road, and the Swamp off-highway vehicle (OHV) route. The Project area also supports special uses, such as apiary permits.

Visual Resources (Scenery)
As mentioned above, the Project area consists of McKinley Grove Picnic Site and McKinley Grove Road from where visitors are expected to have a high concern for scenic values. The McKinley Grove Picnic Site is designated as a destination recreational area and the McKinley Grove Road is designated as a recreational travel route that leads to the “Lake Recreation” and “Transitional” Recreation Settings, based upon the SNF’s Recreation Facility Analysis. Visitors are drawn to these settings because of the large-tree presence characteristic of the area, the presence of water features, and year-round recreation opportunities. Ecosystem stressors (e.g., high-severity fire risk, high insect/disease mortality risk) and vegetation conditions (e.g., excessive density and uniform stands) may potentially pose a threat to the scenic quality of the area.

Desired Conditions
The SNF LRMP directs that management of land and resources be designed to maintain desired conditions or to move existing conditions toward desired conditions. Landscape and stand level desired conditions were collaboratively developed by the Dinkey Collaborative, in which the DLRP strategy describes the attributes emphasized for desired conditions set forth for the landscape. The desired conditions in the following sections are a refinement of and are consistent with the desired conditions provided in the SNF LRMP, which contains the desired
condition statements for natural resources. These statements together with the DLRP strategy describe conditions that are currently not met to some degree in the Project area, and therefore identify management opportunities that were incorporated into the Project.

Fuels reduction and key wildlife species (e.g. California spotted owl) can often have different resource objectives, creating a dichotomy that may impact vegetation removal and managed fire. A balance of the desired conditions for these resources must be reached in order to establish a forest that allows for fire conditions similar to what they were historically.

**Forest Structure**

Forest structure and function generally resemble historic conditions. High levels of horizontal and vertical diversity exist within 10,000-acre landscapes. Varying relative densities are apparent across the landscape. Areas would maximize growth, while other areas would continue to perpetuate crowded conditions effectively providing more canopy cover and snag recruitment through time.

Forest structure would be consistent with historic fire-adapted stands. Species composition would favor those adapted to frequent fire and would focus on removal of fire-intolerant white fir and incense-cedar. The desired condition for forest stands is a fire resilient, all aged structure across vegetation strata and types that represents a variety of habitats. Specifically,

- achieving heterogeneity at the stand scale at a degree that reflects reference conditions,
- decreasing trees per acre in the Project area to reach the reference condition which is not more than 50 percent of the area with more than 40 trees per acre, and
- increasing the percentage of pine in mixed conifer stands to the reference condition which reflects the topographic position and forest type of each stand.

**Fire, Fuels and Providing for Safety**

Differences in fire severity created a forest structure and composition that varied by fire patterns that were controlled by slope aspect, slope steepness, topographic position and fire frequency (Stephens et al. 2007, Taylor and Skinner 2003, Beaty and Taylor 2001, Urban et al. 2000, Fites-Kaufman 1997). These studies suggest forest landscapes varied depending on fire frequency and intensity, which is largely controlled by relative moisture, fuels and topography. Resulting forest structural conditions vary based on these factors (North et al. 2009, Kane et al. 2013). The Project seeks to re-establish ecosystem process and structures similar to those consistent with frequent low to mixed intensity fire regimes. Specifically,

- outside the WUI, managing fuels to reach the referenced condition of 85 percent of the area to have less than 12 foot flame lengths in a wildfire; The other 15 percent of the Project area to be allowed greater than 12 foot flame lengths, and
- allowing prescribed fire to produce patches of single and group tree torching up to five acres to reach the reference condition of having more than 50 percent of the Project area with four snags larger than 20 inches diameter per acre.

Wildfires would be manageable in a cost-efficient manner, without threatening sustainability of resource values or human life and property outside the WUI.
Special Status Species and Their Habitat

For terrestrial wildlife species, emphasis would be put toward promoting spotted owl and fisher habitat across the landscape by retaining key nesting and foraging structures and promoting stand heterogeneity. Planning habitat alteration activities that result in low probability of territory abandonment by spotted owl and does not reduce current use by fisher would be desired. Specifically,

- Promote basal area and canopy cover in HRCA to within range of variability (Verner et al 1992) Managing tree basal area in spotted owl HRCAs to reach the reference condition which is having 220 sq. ft. per acre or 50 percent tree canopy cover within HRCAs, and

- promoting the recruitment of large diameter trees to reach the reference condition of having more than 50 percent of the Project area with three trees larger than 30 inches diameter per acre.

For aquatic wildlife species, such as the YT and SYLF, habitat would be maintained or improved.

For botanical resources, areas of known occurrences of botanical species would be preserved or increased.

Watershed

In-stream flows are sufficient to sustain desired conditions of riparian, aquatic, wetland, and meadow habitats and keep sediment regimes as close as possible to those with which aquatic and riparian biota evolved. Soils with favorable infiltration characteristics and diverse vegetative cover absorb and filter precipitation and sustain favorable conditions of stream flows. Water quality meets the goals of the Clean Water Act and Safe Drinking Water Act; it is fishable, swimmable, and suitable for drinking after normal treatment. The connections of floodplains, channels, and water tables distribute flood flows and sustain diverse habitats. The physical structure and condition of stream banks and shorelines minimizes erosion and sustains desired habitat diversity. Meadows are hydrologically functional. Sites of accelerated erosion, such as gullies and headcuts, are stabilized or recovering. Vegetation roots occur throughout the available soil profile.

Meadows and Riparian Areas

Habitat supports viable populations of native and desired non-native plant, invertebrate, and vertebrate riparian and aquatic-dependent species. New introductions of invasive species are prevented. Where invasive species are adversely affecting the viability of native species, the appropriate state and federal wildlife agencies have reduced impacts to native populations. Large woody debris would be in riparian areas to provide wildlife cover and to regulate stream temperatures.

Noxious Weeds

Noxious weeds would decrease in known populations. New weed infestations would be prevented.
**Visual Resources (Scenery)**

The Project area as viewed from McKinley Grove Picnic Site and McKinley Grove Road would display an open, park-like setting with diverse forest canopy and mosaic vegetative patterns (heterogeneity), dominated by large trees. The presence of intermediate-sized trees (primarily white fir) would be greatly reduced, especially those which crowd and weaken the more attractive larger trees.

Diversity of canopy density, species, and sizes would be more prominently displayed and the visual access through the understory would be improved. Lastly, re-introduction of wildfire evidence into the landscape is desired, primarily as patchy, irregularly shaped low-intensity burn patterns to restore mosaic vegetative patterns of heterogeneity, remove woody debris, and enhance regeneration of the understory.

**Purpose and Need for Action**

The SNF LRMP provides direction to maintain and restore ecological sustainability and emphasizes the need to modify wildland fire behavior across broad landscapes through the strategic placement of area treatments and establishment of a managed fire area by amending the LRMP (see Project-Specific Forest Plan Amendment), reduce stand density and improve tree vigor, and to improve overall forest health. The overarching goals of the Project are improvement and maintenance of key spotted owl habitat structures, the reduction of fire and hazard tree (dead or structurally damaged trees that pose a threat to humans or structures) risk to communities and fire fighters, restoration of forest health to a more natural condition characteristic of frequent-fire forests and the SNF LRMP, and meeting the interests expressed by the Dinkey Collaborative.

There is a need to protect nesting and foraging structures for California spotted owl from future wildfire and to enhance these structures, as well as nesting and foraging habitat which in turn will provide habitat for the Pacific fisher. The SNF currently provides habitat for sensitive species such as the California spotted owl and the Project area is highly productive area for owl reproduction. Wildfire poses an immediate threat to the survival of these sensitive species due to the high fuel loadings.

There is a need to restore a vigorous, diverse, forest ecosystem that is resilient to the effects of wildfire, insect and disease, air pollution, and climate change. The structure and tree species composition of the forest stands and plantations have made them vulnerable to mortality. The heterogeneity in vegetation structure would use variable residual tree density (basal area per acre) for each topographic and aspect zone to restore more historical density for trees and to provide habitat for all wildlife species, with an emphasis on the spotted owl and fisher. Frequent low-intensity fire historically controlled surface fuels and tree density, which has been interrupted by fire suppression. The need to reintroduce fire as an ecosystem process is better understood today.

There is a need to protect adjacent landowners and private property from the effects of wildfire. Existing fuel loadings and dense conifer stands within the Project area increase the potential of high intensity wildfires with individual tree torching and possible crown fires that could cause spot fires within the treated WUI area. Within the Project area the existing fuel loadings and dense conifer stands also raise the likelihood of uncharacteristic fire effects following high intensity wildfire. The SNF LRMP’s highest priority has been given to fuel reduction activities in the WUI to protect developed areas from wildland fire as well as minimize the spread of fires that may originate in these developed areas. The existing fuel conditions also increase the risk to firefighters and the public.
There is a need to reduce the safety risk from hazard trees in the Project area. Timely falling and removal of dead and unsound trees that pose a hazard in areas of public use is needed to ensure safety of the public, nearby communities, FS personnel and contractors and to provide for strategic fire protection including facilitating prescribed fire. The FS manual (FSM) direction (FSM 7733.04c) and FS Handbooks (FSH) (7709.59 Chapters 40 and 41) provide direction to manage roadways for safe passage by road users and management of roadside vegetation to remove hazard trees. Drought, disease, bark beetles and high tree density have created dead or structurally unsound trees across the landscape. Use of National Forest System (NFS) roads within the Project area increases human exposure to these trees and elevates the risk of injury and the risk during fire suppression and prescribed fire efforts from the collapse of dead or unsound trees. Removal of snags along strategic roads provides safe access to suppress future fires.

There is a need to incorporate potential ecological benefits into the fire management decision making process in locations where naturally ignited fires can be managed with minimal risk to communities and firefighters.

There is a need to improve watershed resilience and function and improve aquatic habitat for sensitive wildlife species, such as the YT and SYLF. Proper management of watersheds, riparian areas, and streamside management zones (SMZs) would provide good quality habitat for riparian species.

There is a need to restore and/or enhance meadow habitat and aspen communities. Conifer encroachment is widespread and is reducing the amount of meadow habitat in the Project area. Due to fire exclusion and grazing, aspen stands in the Project area have been overtopped by conifers. These stands have very little regeneration of aspen due to over-shading and competition for resources. Aspen habitat is particularly important for biological diversity and is limited across the landscape. The protection and enhancement of aspen stands in the Project area is needed since these habitats are declining.

There is a need to reduce the spread of noxious weeds and to protect sensitive botanical species within the Project area. Noxious weeds can displace native plants, causing additional fuels hazards, reduce the cover of native plants, and take up resources needed by seedlings.

**Proposed Action**

As mentioned in the Background section, the Project area is high priority to improve existing conditions at this place and time. The actions described below were designed to move current conditions closer to reference conditions (see Existing Conditions and Desired Conditions sections.)

The treatment descriptions below provide an overview of specific activities that would meet the purpose and need of the area. Many treatments would occur sequentially and overlap.

Applicable standards and guidelines (S&Gs) from the SNF LRMP would be followed under the treatment methods defined by the proposed action, and discussed below. However, one amendment to the SNF LRMP is proposed for the Project and is described below under Project-Specific Forest Plan Amendment. Design Criteria and Best Management Practices (BMPs) would be applied to the actions as applicable (see Design Criteria section).
**Project-Specific Forest Plan Amendment**

A project-specific Forest Plan Amendment is proposed in the eastern portion of the Project (see Figure 1) and includes the use of managed wildfire outside of a designated wilderness boundary. This managed fire area would only allow managed wildfire.

If a lightning strike fire occurs in this area, it may be allowed to burn and spread creating a natural fire adapted landscape. Numerous management considerations would need to be considered in this type of fire management.

Benefits of wildfire use may include: achievement of a more natural range and variation of fire severities, larger landscape scale reintroduction of fire, reduced cost per acre treated with fire and increased natural fire effects that are more consistent with historic reference conditions.

**Vegetation Treatments**

The proposed action would involve the vegetative treatments described below. The treatments were integrated with individual species restoration strategies that are developed as part of the landscape and Project planning processes, per the Dinkey Strategy. Aside from roadside hazard tree removal, mechanical treatments would not occur in California spotted owl PACs. Wherever possible, high and moderate quality Pacific fisher rest sites would receive no treatments, per the Dinkey Decision Priorities (Project Record), in order to retain understory structure and maintain favorable habitat conditions for the spotted owl and fisher.

Commercial thinning prescriptions are designed to consider desired conditions and the present condition of the forest. The commercial thinning areas would by thinned utilizing an all-aged silviculture prescription with no trees over 30 inches diameter at breast height (dbh) being harvested except in the case of identified hazard trees. Harvest methods to be used in the prescriptions would involve mechanical ground-based equipment (tracked or rubber-tired mechanical harvesters and skidders) to remove commercial size (10 – 29.9 inch dbh) conifer trees, as well as biomass. Merchantable cut trees would be whole tree yarded to a landing where material would be processed and removed from the site. Economic efficiency was incorporated by design into the proposed action, to the extent that the applicable S&Gs and BMPs would be met and followed. Cut trees could be removed as either biomass (chips) or as sawlog (greater than 10 inches dbh) material. Biomass can be either small trees, or waste from processing of sawlog trees. If no viable market exists for biomass, it may be piled and burned either at the landing or within the residual stand.

Bull thistle treatments would be planned, using a combination of herbicide (glyphosate) and manual removal techniques; wooly mullein can be treated with manual treatment only due to limited occurrence numbers. This does not include the herbicide treatment for brush control by silviculture. Any unknown noxious weeds found during implementation would also be treated.

**Restoration Thin**

In stands where habitat improvement and forest restoration objectives are the priority, trees would be removed according to a variable thinning prescription that corresponds to topographic variables (slope shape, aspect, position, etc.), favors pine species, and maintains key habitat structures (denning sites, foraging and roosting areas, etc.), using GTR-220 principles.

Restoration thinning would be conducted on slopes that are generally less than 35 percent. For short distances (up to 150 feet) equipment may enter slopes up to 45 percent, but generally only when stand conditions are dense enough to warrant thinning to reduce stand densities to identified levels and where soil conditions are met (see Design Criteria – Geology, Soils, and
Watershed section). Trees would be prescriptively thinned by use of a feller-buncher. Thinned material would be taken to a landing with a skidder, and processing would occur at the landing.

Individual zone prescriptions (i.e. north, south, ridge, canyon) would create varying stand density and structure throughout the Project area. A variable thinning strategy would be applied across the landscape to capture the variability of site qualities. Generally there is lowered productivity on southern slopes and ridgetops due to shallower soils and associated decreased water holding capacity, as well as increased solar radiation. North zones and canyons have higher productivity as soils are generally deeper and effective shading from solar rays is less. Sites with deeper soils and less solar radiation can sustain more trees over time, as moisture does not become limited as quickly. Site conditions favor higher density levels, and so associated canopy cover is generally higher.

Stand specific prescriptions would be based on recent and historical treatments taking into consideration where past activities have limited options for retaining clumps of large trees and placement of openings. To improve heterogeneity, clumps of small diameter trees would be retained throughout the stands, and openings would be created to allow for the planting of pine.

Restoration of native species composition is proposed through the regeneration of pine species; the retention of existing shrubs, pine, and oaks consistent with the desired condition; the enhancement of growing conditions of existing pine; and the eradication of noxious weed species. Both younger shrub age classes and pine regeneration are proposed for restoration in existing openings. The proposed action emphasizes maintenance of small brush openings (up to 10 percent of Project area) consistent with historic conditions. Pine would be regenerated in existing openings and vegetation patches with less than 25 percent canopy cover composed mostly of white fir and/or incense cedar in excess of the 10 percent needed to meet shrub expectations.

No more than 10 percent of the total acres of any given stand treatment area would be reforested with pine. In areas where competing vegetation is deemed to be problematic to establishment of planted trees, herbicide may be utilized. Competing vegetation is defined as vegetation that is undesirable at the time of planting and that would directly compete for soil, water, and nutrient resources. Other openings would be created and would not be planted with trees in an effort to increase shrub species and diversity of the understory.

An Environmental Protection Agency (EPA) registered borax fungicide would be applied on stumps of cut trees greater than 15 inches dbh along McKinley Grove Road and main collector roads to prevent the spread of annosus root disease and hazard trees in public use areas. In developed recreation sites, this application would occur on all fir stumps.

Large down woody debris would be retained as needed for ecological improvement, but would not generally exceed 20 tons per acre. In areas low (less than five tons per acre) in large woody debris and outside of WUI defense zones and major travel corridors, dropping and retaining large trees (generally between 24 and 30 inches dbh) would be an option and would follow SNF LRMP S&Gs for retaining large woody debris. Public and firefighter safety would be the primary consideration within the WUI and for the basis for prescriptions, including residual densities and fuel loadings.

**Treatments Inside and Outside of HRCAs**

Treatments in California spotted owl HRCAs would be designed to result in a very low probability of abandonment of active owls in a way that is effective for the species as well as reduce fire risk. A restoration treatment retaining more trees would be applied while maintaining
canopy cover at or above 50 percent across a treatment area. This prescription is designed for wildlife objectives, not a restorative treatment.

Spotted owls select habitat at multiple scales, with less flexibility in the nesting and roosting habitat requirements, and more flexibility in the foraging habitat. Forest heterogeneity, with various vegetation communities or fire severities infused into late-successional forest, may improve spotted owl fitness (GTR-237 pg. 61). Because owls use a variety of habitats for foraging and nesting, there is a possibility that forest heterogeneity across the landscape may improve spotted owl viability. The prescription for clumps was designed to retain patches of dense forest with large structures and improve their resilience to wildfire while maintaining canopy density. Clumps of trees are a grouping of trees identifiable by density, species mix, tree size or presence of snags. Clumps have an identifiable edge, they can be walked around.

Large tree clumps would be maintained inside and outside of HRCAs. A clump consists of an up to five acre patch of California Wildlife Habitat Relationship (CWHR) types 5M, 5D, or 6, preferably with a few trees having physical characteristics suitable for owl roosting and fisher resting. Clumps would be pre-identified using LiDAR\(^4\) and/or aerial photo analysis to get a better sense of preferred habitat. Clumps would also be identified on the ground and marked in a clumped distribution of leave trees rather than an even-spacing distribution of leave trees (see Dinkey Decision Priorities). The following plan IDs are an example of where these treatments may be included\(^5\): 336, 337, 356, 377, 523, 534, 1034, and 1045.

**Inside HRCAs –**

1. Identify the two to five acre patches of 5M, 5D and 6.
2. Retain known and potential nest and roost trees.
3. Clumps would have mechanical treatment to remove surface and ladder fuels.

**Outside HRCAs -**

4. Identify the two to five acre patches of 5M, 5D and 6.
5. At a minimum, clumps will have mechanical treatment to remove surface and ladder fuels.

**Snag Recruitment**

Recruitment of large snags would occur through prescribed fire treatments and through the retention of dense areas across the landscape. Snags would be maintained throughout the Project area in stands that do not meet the SNF LRMP S&Gs if they do not pose a threat to public and fire fighter safety.

**Ladder Fuels Treatments**

A ladder fuels prescription (mechanical) would be applied within the 700-acre den buffer surrounding fisher den sites to reduce surface and ladder fuels sufficient to meet fire behavior and fuel standards (S&G 86).

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\(^4\) LiDAR is a remote sensing technology that measures distance by illuminating a target with a laser and analyzing the reflected light.

\(^5\) This example of plan IDs may change during analysis and or field verification of treatments.
**Plantation and Reforestation Treatments**

There are existing plantations and shelterwoods that occur within stands in the Project area. In selected plantations (consisting mainly of 35 to 45 year old Jeffrey pine), trees would be commercially thinned using a plantation thin prescription to accelerate large tree development and create heterogeneity.

The understory in shelterwoods dominated by trees less than 10 inches dbh (e.g. seedlings, saplings and poles) would be thinned to leave between 150 and 225 trees per acre.

Openings would be created or existing openings would be accentuated within pine plantations by removing commercial size trees. Openings would be planted with fir or pine to create heterogeneity. Openings would occur in up to five percent of treatment areas and would be less than one acre in size or the size of existing openings.

Brush would be cut concurrently with thinning to reduce brush cover and provide improved resource conditions for the plantation trees. Brush would be masticated or tractor/grapple piled and burned.

Reforestation treatments (site preparation, planting, release of seedlings, etc.) would occur in stands proposed for restoration thinning and some openings within existing plantations.

Site preparation treatments are proposed to reduce competing vegetation prior to the planting of conifer seedlings. Site preparation would be conducted in combination with fuels treatments. Following planting of seedlings, release treatments would occur to control vegetation that is competing with the seedlings and saplings. This involves removing the competing vegetation using manual, mechanical, or chemical methods, or a combination of these methods. To be effective, release treatments need to remove vegetation within a five foot radius around each tree. The treatments could involve up to two entries over the Project implementation period (10 years).

For chemical applications, glyphosate herbicide would be directly sprayed (using colored dye to know what has been treated) only to the target species that would compete with the conifer seedlings planted. Extensive re-sprouting is usually eliminated with this type of treatment. One or two applications would be used depending on the competing species.

- **One application** would be typically used with species that sprout but whose roots are controlled with one application of herbicide, such as whitethorn. Subsequent manual release treatments are used to control brush seedlings. Brush is often shredded or tractor piled to reduce the size of plants and make subsequent chemical treatments more effective. Hand/manual release is often used in combination with one application of chemical.

- **Two applications** would typically be used for species that sprout prolifically from roots or rhizomes and where grass invades following initial treatment or when plants larger than two feet are present. Ceanothus cordulatus and green leaf Manzanita are prolific sprouters.

**Fuels Reduction Treatments**

In stands where fire risk reduction is the priority, trees that could act as ladder fuels, flammable brush, and slash generated by the other thinning activities would be removed; and crowns would be separated to reduce the possibility of crown fire where necessary. Fuels reduction treatments along strategic roads (i.e. McKinley Grove Road, Big Fir Road) are also proposed. The following methods may be used.
Proposed Action for Scoping

Strategic Fuels Treatment

A strategic fuels treatment is proposed for the Project to reduce the potential risk of wildland fire to the WUI and to resources in the area. Strategic roads in the Project area include McKinley Grove Road and Big Fir Road (10S13). These roads would be used as strategic holding points in the case of a large fire coming up the canyon and also as containment lines for prescribed fire.

Hazard Tree Removal

Falling and removing unstable and dead trees identified as hazards is proposed to meet the need to provide for safety. Determinations of hazard trees would be identified using the Hazard Tree Guidelines for Forest Service Facilities and Roads in the Pacific Southwest Region, 2012 and the Sierra National Forest: High Sierra Ranger District Marking Guidelines Roadside Hazard Tree Removal Projects, 2013 (Project Record).

Hazard trees would be assessed within 300 feet of a road or developed areas; however, the majority of hazard trees are anticipated to be within one tree height of these areas or approximately 150 feet. Hazard trees along roads and near structures would be felled and removed for safety and fuels reduction purposes. See Figure 6 for approximate location of hazard tree removal.

The following activities are proposed for Strategic fire roads, roadside on maintenance level 4, 3, and 2 roads, and public use areas (i.e. McKinley Grove Picnic Site) for safety hazard treatments:

- Fall and mechanically remove hazard trees utilizing ground-based systems. Non-merchantable trees may be felled, masticated (shredded), machine piled, or removed as biomass and merchantable trees would be removed as sawlogs.

- Lop and scatter (less than or equal to 18 inches depth) non-merchantable trees and project created slash within 75 to 125 feet from the road prism or within streamside management zones (SMZs) outside of other restoration treatment areas.

- Within 75 feet of the 11S40 (McKinley grove road) and 10S13 (big fir loop road), pile and burn non-merchantable and project created slash to create and maintain a strategic control point and increase firefighter safety and fire control operations outside of other restoration treatment areas.
Figure 6. Roadside Hazard Tree Removal in Project Area.
**Activity Fuels and Natural Fuels Treatment Methods**

Grapple piling on slopes up to 45 percent would occur for fuels reduction of surface and ladder fuels. This treatment involves piling of dead and down material (fuels and slash) with a tracked grapple excavator to minimize ground disturbance. Material would be left on site and burned.

Mastication on slopes up to 45 percent would occur for fuels reduction of surface and ladder fuels. This prescription involves mechanically shredding small trees using tracked equipment (low-ground pressure) with a masticating head on an articulating arm. Shredded material post treatment would generally be at a maximum depth of 15 inches.

Tractor piling would occur to reduce surface fuels. This involves piling of fuels with a brush rake attached to a tracked machine.

**Prescribed Fire**

Prescribed fire would be used as a fuels reduction treatment and as a tool to restore natural processes. Activity piles generated from hand and mechanical prescriptions would be burned in this treatment.

Underburning involves the burning of stands by aerial ignition and/or hand ignition techniques under prescribed conditions. Underburning within the Project would seek to mimic natural ignitions varying from low and moderate intensity to patches of high intensity fire. These prescribed ignitions would seek to reduce fuels within the WUI and areas outside the WUI until expected flame lengths from a wildfire are expected to be under four feet and under 12 feet respectively.

Control lines would seek to use existing roads and natural features where feasible. Hand and dozer line may be used where needed. Control lines would need to be scraped to bare mineral soil to be effective. Constructed control lines would be rehabilitated by following forest management guidelines.

Fire in and around meadows and riparian areas would follow specialist recommendations and BMPs. Techniques may include backing fire, limited ignition devices, and jack pot burning to manage for wildfire, aiding aspen growth and to address conifer encroachment. Meadows within the Project are at relatively high elevation and therefore tend to stay too moist to carry fire most years with the exception of a very dry year. Hand cut jackpots can be ignited in non-YT occupied meadows and fire be allowed to spread if possible given moisture conditions. See Meadow Restoration Prescription section below for site specific treatments.

Within McKinley Grove, prescribed fire would be used to stimulate the growth of sequoias and reduce fuel loads. Sequoia seedlings need moisture, light and a thin duff/litter layer (less than two inches). They also need canopy gaps for successful germination and growth. At the McKinley Grove Picnic Site, handline would be placed around infrastructure and amenities (bathrooms, picnic tables, signs) as well as large downed sequoia logs around the interpretive trail at the site to protect from prescribed fire.

**Cultural Burn**

Cultural burning in the Project area would involve managing specific black oak stands for acorn production based on potential production and access for Native American practitioners. This includes putting fire and smoke under the trees and tending the area around and under the trees by keeping it clean of accumulated duff and litter. Ultimately this small scale burning would lead to acorn harvesting and increased food for wildlife.
Watershed Restoration Treatments

Actions are proposed to maintain or improve the function and resilience of riparian areas and watersheds. Treatment objectives include maintenance and restoration of: meadow vegetation including herbaceous vegetation, willows, and aspen; surface and groundwater levels; wildlife habitat; and cultural use of plants (sedges).

Meadow Restoration Prescription

Site-specific treatments are proposed to preserve, improve, and/or restore meadow function in five meadows in the Project area, including treatments inside the 100-foot wide Riparian Management Areas (RMAs) associated with these meadows. Four of these five meadows proposed for meadow restoration are YT occupied. Restoration would be accomplished by a series of activities including removal of encroaching conifer, aspen stand enhancement, and stream headcut repair and maintenance of previous watershed repairs, and willow enhancement. Table 2 below provides approximate acres of meadows and treatments. Detailed descriptions, site-specific treatments, and detailed maps for each of the meadows listed in Table 2 will be developed during analysis.

<table>
<thead>
<tr>
<th>Meadow Area Number</th>
<th>Meadow Name</th>
<th>Plan ID associated with meadow</th>
<th>Adjacent Plan IDs w/ Periphery Treatments</th>
<th>Resource concerns</th>
<th>Current Meadow Acres</th>
<th>Acres of Mdw Encroachment Within Meadow</th>
<th>Other treatments proposed</th>
</tr>
</thead>
<tbody>
<tr>
<td>520M170</td>
<td>Exchequer</td>
<td>238</td>
<td>211, 219, 223, 233, 242, 260, 960</td>
<td>YT occupied, PAC in adj plan IDs</td>
<td>20.5</td>
<td>4.0</td>
<td>headcut repair, willow enh.; sedge enh.</td>
</tr>
<tr>
<td>520M129</td>
<td>Bear Paw</td>
<td>1034</td>
<td>173</td>
<td>YT occup., fen, HRCA11</td>
<td>5.7</td>
<td>0.4</td>
<td>none</td>
</tr>
<tr>
<td>520M124</td>
<td>n/a</td>
<td>317</td>
<td>348, 349</td>
<td>YT occup.</td>
<td>21.6</td>
<td>5.7</td>
<td>none</td>
</tr>
<tr>
<td>520M126</td>
<td>Gopher</td>
<td>317</td>
<td>None</td>
<td>YT occup.</td>
<td>6.7</td>
<td>1.6</td>
<td>none</td>
</tr>
<tr>
<td>520M82</td>
<td>No name</td>
<td>501</td>
<td>506, 532</td>
<td>n/a</td>
<td>15.3</td>
<td>2.9</td>
<td>none</td>
</tr>
<tr>
<td>Totals:</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>69.8</td>
<td>14.6</td>
<td></td>
</tr>
</tbody>
</table>

The treatment types are described below, and applicable design criteria are described in the Design Criteria section. Table 4 below summarizes the proposed treatments by proximity to the meadow (periphery treatments).

Remove Encroaching Conifer in Meadows

Conifer encroachment into meadow and riparian areas considered for this Project is based on 1940s aerial photographs (Project record, HSRD office). In the five meadows listed in Table 2 above, encroaching conifers would be cut by hand using loppers or chainsaws and removed. The material would be bucked, lopped in the meadow, followed by jackpot burn (not in occupied toad meadows) using drip torches and removed and piled outside the meadow in an authorized location.
Stimulate Aspen

There are aspen clones located in two meadows (520M170 - Exchequer Meadow and 520M82, see Table 2 above) that are proposed for treatment to stimulate aspen. In this treatment, selected trees that shade aspen clones would be removed. This treatment would extend at least one dominant tree height, or approximately 100 feet, from existing aspen sprouts. No trees over 30 inches dbh would be removed.

There would be no piling of activity generated fuels within 50 feet of the identified and flagged clone areas to avoid damaging the clone with heat from burning piles. Trees removed would be felled away from clones. Equipment would be allowed to come within 50 feet of the tree to pull felled trees out of the area. Residual fuel loading post treatment is approximately five tons per acre within the clone and within 100 feet of the clone to provide for clone expansion post treatment. Tree removal and slash treatment would be followed by ground disturbance to stimulate aspen sprouting. This disturbance would be accomplished by prescribed burning or by hand or mechanized disturbance. Table 3 describes the various techniques that could be used to accomplish the disturbance.

Table 3. Possible disturbance techniques to stimulate aspen sprouting.

<table>
<thead>
<tr>
<th>Potential Disturbance Method</th>
<th>Description of Method</th>
</tr>
</thead>
<tbody>
<tr>
<td>Prescribed burn</td>
<td>Burn would need to be hot enough to disturb the clone but not so hot as to damage it (ensure clonal survival). The low fuel moisture levels needed for a successful burn in these riparian areas are an infrequent occurrence, and would only occur for a short period during an unusually dry year.</td>
</tr>
<tr>
<td>Ripping by hand (also termed 'trenching')</td>
<td>Hand tools would be used to remove strips of sod and chop the exposed soils to a depth of approximately 20 inches. The sod strips would then be put back in place. The strips would be approximately eight inches wide, with a spacing of approximately 18 – 24 inches.</td>
</tr>
<tr>
<td>Ripping with mechanical equipment</td>
<td>The area would be mechanically ripped to 20 inches in depth using tines mounted on a tractor. The spacing of the ripping tines is typically 18 – 20 inches.</td>
</tr>
</tbody>
</table>

Any (or some) existing old fences would be removed from the meadow by hand and taken off site. New fences may be constructed around the clone areas to protect the young aspen from trampling and browsing. Fences would be eight feet tall to exclude both cattle and deer, and would be let down each year prior to significant snowfall and put up each spring. The fences would remain in place until monitoring indicates that enough aspen have established and are tall enough to withstand incidental browsing (approximately five years).

Stimulate Willow

Large decadent willow clumps would be cut/pruned or burned to stimulate regeneration. This treatment is proposed only in Exchequer Meadow. Treated willows would be monitored five years post treatment. Grazing management strategies would be implemented and/or temporary.

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6 An aspen clone consists of aspen trees with identical characteristics that share a single root structure.
exclosures/barriers would be constructed to protect willow regeneration from herbivory during that timeframe, if deemed necessary.

**Treatments in Meadow Periphery Areas**

Treatments near meadows are designed based on habitat and stand characteristics, as shown in Table 4.

Any mechanical treatments within 100 feet of meadows would have a north aspect prescription from GTR-220, while Jeffrey pine plantations would be thinned to the basal area ranges displayed in Table 4.

In the areas surrounding most of the meadows, underburning would follow the thinning treatments as part of the surrounding stand treatments. The burning is included in the proposed treatments for these Plan IDs. For meadows whose adjacent stands do not include proposed prescribed burning treatments, the zone extending 100 feet from the meadow edge are considered jackpot burn areas for the analysis. However, since only portions of these areas have thinning treatments proposed, burning would only be conducted where the on-the-ground conditions are conducive for the treatment.

**Table 4. Meadow and Meadow Periphery Treatments by vegetation type, slope, and distance from the meadow.**

<table>
<thead>
<tr>
<th>Distance from Meadow Edge (feet)</th>
<th>Slope</th>
<th>Meadow</th>
<th>Mixed Conifer Stand</th>
<th>Jeffrey Pine Plantation</th>
<th>Prescribed Fire Treatments</th>
</tr>
</thead>
<tbody>
<tr>
<td>Inside Meadow</td>
<td>-</td>
<td>Hand thin trees</td>
<td>-</td>
<td>-</td>
<td>under burn</td>
</tr>
<tr>
<td>0 – 25</td>
<td>-</td>
<td>Hand thin trees (or reach in with equipment) using North Aspect prescription from GTR-220. End line trees out of zone, or lop and scatter; or remove and pile</td>
<td>Hand thin trees (or reach in with equipment) to a minimum of 180 ft² basal area. End line trees out of zone, or lop and scatter; or remove and pile</td>
<td>Prescribed fire may back in to meadow areas</td>
<td></td>
</tr>
<tr>
<td>25 – 100</td>
<td>≤15%</td>
<td>Use North Aspect prescription from GTR-220. Allow mechanical yarding, following design criteria.</td>
<td>Thin trees to 160 to 180 ft² basal area. Allow mechanical yarding, following design criteria.</td>
<td>As proposed for adjacent Plan IDs OR jackpot burn where appropriate given the specific fuels and vegetation conditions</td>
<td></td>
</tr>
<tr>
<td>&gt;15%</td>
<td>-</td>
<td>Exclude equipment. Use North Aspect prescription from GTR-220 only in the outer 50 feet, and end line trees out of zone.</td>
<td>Exclude equipment. Thin trees to 160 to 180 ft² basal area only in the outer 50 feet, and end line trees out of zone.</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

28
Watershed Improvement Need Sites Restoration

WIN site treatments are proposed to control erosion and maintain or improve the function and resilience of watershed and riparian areas. Restoration of WIN sites could utilize the local community workforce, including possible integration with the Hands on the Land program. The WIN sites and proposed treatments are shown in Table 5. Treatments would include:

**Improve drainage** – Actions related to managing the flow of water along and off of roads or trails. This would entail maintaining and installing rolling dips and installing energy dissipation (using rock or woody material) at dip outlets to encourage water to spread and infiltrate, thereby reducing downslope erosion.

**Stabilize headcut** – Addresses vertical channel instability, often through construction of a ‘bowl’ structure, rock step pools, or log step falls. Actions may include reshaping the face of the headcut to achieve a more stable angle; placing geotextile fabric; placing logs or rock; and establishing woody or herbaceous riparian vegetation.

**Stabilize channel / stabilize stream banks** – Actions are specifically tailored to each site and address the cause of instability at that location. Possible treatments include: reshaping stream banks to a more stable angle; installing jute netting or other erosion control product; establishing woody or herbaceous riparian vegetation; placing rock to harden vulnerable areas or redirect stream energy; or redirecting livestock away from the area.

**Protect from livestock** – Treatment areas that would be vulnerable to livestock trampling would be temporarily protected until they have stabilized. This would be accomplished through construction of small temporary drop-down fences made of t-posts, hog wire panels, and zip ties, or through arrangement of logs to divert livestock away from the repaired sites.

**Install erosion control** – These actions are also tailored to the site-specific processes causing erosion at a given location, and focus on establishing ground cover. Methods could include jute netting or other erosion control product; establishing vegetation; placing rock; or placing rock or wood dissipaters to encourage water dispersal and sediment deposition.

**Realign road** – Develop short section of new road alignment to avoid resource impacts, and close and restore the existing segment that is causing impacts.

**Rehabilitate landing** – Implement corrective actions to mitigate damage caused by landing on moist soils. May include ripping to mitigate compaction, waterbarring or placement of jute netting to minimize erosion, and/or establishing vegetation.

**Remove culvert** – Remove culvert pipe from stream channel. There is no fill remaining around the culvert so this would not require removal of fill material.
Table 7. Documented WIN sites with proposed treatments.

<table>
<thead>
<tr>
<th>WIN Site #</th>
<th>Plan ID</th>
<th>Meadow</th>
<th>Description</th>
<th>Proposed Treatment</th>
<th>Timing</th>
</tr>
</thead>
<tbody>
<tr>
<td>54382</td>
<td>60, 96</td>
<td>N/A</td>
<td>Erosion and sediment delivery from closed skid trails</td>
<td>Improve drainage</td>
<td>Any – no stand treatments proposed in these Plan IDs</td>
</tr>
<tr>
<td>54048A</td>
<td>520M170</td>
<td></td>
<td>3 headcuts repaired in 1992, all repairs have failed</td>
<td>Stabilize headcuts, maintain existing structures, temporarily protect restored area from livestock</td>
<td>During low flow conditions.</td>
</tr>
<tr>
<td>54313</td>
<td>520M170</td>
<td></td>
<td>Very large headcuts at lower end of Exchequer Meadow; repairs have failed</td>
<td>Stabilize headcuts, maintain or replace existing structures, temporarily protect restored area from livestock</td>
<td>During low flow conditions.</td>
</tr>
<tr>
<td>54365</td>
<td>520M170</td>
<td></td>
<td>Off-channel headcut and gully</td>
<td>Stabilize headcut, repair gully, temporarily protect restored area from livestock</td>
<td>Based on YT.</td>
</tr>
<tr>
<td>54374</td>
<td>520M171</td>
<td></td>
<td>Bank erosion</td>
<td>Stabilize channel / stabilize streambanks, protect restored area from livestock</td>
<td>Based on YT.</td>
</tr>
<tr>
<td>54367</td>
<td>302</td>
<td>N/A</td>
<td>Road erosion on 10S13MA / sediment deposition</td>
<td>Improve drainage</td>
<td>Road work before stand treatments occur (WIN site location is outside project area boundary, but road is required for access)</td>
</tr>
<tr>
<td>54392</td>
<td>302, 311, 342</td>
<td>520M120</td>
<td>Hydraulic mining impacts in Mar-Y-Mac tributary to Exchequer Cr (and washed out culvert / road erosion on 10S13M – to be corrected by road work under Bald Mountain Project).</td>
<td>Stabilize headcuts in tributary channels.</td>
<td>Headcut work during low flow conditions.</td>
</tr>
<tr>
<td>54013</td>
<td>243, 309, 310, 322</td>
<td>N/A</td>
<td>Hydraulic mining impacts in Laurel Creek</td>
<td>Plant riparian vegetation to enhance channel recovery. Stabilize headcuts in tributaries.</td>
<td>During low flow conditions. If using willow cuttings, during dormancy.</td>
</tr>
<tr>
<td>54059</td>
<td>317</td>
<td>520M124, 520M125</td>
<td>Hydraulic mining and trampling impacts in Cabin Meadow complex</td>
<td>Stabilize headcuts in tributary channels. Develop off-site water</td>
<td>During low flow conditions.</td>
</tr>
<tr>
<td>54060</td>
<td>315</td>
<td>520M123</td>
<td>Hydraulic mining impacts in Cabin Meadow Trib to Laurel Creek</td>
<td>Plant riparian vegetation to enhance channel recovery. Stabilize headcut in tributary.</td>
<td>During low flow conditions. If using willow cuttings, during dormancy.</td>
</tr>
<tr>
<td>54224</td>
<td>438</td>
<td>N/A</td>
<td>Headcut in ephemeral channel formed by the 10S13 road prism</td>
<td>Stabilize headcut</td>
<td>Anytime.</td>
</tr>
<tr>
<td>54912</td>
<td>N/A</td>
<td></td>
<td>Two headcuts at intermittent stream crossing of 10S432</td>
<td>Stabilize headcuts</td>
<td>During low flow conditions</td>
</tr>
<tr>
<td>54061</td>
<td>414</td>
<td>520M89</td>
<td>Headcuts and gully, loss of meadow hydrology</td>
<td>Stabilize headcuts</td>
<td>During low flow conditions</td>
</tr>
<tr>
<td>54267</td>
<td>414</td>
<td>Some in 520M89</td>
<td>Series of headcuts along Trib to Bear Creek.</td>
<td>Stabilize headcuts</td>
<td>During low flow conditions</td>
</tr>
</tbody>
</table>
### Purpose and Need/Proposed Action

**Exchequer Restoration Project**

<table>
<thead>
<tr>
<th>WIN Site #</th>
<th>Plan ID</th>
<th>Meadow</th>
<th>Description</th>
<th>Proposed Treatment</th>
<th>Timing</th>
</tr>
</thead>
<tbody>
<tr>
<td>54268</td>
<td>414</td>
<td>N/A</td>
<td>Crushed culvert and stream crossing erosion on plantation access temporary (unauthorized route KD-188)</td>
<td>Pull culvert and properly close (treat as a temporary road).</td>
<td>Correct crossing problems prior to use of road to access Plan ID 414. Properly close (treat as temp road) after plantation work is completed.</td>
</tr>
<tr>
<td>54301</td>
<td>516</td>
<td>(unmapped / no#)</td>
<td>Old landing and road in unmapped meadow area.</td>
<td>Realign road 10S24B and rehabilitate landing</td>
<td>Use landing for roadside hazard removal if needed, prior to rehabilitation. (No adjacent stand treatments.)</td>
</tr>
<tr>
<td>54351</td>
<td>552</td>
<td>N/A</td>
<td>Washed out culvert near end of road 10S24A</td>
<td>Remove culvert, stabilize stream banks.</td>
<td>During low flow conditions. Timing related to other treatments = anytime.</td>
</tr>
</tbody>
</table>

### Restore Unauthorized OHV Trails

Restore site productivity to approximately 3.5 miles of unauthorized routes, roads, or trails within the Project boundary. Restoration of an unauthorized route, road, or trail is defined as discontinuing motor vehicle use and either actively providing erosion control and revegetation or allowing natural recovery over time. Restoration would be accomplished through barricades and signage, water bar installation and/or mechanical treatments.

### Roads and Landings

There are approximately 80 miles of NFS Roads within the Project area. A portion of these roads would require maintenance and reconstruction to support Project access and eliminate or minimize resource damage. Project area roads were inventoried using a modified version of the Region 5 Road Inventory Project Field Methods, in order to determine the locations where road runoff and/or sediment enter streams. This information was used to identify road segments where maintenance or drainage improvement could benefit watershed condition. The areas identified were then evaluated by FS Engineering staff to determine the work needed.

No new permanent road construction would be required to accomplish the proposed activities. Temporary roads may be constructed and are generally short segments of approximately 0.1 to 0.2 miles in length constructed to access treatment units and log landings. These roads provide a temporary transportation link between the treatment area and the FS roads. Following completion of treatment activities, temporary roads would be rehabilitated to a near natural condition and would be blocked consistent with timber management and road BMPs to maintain water quality.

Road reconstruction would occur on some roads to support access to treatment units without allowing for damage to resources. Activities may include rock and log removal, grading, and brush clearing. Plugged culverts would also be cleared. This type of reconstruction does not change the road standard or intended access.

Road maintenance would occur on roads needed for access to treatment units. Some maintenance would be needed prior to Project completion, including repair of damage from wet weather planting traffic. Road maintenance activities would include roadside brushing, installation of waterbars or rolling dips, grading, cleaning ditches and culverts, and removing small trees and limbs that interfere with traffic and/or visible sight distance around curves.
Landings would be included in the commercial treatment units located at the end of the temporary road segments or adjacent to FS roads. Landings that already exist within the Project area would be utilized, although some may be enlarged or re-created to accommodate the removal of trees and/or biomass. All landings (new and existing) would meet BMPs and other direction for location, development, use and rehabilitation.

**Design Criteria Incorporated into the Proposed Action**

To minimize potential adverse impacts to resources in the area from this Project, the following design criteria would be incorporated into the Project. The design criteria would apply to all Plan IDs in the Project unless specifically noted. The design criteria are categorized by resource but many of the criteria may apply to and reduce impacts to other resources as well. All applicable SNF LRMP S&Gs are incorporated into the Project design. Conservation Measures and Terms and Conditions from appropriate Biological Opinions relating to the Project would also apply where applicable.

All applicable BMPs would be incorporated into all Project activities and implemented to protect water quality (S&G 124). Specific BMPs and the activities to which they apply are listed in the BMP table located in the Project Record. BMPs would be included in Project contract specifications and maps, and adhered to during Project implementation. Implementation of BMPs (FSH 2509.22 Ch. 10, Region 5 Supplement 2011) is required to meet the requirements of the Clean Water Act and agency obligations to the State Water Resources Control Board (SWRCB).

Additional design criteria and mitigation measures may be added during Project development and analysis.

**Terrestrial Wildlife**

**General Wildlife**

1. Where traffic and other disturbance needs to be minimized in and/or adjacent to fisher den buffers, PACs, HRCAs and deer use areas, landings would be blocked with log and dirt berms. Shrubs or trees would be planted, or slash would be dispersed on the landings and on skid trails within 100 feet of the landings to further discourage vehicular use, if needed. If dispersed slash is needed to discourage vehicular use within a landing, a fire line would be placed around the perimeter (professional opinion; S&G 90).

2. Before work occurs, coordinate with the wildlife biologist to determine nesting status of spotted owls. (SNFPA S&G 75)

3. Clumps would be identified within the CWHR types 5M, 5D and 6 (LPWG). If treatments occur in these clumps the CWHR type would remain the current designation (e.g. 6 would remain 6) (SNFPA, Table 1).

**Snags, Down Logs, and Trees with Unique Wildlife Structures**

4. Four of the largest snags per acre greater than 15 inches dbh would be retained in the westside mixed conifer and ponderosa pine types, and westside hardwood ecosystems (S&G 11). Within the mixed conifer forest type, preferred snag species would be ponderosa pine except where great gray owl design criteria indicate otherwise. (Professional opinion)

5. Six of the largest snags per acre greater than 15 inches dbh would be retained in the red fir forest type (S&G 11).
6. Snags would be clumped and distributed irregularly across treatment units. Consider leaving fewer snags strategically located in treatment units within the WUI (SNFPA S&G 11).

7. Three of the five required down logs per acre (SNF LRMP) would be in the largest size classes, in decay classes 1, 2, & 3 (SNFPA S&G10), and at least 20 inches by 20 feet (North Kings Deer Herd [NKDH] Management Plan [Winter et al.1970]). Down logs would be distributed throughout treatment units. S&Gs specific to deer would be followed.

8. To provide for future snags, and/or nesting, denning, and resting structures, live trees greater than 15 inches dbh that have unique characteristics would be retained: evidence of known or potential cavities; broken tops; conks or other heart-rot indicators; mistletoe or other abnormal witches broom formations or other diseased or insect damaged trees; teakettle branches; forked tops; broken large branches, or large lateral branches (SNFPA S&G 11).

9. Piles would not be placed within at least 20 feet from snags, down logs, nest trees, trees with unique characteristics that are retained for wildlife. They would also be placed at least 20 feet away from the 25-foot buffers placed around Fisher den trees and rest site clumps (Dinkey Decision Priorities, Project record).

10. Prescribed fire prescriptions (timing and firing pattern) would minimize impact upon snags, down logs, nest/den/rest trees, and other trees retained for wildlife (S&G 90).

### Oaks

11. Where possible, openings would be created around existing actively-growing California black oak to stimulate natural regeneration (SNFPA S&G 18).

12. All montane hardwoods with a dbh of 12 inches or larger would be retained (SNFPA S&G 23). The mix of oak age classes and species would be retained. An adequate amount of seedlings, saplings, and poles would be ensured to replace large oaks that die.

13. Vegetative cover would be maintained beneath and around large decadent oaks to provide hiding cover for wildlife. Overtopping of decadent oaks would not be prevented (professional opinion and portion within Dinkey Decision Priorities).

14. Planting of oaks (along with pine) would be considered in regeneration areas of one or two stands, where oaks are deficit. The oak regeneration success would be monitored (professional opinion).

15. Trees would not be planted within 20 feet of the edge of hardwood tree crowns (SNFPA S&G 26).

### Special Status Terrestrial Wildlife

**Pacific Fisher**

16. Key large tree denning structures needed by Pacific fisher would be retained to the extent possible (SNFPA 2004). Dinkey Decision Priorities would be implemented with regards to den structures and suitable habitat for fisher.

17. Fuel treatments in fisher den site buffers would be avoided to the extent possible. If areas within den site buffers must be treated to achieve fuels objectives for the urban wildland intermix zone,
treatments would be limited to mechanical clearing of fuels. Ladder and surface fuels would be treated to achieve fuels objectives (S&G 86).

18. Southern Sierra Fisher Conservation Area: Prior to vegetation treatments, design criteria such as prescribed burning techniques would be implemented to protect important habitat structures as identified by the wildlife biologist, such as large diameter snags and oaks, patches of dense large trees (1/4 to 2 acres in size), key large tree nesting structures, small understory trees, and coarse woody material. Mechanical treatments would be used when appropriate to minimize effects on preferred fisher habitat elements (S&G 90).

**California Spotted Owl**

19. **Within HRCAs**: At least 50 percent canopy cover averaged within the treatment unit would be retained (S&G 7).

20. **Outside HRCAs**: At least 50 percent canopy cover would be retained within the treatment unit. Where canopy cover must be reduced below 50 percent, at least 40 percent canopy cover averaged within the treatment unit would be retained (S&G 7).

21. **Within spotted owl PACs activity center**, including the 500-foot radius buffer, prescribed burning would be allowed to reduce surface and ladder fuels. Hand treatments, including handline construction, tree pruning, and cutting of small trees (less than 6 inches dbh), may be conducted prior to burning as needed to protect important elements of owl habitat. Mechanical treatments are prohibited within a 500-foot radius buffer around a spotted owl activity center within the designated PAC for treatments in WUI defense zones (S&G 73). However, hazard trees may be removed mechanically within PACs (professional opinion).

22. **In PACs located outside the WUI**, limit stand-altering activities to reduce surface and ladder fuels through prescribed fire treatments. In forested stands with overstory trees 11 inches dbh and greater, prescribed fire treatments would be designed to have an average flame length of 4 feet or less. Hand treatments, including handline construction, tree pruning, and cutting of small trees (less than 6 inches dbh) may be conducted prior to burning as needed to protect important elements of owl habitat (S&G 74).

**Great Gray Owl**

23. Prior to implementation of treatments, great gray owl surveys would be conducted in meadows within great gray owl habitat to determine presence; active nest sites, activity centers, and/or foraging perches would be identified; and limited operating periods (LOPs) and applicable design criteria would be determined (Great gray owl protocol 2000).

24. Avoid treatments or, retain 60 percent canopy cover, within 500 feet of known great gray owl nests (professional opinion).

25. Five to six snags greater than 24 inches dbh and at least 15 feet tall would be retained/recruited within 300 yards of meadows that provide great gray owl habitat (meadows or meadow complexes that total 10 acres or more and are between 2,500 and 8,000 feet in elevation). Broken top cedar or fir snags would be retained, where available. (Great gray owl protocol 2000)

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7 LOP is a period of time where treatment activities are limited or prohibited within a given area.
Willow flycatcher

26. Willow flycatcher surveys would be conducted in Exchequer meadow for treatment prior to implementation to determine if a LOP is needed. (Professional opinion)

Deer

27. While meeting the down log requirements provided above under Snags, Down Logs, and Trees with Unique Wildlife Structures design criteria section, two to three logs at least 20 inches in diameter at the large end and 20 feet long per acre would be retained/recruited within 100 yards of meadows, standing water, regeneration cuts, and young plantations that are open enough to provide shrubs for browse and herbaceous vegetation for forage (NKDH Management Plan).

28. The use of prescribed fires in older pine plantations would be encouraged to manipulate competing vegetation. This is especially desirable in population centers. Where prescribed fire cannot be done, mechanical release treatments would be implemented in plantations to increase forage values by promoting new growth and maintaining forage within animal reach. This would also be implemented in natural shrub patches to maintain browse, when possible. For best forage value, browse should be maintained at heights greater than three feet (NKDH Management Plan).

Population Centers, Holding Areas, Migration Corridors

The following design criteria apply to important deer areas (population centers, holding areas, migration corridors) within the Project area:

29. Outside of owl and goshawk PACs and fisher dens, where the desired forage and browse (mentioned above) does not exist, small (1/4 to 1 acre) dispersed openings would be created to encourage establishment of forage and shrubs (professional opinion).

30. Within deer population centers (Cabin Mdw #14 and Bear Creek #15), when treating established plantations adjacent to meadow restoration treatments (see Table 4), at least 20 percent of the native brush and herbaceous vegetation would be retained (NKDH Mgmt Plan).

Limited Operating Periods

31. Spotted owl PACs: All treatment units within 1/4 mile of the activity center during the breeding season would have a LOP prohibiting vegetation treatments from March 1 to August 15, unless surveys confirm that owls are not nesting (S&G 75).

32. Northern goshawk: All treatment units within one-quarter mile of a nest site during the breeding season would have a LOP prohibiting vegetation treatments from February 15 to September 15, unless surveys confirm that goshawks are not nesting (S&G 76).

33. Breeding season LOP restrictions for spotted owls and northern goshawks may be waived, where necessary, to allow for use of early season prescribed fire treatments (S&Gs 78 & 79).

34. Great gray owl PACs: All treatment units within 1/4 mile of an active nest stand during the nesting period would have a LOP prohibiting vegetation treatments and road reconstruction from March 1 to August 15, (S&G 83).

35. Pacific fisher den site buffers: Fisher den site buffers would have a LOP prohibiting vegetation treatments at from March 1 to June 30, as long as habitat remains suitable (S&G 85).
36. In areas where a registered borate compound is applied, avoid application prior to **August 15** within important deer use areas (population centers). (SERA report 2006)

As listed in the SNF LRMP:

37. Minimize management activity in deer holding areas 11 during the following periods (LRMP S&G 45):

   - Holding areas above 5,000 feet in elevation **May 15 to June 15**, and **October 1 to November 30**.
   - Holding areas below 5,000 feet in elevation **May 1 to June 1**, and **October 15 to November 30**.

38. During July, management activities, such as logging and vehicular traffic, would be minimized in deer population centers (S&G 44).

**Fire and Fuels**


   - 11S40 (McKinley Grove Road)
   - 10S36
   - 10S13 (Big Fir Loop)
   - 10S24
   - 10S71
   - 10S40A
   - 10S23
   - 10S23C
   - 10S66E
   - and 10S66A.

40. All other roads within prescribed fire burn boundaries may be used as secondary control lines, to be determined by burn boss during ignition operations. Snags may be felled as necessary if they pose a threat to firefighter safety at time of burn. Tagged wildlife trees and snags would be flagged and avoided (California Public Law: Title 14 California Code 4291, Division 5, Ch. 7, Sub Ch. 3 Article 3, dated Oct 28, 2005. Regional Forester Direction - Defensible Space consistency letter dated Dec. 17, 2009. National Wildland Coordinating Group 2004, Fireline Handbook, page 58).

**Silviculture**

42. Biomass thinning operations would be timed to reduce the risk of active bark beetle breeding season (December to June). Activity generated small trees (less than 10 inches dbh) would be removed from the Project area, or burned on site. (Based on standard recommendations of Forest Health protection).

43. Thinning in plantations and other areas would be limited to periods when slash would be less likely to provide habitat to the Ips species of bark beetle (December to June) to reduce the potential from insect attacks. These dates can be changed based on an evaluation of a certified silviculturist (S&G 117, Fettig et al. 2006, Integrated Pest Management 1990)

44. If the green conifer slash must be piled following vegetation treatments, slash piles would be located in open, sunny locations outside of the dripline of leave trees and kraft paper may be used to protect an ignition point from wet weather. Slash piling would occur from July 1 through October 31 to enhance the drying of created slash and reduce the build-up of detrimental insect populations (except when restricted by a LOP) (S&G 117, Fettig et al. 2006).

45. A registered borate compound may be applied to trees greater than 15 inches dbh within two hours post cutting, as recommended by a site specific evaluation. Application would generally be limited to McKinley Grove Road, road 10S13, and main collector roads. Within developed recreation areas, all cut tree stumps would receive application of a registered borate compound. This is to prevent the spread of annosus root disease.

**Geology, Soils, and Watershed**

46. Lop and scatter fuels below rock outcrops that have the potential to generate runoff into management activity areas and cause erosion, loping and scattering fuels within these areas will maximize soil cover and surface organic matter retention (USDA FS 2012).

47. Conduct mechanical equipment operations when the soil is sufficiently dry in the top 12 inches to prevent unacceptable loss of soil porosity (USDA FS 2012).

48. Subsoil and water bar skid roads and trails in areas where soil compaction exceeds 15 percent of a treatment area (USDA FS 2012).

49. Excluding mastication, limit mechanical operations where sustained slopes exceed 35 percent, except where supported by on-the-ground interdisciplinary team (IDT) evaluation (USDA FS 1991).

50. Limit mastication operations to slopes less than 45 percent (BMP 5.3). Minimize soil displacement and reduce the risk of soil erosion by smoothing or water barring ruts or trenches exceeding six inches in depth and 25 feet in length on slopes greater than 35 percent (BMP 1.9).

51. Soil cover needs to be maintained at an average accumulation of 50 percent on slopes less than 35 percent to minimize soil erosion and uphold surface organic matter accumulation; soil
cover components include the 1 to 100-hour fuels with some 1,000 hour fuels up to 10 inch diameter. Within treated areas on slopes greater than 35 percent, 70 percent soil cover needs to be maintained. Where shrub species predominate, attempt crushing prior to piling to create small woody fragments left scattered over the site for soil cover and erosion protection (USDA FS 1991 & USDA FS 2012).

- Soil cover includes ash, organic surface materials, living vegetation less than three feet tall (grasses, forbs and low growing shrubs), surface rock fragments larger than ¾ inch or where needed applied mulches (USDA FS 2012);
- Some soil and ecological types may not be capable of producing 50 percent soil cover because of naturally low productivity (USDA FS 2012).

52. Endlining within SMZs, near rock outcrops or on steeper slopes where surface gouges or trenches form water bar soil displacements if they exceed six inches in depth and 25 feet in length (BMP 1.9).

53. Maintain 10 to 30 tons per acre of coarse woody debris to provide desirable quantities for soil productivity and protection (Brown 2003 & USDA FS 2012).

- Coarse woody debris is considered as any dead standing or downed pieces larger than three inches in diameter.

54. Provide for road surface stabilization (gravel) where economical on roads over five percent grade located on sensitive soils (Auberry, Holland and Ultic Haploxeralfs soil families) and/or areas of high CWE potential within SMZs that may affect soil productivity and/or water quality (USDA FS 1991).

55. Limit tractor piling in those watersheds where CWEs are a concern and use a grapple piler, especially on slopes greater than 25 percent (USDA FS 1991).

56. Applicable Riparian Protection Buffers (LRMP S&G 70 and SNFPA ROD S&G 91) would be designated. SMZs (USDA FS 1989), RMAs (USDA FS 1989), and Riparian Conservation Areas (RCAs) (USDA FS 2004b) would be designated as follows in Table 6:

<table>
<thead>
<tr>
<th>Feature Type</th>
<th>RCA Width</th>
<th>Stream Class</th>
<th>SMZ Width</th>
<th>RMA Width</th>
<th>Corresponding GIS Layer Stream Order</th>
</tr>
</thead>
<tbody>
<tr>
<td>Perennial Streams</td>
<td>300 feet</td>
<td>I(^9)</td>
<td>At least 100 ft</td>
<td>100 feet</td>
<td>3+</td>
</tr>
<tr>
<td>Seasonally Flowing Streams</td>
<td>150 feet</td>
<td>II</td>
<td>At least 75 ft</td>
<td>N/A</td>
<td>2</td>
</tr>
<tr>
<td></td>
<td></td>
<td>III</td>
<td>At least 50 ft</td>
<td></td>
<td>-</td>
</tr>
<tr>
<td></td>
<td></td>
<td>IV</td>
<td>At least 25 ft</td>
<td></td>
<td>1</td>
</tr>
</tbody>
</table>

\(^8\) All SMZ widths include an additional three feet for each percent slope above 30 percent.

\(^9\) Class I streams are not always perennial. Intermittent streams with certain characteristics can also be Class I.
### Purpose and Need/Proposed Action

**Exchequer Restoration Project**

<table>
<thead>
<tr>
<th>Feature Type</th>
<th>RCA Width</th>
<th>Stream Class</th>
<th>SMZ Width&lt;sup&gt;a&lt;/sup&gt;</th>
<th>RMA Width</th>
<th>Corresponding GIS Layer Stream Order</th>
</tr>
</thead>
<tbody>
<tr>
<td>Streams in Inner Gorge</td>
<td>Top of inner gorge</td>
<td>V</td>
<td>None required</td>
<td>-</td>
<td></td>
</tr>
<tr>
<td>Special Aquatic Features (fens, bogs, springs, seeps, lakes, ponds, wetlands, etc.)</td>
<td>300 feet</td>
<td>N/A</td>
<td>N/A</td>
<td>100 feet</td>
<td>Identified on GIS layers or in the field</td>
</tr>
<tr>
<td>Perennial Streams with Riparian Conditions extending more than 150 feet from edge of streambank</td>
<td>300 feet</td>
<td>I</td>
<td>At least 100 ft</td>
<td>N/A</td>
<td></td>
</tr>
<tr>
<td>Seasonally Flowing streams with riparian conditions extending more than 50 feet from edge of streambank</td>
<td>300 feet</td>
<td>I</td>
<td>At least 100 ft</td>
<td>N/A</td>
<td></td>
</tr>
</tbody>
</table>

57. SMZ widths would be increased by 25 feet in subdrainages with identified CWE concerns<sup>10</sup> (LRMP S&G 120, 124, SNFPA ROD S&G 92).

58. Grapple piling would be used to treat fuels where possible, and where necessary to minimize ground disturbance in subdrainages with identified CWE concerns. In these subdrainages, tractor piling would be permitted in specific areas under 25 percent slope where grapple piling would not be efficient or effective (LRMP S&G 120, 124, SNFPA S&G 92).

59. The hydrologist would be consulted prior to constructing new temp roads or enlarging landings in an RCA (SNFPA ROD S&G 92, 113).

60. Temporary roads and landings located in SMZs would be inspected by the hydrologist prior to acceptance to ensure that BMPs are properly implemented (SNFPA ROD S&G 113).

61. Mastication areas on slopes greater than 45 percent would be evaluated by soils or hydrology staff prior to acceptance to identify any areas of disturbance subject to mitigation requirements (LRMP S&G 130, BMP 5.2).

### Design Criteria Specific to Meadow, Aspen, and Meadow Periphery Treatment Areas

The following design criteria were developed during IDT discussion on meadow and aspen restoration treatments using professional opinions and experience. See Table 2 for a list of meadows and Plan IDs that these criteria would apply to.

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<sup>a</sup> These are defined as subdrainages with a probability rating of ‘Possible’, which means the probability is estimated to be greater than 10 percent.
62. To protect great gray owl (see Terrestrial Wildlife design criteria for great gray owl) Wildlife biologists would identify active great gray owl perch sites to be maintained in and adjacent to each meadow.

- Wildlife biologists would identify some of the trees less than 12 inches dbh to be maintained in each meadow for great gray owl perch sites. (Professional opinion consulting with CA Fish and Wildlife)

- In the case wildlife biologists determine there is a need to increase great gray owl foraging perches within any of these meadows or their peripheries:
  - Approximately two to three trees greater than 12 inches dbh within the meadow may be topped to a height of less than 25 feet or dropped and left within the meadow, unless doing so would degrade meadow hydrology or generate negative cattle impacts. (Professional opinion consulting with CA Fish and Wildlife)
  - The topped portions would be left were felled if they are large enough to provide foraging perches. Otherwise, they would be lopped, scattered, and burned. (Professional opinion consulting with CA Fish and Wildlife)
  - Approximately two to three larger diameter trees (greater than 24 inches dbh) may be felled into the meadow, if the above could not occur. (Professional opinion consulting with CA Fish and Wildlife)

- Throughout the 200 foot zone, retain key great gray owl microsites such as roost clumps (clumps of two to five trees greater than 16 inches dbh), perch sites (trees with larger, spaced limbs that are within 25 feet of the ground), and potential nest trees (broken top trees at least 24 inches dbh). (Professional opinion consulting with CA Fish and Wildlife)

- Low-lying branches of leave trees would not be pruned within 25 foot of the meadow edge to maintain great gray owl perch sites. (Professional opinion consulting with CA Fish and Wildlife)

- Great gray owl surveys would be conducted for each treatment meadow prior to implementation to determine if a LOP is needed. (S&G 83)

63. To protect deer in the Deer Population Center (520M124 habitat):

- Forty percent of the meadow treatment areas would be maintained in blocks of thermal cover that have at least 60 percent canopy closure, if present. Thermal cover is provided by foliage that exceeds five to six feet. It can be provided by mature shrubs or dense (greater than 60 percent canopy cover) forest stands. (NKDH plan)

- To provide hiding cover for deer in meadows, leave enough vegetation within 150 feet of the meadow edge such that 90 percent of an adult deer is screened from view. Hiding cover can be met with shrubs, small trees (less than six feet), and low-lying branches. Vigorous shrubs would be retained over decadent shrubs to provide deer browse. Where hiding cover cannot be met by shrubs, small trees, and low-lying branches, tree basal area or stand density index would be used to achieve this level. (NKDH plan)

- Project activities would not occur within 200 feet of the meadows from June 15 through August 15. (NKDH plan)
64. To minimize ground disturbance in RMAs (within 100 feet of meadows), the following design
criteria have been developed by the IDT. This is consistent with the direction for allowing
modification of the RMA management in USDA FS 1989 (section 3.c). These design criteria
constitute the terms for waiving the prohibition of ground-based equipment in the RMA (USDA
FS 1989, section 7.c.). This modification applies only in the RMAs associated with meadow
restoration activities (see Table 2). All other RMAs are subject to the standard equipment
exclusion.

- Equipment may only operate in the RMA where slopes are less than 15 percent (USDA
  FS 1989).
- Some SMZs that overlap these RMAs still apply as no equipment zones.
- Equipment entries into the RMA are limited to no more than one entry every 40 feet
  along the perimeter (USDA FS 1989). The effectiveness of the 40-foot spacing will be
evaluated in the Eastfork Project (adjacent project) and may be modified depending on
these findings.
- Equipment may not make turns in the RMA. Any turning gouges would be rehabilitated
to natural contour and 100 percent ground cover (USDA FS 1989).
- Side-hilling in the RMA is limited to a maximum of 20 percent of the RMA perimeter
  (USDA FS 1989).
- Disturbance from side-hilling in the RMA that is greater than or equal to 10 feet long and
  six inches deep in soil (as opposed to litter or duff) would be immediately rehabilitated by
  hand to replace soil and provide a minimum of 50 percent ground cover (USDA FS
  1989).

65. In treated RMAs, SMZs (no equipment zones) would be 50 feet for perennial streams, and 25
feet for all other streams. These SMZs would be designated wherever streams cross the RMA,
and were determined on a case-by-case basis for streams paralleling the RMAs. Outside of
RMAs, standard SMZ widths would apply unless otherwise specified (USDA FS 1989).

66. To minimize impacts to meadow habitat from drip torch materials in areas where prescribed fire
would be utilized:

- Drip torches would be checked for proper function prior to use. Use would be
  immediately halted if issues arise to minimize fuel leakage within 300 feet of meadow
  habitat (RCA).
- Drip torches would be filled at landings using a spill pad and spill containment pan.
- Drip torches would not be carried in an open position within the meadow. Drip torches
  would be opened at a minimum of 25 feet from the meadows edge using a spill pad
  when switching to the open position.
- The minimum amount of fuel would be used when igniting materials within the RCA.
- All toxic materials would be stored in a spill containment pan.
Drip torches would not be set down in meadow habitat during Project implementation. Approved locations for setting down drip torches are along the perimeter in a dry area on a spill pad.

A propane torch would replace standard drip torches if issues arise from the use of fuel materials in more than 10 percent of the burn area.

67. To minimize impacts to streams associated with the treatment of aspen clones in SMZs, the following design criteria have been developed by the IDT. These are also consistent with the direction for allowing modification of the guidelines in USDA FS 1989 (section 3.c.), as described above. This modification to SMZ management guidelines applies only to the SMZ areas that overlap the aspen clone treatment areas.

- Tracked or low ground pressure equipment would be used for aspen treatments.
- Mechanical equipment must stay at least 25 feet away from any stream.
- Any piling in aspen treatment areas would be done by hand. There is no mechanical piling in any RMA, including the aspen treatment areas.
- To limit soil disturbance adjacent to streams, ripping within 25 feet of creeks would be done by hand, not with mechanical equipment.

68. The following design criteria apply to the fencing constructed to protect the aspen treatment areas:

- Fencing would not be constructed across stream channels (SNFPA S&G 92).
- The benefiting activity shall provide funds for fences as described under the proposed action that are needed to support other activities or that are not identified in an allotment management plan (FSM 2200 Ch. 2240 – 2241.14a).
- The range permit holder would be notified of the fencing, and would assist in developing a grazing management strategy to limit undesirable impacts such as trailing along the fence line. Grazing permit modifications may authorize range improvement construction, including fencing as described under the proposed action, which would involve grazing permittee contributions. Modifications may (1) provide for any degree of cost-sharing; and (2) recognize contributions in the form of labor, materials, and /or equipment as well as direct funding. Modifications must terminate no later than the grazing permit term (FSM 2235.3 and FSH 2209.13) (FSM 2200 Ch. 2240 – 2241.31).

**Aquatic & Riparian Species and Habitat Design Criteria**

Development of design criteria for aquatic and riparian species and habitats with treatments proposed within occupied or suitable habitats are based on the SNF LRMP, the 2004 SNFPA ROD – S&Gs for RCAs and Critical Aquatic Refuges (CARs) – pages 62 through 66, BMPs (2011), Programmatic Biological Opinion (BO) (FF08ESMF00-2014-F-0557) Conservation Measures and Terms and Conditions, and supporting literature.

The purpose of these design criteria is to avoid or minimize the potential for adverse effects to the species and habitats that will be analyzed in the aquatic BE/BA, and to be consistent with the Programmatic BO. Management activities within RCAs or CARs will be designed to (1) minimize risk of sediment entry into aquatic systems and (2) minimize impacts to habitat for aquatic- and
Riparian-dependent species. These design criteria will apply to any additional Alternatives developed. Additional design criteria may result during project development (e.g. stand by stand, consultation with U.S. Fish and Wildlife Service).

69. The following design criteria apply to aquatic and riparian species habitat with treatments proposed within occupied and suitable habitat:

**General:**

1) Any meadows, perennial streams, seeps, springs, bogs, fens, and/or wet areas discovered during project implementation that are not already identified on project analysis maps would be treated as perennial areas with 300 foot RCA and 100 foot SMZ buffers (Programmatic BO Program Specific 1a).

2) If newly listed or unknown occurrences of federally listed threatened, endangered, proposed, candidate or Forest Service sensitive aquatic species are found within the affected project area during sale preparation and implementation, all design criteria listed here would apply.

3) Report any discovery of amphibians or reptiles (e.g. frogs, toads, salamanders, and turtles) during project sale preparation and implementation to the District Aquatic biologist immediately (Programmatic BO Appendix C #6).

4) Do not cut riparian vegetation during project activities unless coordinated with the District Aquatic biologist (Programmatic BO General Measures 1j).

5) Management activities affecting tree canopy cover within RCA’s should not decrease canopy cover that results in the increase water temperatures above thresholds necessary for local aquatic- and riparian-dependent species assemblages (21 degrees Celsius for Rainbow trout assemblages). Install thermograph devices to monitor stream temperature (ROD S&G 96, Programmatic BO General Measures 1n).

6) If streams are adversely affected by the project to the extent that the three listed amphibians and/or their habitats may be negative affected, mitigation measures and short-term restoration actions would be designed and implemented during or after project implementation to prevent post declines and/or improve conditions. Long-term restoration actions would be evaluated and implemented according to priority (per S&G 102), which includes adverse impacts to listed species (Programmatic BO General Measures 1o).

7) Use of mechanized equipment would be prohibited from sensitive areas in meadows, wetlands, SMZs, and landslide areas unless specifically authorized by the aquatic biologist and hydrologist (per BMP 1.22, per BMP 1.8, and per BMP 1.1). (Programmatic BO General Measures 1h, Project Specific 1t). Exception: includes aspen enhancement areas.

8) Within SMZs, the constraints defined in Sierra Supplement No.1 (USDA FS 1989) apply. No self-propelled ground based equipment may be used, a minimum groundcover of 50 percent would be maintained, and shade canopy may not be modified in a way that affects stream temperature. These guidelines may be modified where site-specific needs exist provided that the action is reviewed by a hydrologist or aquatic species biologist (reference BMP 1.8). (Programmatic BO Program Specific Measures 1x).

9) Do not conduct ground-disturbing activities that would adversely affect hydrologic processes that maintain water flow, water quality, or water temperature critical to sustaining bog and fen ecosystems and plant species that depend on these ecosystems. If actions are found to adversely affect these processes, they would be mitigated prior to winter of that season (Programmatic BO General Measures 1p, ROD S&G 118).
10) Before any work occurs in the project area, including grading and equipment staging, all project personnel would participate in an environmental awareness training regarding special status species and sensitive habitats present in the project area. If new construction personnel are added to the project, they must receive the mandatory training before starting work. As part of the training, an environmental awareness handout would be provided to all personnel that describe and illustrates sensitive resources (i.e., special-status wildlife habitat) to be avoided during project construction and lists applicable permit conditions identified to protect these resources. Training would include a description of the Yosemite toad and its critical habitat and Sierra Nevada yellow-legged frog, the specific measures that are being implemented to conserve the species for the project, and the boundaries of the project area. Brochures, books, and briefings may be used in the training session, provided that a qualified person is on hand to answer any questions.

11) As written in the Programmatic BO Terms and Conditions (pg.68), if appropriate, the Forest Service shall move the SYLF and the YT from within project sites where programs are implemented to a safe location if they are in danger. (See Appendix C of the Programmatic BO for additional specific guidelines)

Each SYLF, Northern Distinct Population Segment of the mountain yellow-legged frog, and the YT encounter shall be treated on a case-by-case, but the general procedure is as follows: (1) leave the non-injured animal alone if it is not in danger; or (2) move the animal to a nearby safe location if it is in danger. These two actions are further described below.

a. When a SYLF and the YT is encountered within the project site, the first priority is to stop all activities in the surrounding area that may have the potential to result in the harassment, injury, or death of the individual. Then, the situation shall be assessed by a FS biologist or Service-approved biologist in order to select a course of action that would minimize adverse effects to the individual.

b. Avoidance is the preferred option if an individual of the SYLF and/or YT is not moving or using a burrow or other refugia. A FS biologist or Service-approved biologist shall inspect the animal and the area to evaluate the necessity of fencing, signage, or other measures to protect the animal.

c. If appropriate, the, three listed amphibians shall be allowed to move out of the hazardous situation on their own volition to a safe location. An animal shall not be picked up and moved based on it not moving fast enough or it is an inconvenience for activities associated with rehabilitation or operation. This only applies to situations where individuals are encountered when they are moving during conditions that make their upland travel feasible. It does not apply to individuals that are uncovered, exposed, or in areas where there is not sufficient adjacent habitat to support the species should the animal move outside the immediate area.

d. Individuals of the three listed species shall be captured and moved by hand only when it is necessary to prevent harassment, injury, or death. If suitable habitat is located immediately adjacent to the capture location, then the preferred option is relocation to that site. An individual shall not be moved outside of the radius it would have traveled on its own. Under no circumstances shall they be relocated to a non-FS property without the landowners’s written permission.

e. Only FS biologists or Service-approved biologists may capture the three listed amphibians. Nets or bare hands may be used to capture the animals. Soaps, oils, creams, lotions, repellents, or solvents of any sort cannot be used on hands within two hours before and during periods when the biologist is capturing and relocating individuals. If the animal is held for any length of time in captivity, they shall be kept in
a cool, dark, moist environment with proper airflow, such as a clean and disinfected bucket or plastic container with a damp sponge. Containers used for holding or transporting shall not contain any standing water, or objects or chemicals that may injury or kill a YT, Northern Distinct Population Segment of the mountain yellow-legged frog, and/or SYLF.

f. To avoid transferring disease or pathogens between suitable habitats during the course of translocating the three listed amphibians, FS biologists or the Service-approved biologist shall use the following guidance for disinfecting equipment and clothing. These guidelines are adapted from the Declining Amphibian Population Task Force’s Code which can be found in their entirety at: http://www.open.ac.uk/daptf/.

g. At the project level, if adverse effects occur within suitable habitat, these areas would be restored to pre-existing conditions within one breeding season.

h. Restoration would be implemented within the project area for areas at risk for erosion, such as those with soil compaction, lowered water tables, and downcutting and gullies (per S&G 122), if there is an adverse effect to suitable habitat for the three listed amphibians.

Fuel Storage/ Refueling

Prevent fuels, lubricants, cleaners, and other harmful materials from discharging into nearby surface waters or infiltrating through soils through the following (reference BMP 2.11, Programmatic BO General Measures 1h, 1g, 2c):

12) Implement the 16 measures described in BMP 2.11 to prevent adverse effects from fuels, lubricants, cleaners, and other harmful materials that are discharged into nearby surface waters or infiltrate through soils to contaminate groundwater resources on skin-respiring amphibians resulting from equipment refueling and servicing. (Programmatic BO General Measures 1h, 2c)

13) Within known YT or SYLF occupied habitat, fuels and other toxic materials would be stored outside of associated RCAs and CARs (per S&G 99) to limit the exposure of the three amphibian species to the toxic materials associated with vegetation management activities unless locations are authorized by the District aquatic biologist (Programmatic BO General Measures 1g, Program Specific 2c, BMP 2.11).

14) For areas outside of YT or SYLF suitable habitat, do not store fuels and other toxic materials in RCAs unless location or fuel storage plan is approved by District hydrologist or aquatic biologist. (S&G 99, BMP 2.11)

15) Storage of heavy machinery would occur only at approved areas such as existing landings, existing roads, or turnout areas, and should be outside of RCA and RMA of known occupied YT or SYLF habitats unless agreed to by the District hydrologist and aquatic biologist (Programmatic BO General Measures 1g, 2c), refer to BMP 2.11 for additional measures).

16) For chainsaws and other gas powered equipment: Refueling may not occur in SMZs or RMAs. In the remainder of the RCA and CAR, refueling may occur with the use of an absorbent spill pad.

17) An emergency response plan would be created and implemented to prevent contamination of waters from accidental spills of hazardous substances (per BMP 7.4) (Programmatic BO Program Specific 1d). Project personnel would be aware of the Forest Spill Plan, including who to contact and other steps to take in case of a spill. A spill kit would be kept on-site.
All waste oil, containers, and other materials would be removed from the project area and properly disposed of.

**Burning**

18) No direct lighting within the designated SMZ. (ROD S&G 109; BMP 6.3). Exception: for meadow restoration treatments where burning is proposed. If Riparian vegetation is located outside of the SMZ, there would be no direct lighting within riparian vegetation; prescribed fires may back into riparian vegetation areas (Programmatic BO General Measures 1d, supports 1h, S&G 109).

19) No helicopter “ping pong ball” lighting within RCA or occupied habitats for the YT and SYLF (Programmatic BO General Measures 1g).

20) Slash / brush piles shall be ignited using a pattern that allows animals to escape the fire. For example, light the pile from the top, leaving the bottom perimeter unignited that serves as an escape route.

21) Slash / brush piles located around occupied YT meadows should be burned in the fall to minimize impacts spring dispersal of adult YT.

22) Dozer or hand fire line construction within RCA would be constructed to reduce sediment entry into channels. (Programmatic BO Program Specific 1f)

   a. They would follow the natural landscape contour as much as possible, and would have water bars.

   b. Fire lines in SMZs would be hand cut.

   c. They would cross perpendicular to streams, and waterbars would be placed on either side of each stream crossing to prevent or reduce sediment entry into streams. (reference BMP 6.3 and 1.17)

23) Where operations disturb the soil, a vegetative ground cover would be established to prevent erosion and sedimentation (per BMP 1.15) (Programmatic BO Program Specific 1f)

24) To protect water-quality during the implementation of prescribed fires, the prescription would include at the watershed- and subwatershed-scale, the optimum and maximum burn block size, aggregate burned area, acceptable disturbance for contiguous and aggregate length for the Riparian/SMZs; and expected fire return intervals and maximum expected area covered by water-repellant soils. (per BMP 6.2) (Programmatic BO Program Specific 1bb)

25) Water quality would be protected from prescribed burning effects by maintaining soil productivity; minimizing erosion; and minimizing ash, sediment, nutrients, and debris from entering water bodies (per BMP 6.3). Some of the techniques that would be used to prevent water-quality degradation include constructing water bars in fire lines, reducing fuel loading in drainage channels; and maintaining the integrity of the SMZ within the limits of the burn plan. (Programmatic BO Program Specific 1cc)

**Slash Piles:**

26) Water quality would be maintained or improved by protecting sensitive areas from degradation which likely would result from using mechanized equipment for slash disposal. (Programmatic BO Program Specific 1s)
The following slash treatments would be prescribed in sensitive areas and areas with habitat for the three listed amphibians to facilitate slash disposal without use of mechanized equipment (per BMP 1.22). (Programmatic BO Program Specific 1s, 1y)

a. Avoid piling in SMZs or RMAs. Where not possible, only hand pile.

b. In all areas, hand piles would be kept at least 50 feet away from all streams, meadows, springs, seeps, and other sensitive aquatic areas. Greater distances may be required in certain habitats where determined by the aquatic biologist (reference BMP 1.22).

c. No piling of slash within meadows, streams or within riparian vegetation.

d. When selecting locations for piles that may be within 1250 meters of known occupied YT meadows, avoid piling in open dry areas with lupine unless area is surveyed and approved by District Aquatic biologist for use (protection of YT adult terrestrial habitats).

e. Do not pile on or around old stumps for up to 20 feet (for protection of YT summer and overwintering terrestrial habitats).

f. Where mechanical piling is necessary within known occupied habitats of the YT, coordinate implementation with the District aquatic biologist (also refer to BMP 1.22).

Skidding/End-Lining, Skid Trails, Temp Roads (new & old), Landings, and Roads

The following protection measures would be implemented within habitats associated with Threatened, Endangered, Proposed, Candidate or Sensitive (TEPCS) occupied aquatic/riparian species habitat:

General

28) All skid trails, landings, and temp roads (existing or new) within RCAs must be consistent with Riparian Conservation Objectives outlined in the SNF LRMP ROD (2004) prior to use (ROD S&G 92, 113) and be in compliance with BMPs outlined in the hydrologist report (referencing Programmatic BO General Measures 1i). The sale administrator and contractor would designate all skid trails prior to ground disturbing activities. If uncertainty arises regarding potential resource impacts of skid trail location, a hydrologist, aquatic biologist, or soil scientist would be consulted (reference BMP 1.10).

29) All skid trails, landings, temp roads, and end-lining activities within known occupied YT or SYLF habitat shall not cross through or within the following areas without pre-project design, consultation with the District Aquatic biologist and verified as consistent with the Programmatic BO (ROD S&G 92, 100, 118) as identified in GIS shapefile with treatment (also refer to BMP 1.10, 2.1 and 2.2, referencing Programmatic BO General Measures 1i):

a. 25 meters of SYLF known occupied habitat (PlanID: TBD)

b. 1250 meters of known occupied YT meadows or habitat (PlanID: TBD)

30) Low ground pressure equipment or other non-ground disturbing actions would be implemented when needed to achieve Riparian Conservation Objectives in the written opinion of the Forest Biologist in order to minimize impacts to RCAs when operating off of existing roads. The measures include minimizing construction of skid trails or roads for access into RCAs for fuel treatments, salvage harvest, or hazard tree removal (per S&G 113) (Programmatic BO General Measures 1c, 1i).

31) Erosion control measures would be installed on all skid trails and temporary roads. These measures may include, but are not limited to, cross ditches (water bars), organic mulch, or
ripping. Cross ditches would be spaced based on percent slope, maintained in functioning condition, and placed in locations where drainage would naturally occur (i.e., swales). Slopes 0 to 15 percent feet would have a maximum spacing of 125 feet, slopes 15 to 35 percent would have a maximum spacing of 45 feet. The level of maintenance would be contingent upon existing or predicted weather patterns as determined by the sale administrator (reference BMP 1.17) (Programmatic BO General Measures 1h).

32) Locate new log landings or reuse old landings located in such a way as to avoid watershed impacts and associated water quality degradation by: (Programmatic BO Program Specific 1n)

a. Selecting landing locations that involve the least amount of excavation and the least erosion potential, and to the extent feasible are well outside of the SMZ; near the ridges away from headwater swales in areas that would allow skidding without crossing channels; and avoid violating the SMZ, or causing direct deposit of soil and debris to the stream.

b. The Sale Administrator would work with the Forest Biologist and the IDT when considering landings that do not meet these criteria.

c. Locating landings where the least amount of skid roads would be required and sidecast can be stabilized without entering drainages or affecting other sensitive areas.

d. Positioning landings such that the skid road approach would be as nearly level as possible to promote safety, and protect the soil from erosion.

e. The number of skid trails entering a landing would be kept to a minimum (per BMP 1.12).

33) To prevent erosion at landings, the contract administrator would be responsible for ensuring that landings are:

a. Properly cross-ditched, ripped (if soils are compacted), re-contoured (as necessary), and mulched after use and before the winter precipitation period, whichever comes first.

b. Excess material not needed for erosion control may be piled and burned (see design criteria under Burning section for pile burning).

c. Drainage from roads would be prevented from reaching landings. In some locations the hydrologist may assist the contract administrator in determining sufficiency of this work (reference BMP 1.16). (supporting Programmatic BO General Measures 1h)

34) All Cull and other materials shall be removed from landings located within the RCA associated with known occupied YT meadow habitat that field season. (LRMP S&G 37, 69; ROD S&G 92)

35) Corrective actions would be developed and implemented when needed to restore hydrologic connectivity of aquatic systems that are disrupted by roads in the project area that result from implementation of the project (per S&G 100) (Programmatic BO General Measures 1r)

36) To protect water quality during road maintenance and operations, 31 practices related to road inspection, maintenance planning, and operations would be implemented as appropriate based on local site conditions (per BMP 2.4). (Programmatic BO General Measures 2d)

37) Measures outlined in BMP 2.3 would be followed to minimize erosion and sediment delivery during road construction and reconstruction. Implementation would include scheduling
operations when precipitation is less likely, soil moisture is optimal for construction, and rutting does not occur (Programmatic BO Program Specific 2f, supports General Measures 1h)

38) Roads placed in storage would be maintained so that drainage facilities and runoff patterns function properly, and damage to adjacent resources is prevented (per BMP 2.6). Programmatic BO Program Specific 2g, supports General Measures 1h)

39) Specifications for stream crossing areas and design, construction/reconstruction of permanent and temporary crossings, as well as maintenance of these crossings included in 36 technical specifications listed in BMP 2.8 would be followed to minimize water, aquatic and riparian resource disturbances that may affect individuals. (Programmatic BO Program Specific 2b, General Measures 1k)

40) Stream crossing structures (i.e. culverts) or in-stream habitat improvements (including during implementation) would not create barriers to upstream or downstream passage for aquatic-dependent species except when it benefits the two amphibian species (Programmatic BO Program General Measures 1q, ROD S/G #101)

41) A project-specific erosion control plan would be developed to effectively limit and mitigate erosion and sedimentation from any ground-disturbing activities, through planning prior to commencement of project activity, and through project management and administration during project implementation (per BMP 2.13). Programmatic BO Program Specific 2h, supports General Measures 1h)

42) Management of roads by closure to seasonal, temporary, and permanent use would be used to exclude activities that could result in damages to either resources or improvements, including impaired water quality from roads and trails (per BMP 7.7). Closure to use would occur when the condition of the watershed must be protected to preclude adverse water-quality effects and adverse impacts to the three listed amphibians (per BMP 1.5; per BMP 2.9). (Programmatic BO Project Specific 1gg).

To avoid damage to ground cover, soil and the hydrologic function of meadows (Programmatic BO Program Specific 1y):

Meadows

43) No End-lining across meadow habitat.

44) No skidding within 100 feet of meadows (RMA=no equipment zone). (Exception: specific treatment meadows as described in PA)

45) In meadows identified as known occupied with YT or SYLF end-lining may occur up to 100 feet from the meadow vegetation edge. If the meadow is un-occupied, end-lining may occur up to 50 feet from the edge (reference BMP 1.21).

46) Hazard trees within 25 feet of meadows NOT occupied with TEPCS aquatic/riparian species: Fall away from meadow and buck tree at a distance of 25 feet from the meadow vegetation edge and leave tree segment adjacent to meadow
   a. Exception: tree can be felled directly onto road, or if first log can be lifted directly up and out of 25 foot zone with NO soil disturbance.

47) Hazard trees within 100 feet of meadows occupied with TEPCS species would be drop and leave only unless tree can be felled directly onto a road
   a. Exception: from 50 ft to 100 ft: buck tree at a distance of 50 feet. Remove that portion of log can be lifted directly up and out with NO soil disturbance.
Purpose and Need/Proposed Action

Exchequer Restoration Project

**Streams (Perennial / Intermittent)**

48) End-lining of trees can occur up to 50 feet of any streams NOT occupied with YT, SYLF or any other additional TEPCS species.

49) Trees located between 25 and 50 feet of streams NOT occupied with TEPCS aquatic species:
   a. Fall away from stream and buck tree at a distance of 50 feet from the stream high water mark edge (Top of Bank or Floodplain level) and leave tree segment adjacent to stream.
   b. Exception: Tree can be felled directly onto road or if first log can be lifted directly up and out of 50 foot zone with NO soil disturbance.

50) Within the SMZ of occupied TEPCS stream habitats, fall tree away from stream and leave portion of tree within the SMZ in place unless tree can be felled directly onto a road.

51) No end-lining within 100 feet of YT and SYLF occupied streams unless area is surveyed and approved by the District Aquatic biologist.

52) No End-lining within or across any riparian vegetation of perennial or intermittent channels.

53) No streamside bank trees with drip-line extending to stream should be cut to protect streambank stability.
   a. Exception: Hazard trees end-lining can occur up to 25 feet of a stream bank.
   b. Fall away from stream and buck tree at a distance of 25 feet from the stream high water mark edge (Top of Bank or Floodplain level) and leave tree segment adjacent to stream.
   c. Exception: Tree can be felled directly onto road or if first log can be lifted directly up and out of 25 foot zone with NO soil disturbance.
   d. Within the inner 50 feet of an SMZ, soil disturbance from end-lining greater than 6 inches would be rehabilitated to reduce channelization of overland waters and to minimize sediment entering into streams.

**Harvest Treatments**

54) Harvested or managed areas would be revegetated within five years to contain the minimum number, size and species composition specified in regional silvicultural guides for each forest type. This protects water quality by helping to stabilize soils, increasing ground cover and providing improved infiltration (per BMP 1.23) (Programmatic BO Program Specific 1g)

55) Surface-disturbed areas with unstable soils that are located during implementation would be revegetated with grass or browse species between previously planted trees as needed for control of overland runoff and to meet wildlife needs and minimize soil erosion to protect water quality via the stabilizing influence of vegetation foliage and root networks (per BMP 5.4) (Programmatic BO Program Specific 1h).

56) Forests would maintain desirable stream channel characteristics and watershed conditions to ensure favorable conditions of water quality and quantity and maintain habitat for three listed amphibians. In designing harvest units, size and distribution of natural structures, such as snag and down logs, would be considered to prevent erosion and sedimentation (per BMP 1.2). (Programmatic BO Program Specific 1i)
57) Tractor logging would be avoided where the predicted, post-logging erosion hazard cannot be reduced to either “low” or “moderate.” The careful control of skidding patterns would serve to avoid onsite and downstream channel instability, build-up of destructive runoff flows, and erosion in sensitive watershed areas such as meadows and SMZs (per BMP 1.9; per BMP 1.10). (Programmatic BO Program Specific 1l)

58) To reduce gully and sheet erosion and associated sediment production (Programmatic BO Program Specific 1v):

1. Limit machine falling, ground skidding and machine piling with tractors to sustained slopes less than 35 percent.
2. On short pitches less than 35 percent, limit soil erosion and reduce the risk of soil erosion by smoothing or water barring any ruts or trenches exceeding 6 inches in depth and 25 feet in length.
3. End-lining may be used to remove logs from steeper slopes (refer to end-lining requirements within occupied habitats).
4. Ground disturbance on areas of shallow soils, notably soils adjacent to and abutting rock outcrops, would be avoided (reference BMP 1.9, 5.2).
5. Masticators may be used on slopes up to 45 percent, provided that they are operating on a mat of masticated material that protects soils from disturbance. If disturbance with the potential to concentrate water occurs due to mastication, it would be mitigated by techniques such as raking, constructing waterbars, or increasing groundcover (reference BMP 5.2).
6. Mastication would be limited to time periods when soils are sufficiently dry to prevent rutting and/or compaction by a single pass of the equipment (reference BMP 5.6).

Herbicides

The following management direction for all herbicide treatments would be incorporated for all of aquatic and riparian species habitat:

59) No treatments of herbicides/pesticides within:

a. 1250 meters of suitable or occupied YT meadow habitat (Programmatic BO General Measures p. 13)

b. 25 meters of suitable or occupied SYLF stream or meadow habitat (Programmatic BO General Measures p. 13)

60) Do not apply Sporax to tree stumps located within the SMZs of known occupied habitat for the YT or SYLF

61) Clean up any spills of Sporax immediately.

Erosion Control

62) Appropriate erosion and sedimentation protection for disturbed areas would be provided by spreading slash, mulch, wood chips, or, by agreement, some other treatment, on portions of tractor roads, skid trails, landings, cable corridors or temporary road fills (per BMP 1.14). (Programmatic BO Project Specific 1p).

63) Erosion would be minimized by ensuring that constructed erosion-control structures are stabilized and working (per BMP 1.20) (Programmatic BO Project Specific 1q).
64) To ensure that erosion control structures are stabilized and working, during the period of the timber sale contract, the purchaser would provide maintenance of soil erosion control structures constructed by the purchaser until they become stabilized, but not more than one year after their construction. The sale administrator is responsible for ensuring erosion control maintenance work is completed (reference BMP 1.20). (Programmatic BO Project Specific 1q).

65) To ensure the adequacy of required erosion control work on timber sales, the sale administrator must inspect erosion control measures to ensure their adequacy prior to accepting closure on the unit and/or sale. The effectiveness of erosion control measures would be evaluated after the sale area has been through one or more wet season. Evaluation would ensure that erosion control treatments are in good repair and functioning as designed before releasing the purchaser from contract responsibility. The purchaser is responsible for repairing erosion control treatments that fail to meet criteria in the timber sale contract, as determined by the sale administrator, for up to one year past closure of the sale. (reference BMP 1.21). (Programmatic BO Project Specific 1r).

If Stream Drafting is necessary:

**Stream Drafting Guidelines**

66) To protect hydrologic values and aquatic species water source development and utilization would follow specific criteria below for the location of drafting sites, procedures for drafting operations, as well as approaches and drafting pads (per BMP 2.5). Programmatic BO General Measures 2a)

   a. Water drafting sites in the project area would be at least 150 to 1250 meters away from occupied aquatic species habitat as determined by the District aquatic biologist. (ROD S&G 92, 96, 103, 101, 110)

   b. Drafting sites would be located where vehicle approach and water removal have minimal effects on the stream.

   c. Drafting pumps must be placed a minimum of five feet from the top of the stream bank and be placed in a spill containment tray.

   d. Water drafting vehicles must carry spill kits including petroleum-absorbent pads.

   e. Drafting vehicles would be inspected daily for leaks and repaired when needed to prevent petroleum leaks in the SMZ.

   f. Water drafting sites would be located to avoid adverse effects to instream flows and depletion of pool habitat (Programmatic BO General Measures 1q)

   g. Drafting sites shall be visually surveyed by the hydrologist, District aquatic biologist or trained personnel for frogs and their eggs before drafting begins. If eggs or frogs are observed, the District aquatic biologist would be notified immediately and a different location would be used.

   h. Use a screened intake device and pumps with low entry velocity and suction strainers with screen less than 2mm (1/8 in) in size to minimize removal of aquatic species, including juvenile fish, amphibian egg masses and tadpoles, from aquatic habitats. (Programmatic BO General Measures 1e, ROD S&G 110)

   i. The suction strainer (screened as described above) would be inserted close to the substrate in the deepest water available and placed in a canvas bucket to avoid substrate and aquatic species disturbance.
j. Where overflow may enter the stream, erosion control devices shall be installed.

k. For fish-bearing streams and streams occupied by amphibians or reptiles, drafting would not be permitted when bypass flows are less than 1.5 cfs.

l. For non-fish-bearing streams that are also not occupied by amphibians or reptiles, drafting is not permitted when bypass flows are less than 10 gallons per minute.

m. No more than 50 percent of the flow exceeding these minimum levels may be removed.

WIN Site and Meadow Restoration Activities

In addition to the General and Fuel Storage / Refueling Aquatic / Riparian Species and Habitat design criteria listed above, the follow apply to WIN site restoration activities for protection of TEPCS species and habitat:

67) Coordinate with District Aquatic biologist for updates to aquatic/riparian species or habitat occurrences at or around stream crossings identified with restoration opportunities.

68) Where applicable, implement YT and SYLF LOPs listed under the species specific section for streams and meadows occupied with TEPCS species.

69) Clean all gear prior to bring on site. Decontamination of equipment and gear that may become wet should occur. This is to avoid the spread of the potentially devastating Chytrid fungus which is known to occur throughout the forest. Decontamination between sites in other areas of the project is recommended as well. Decontamination can be accomplished by:

   1. Prior to arriving at the site scrape off all mud/dirt from boots and equipment that may have come in contact with water or sediments
   2. Scrub and soak boots and equipment with either a 75 percent ethanol solution or a 10 percent bleach / water solution (1 part bleach to 9 parts water)
   3. Make sure to get all surfaces thoroughly wet with the solution
   4. All traces of the disinfectant should be rinsed clean and removed from equipment before entering the next aquatic habitat.

70) Use materials for habitat restoration from an approved location (i.e.: rock quarries)

71) Tightly woven fiber netting or similar material shall be not used for erosion control or other purposes where the nine Forest programs are implemented within suitable habitat to ensure that the SYLF, Northern Distinct Population Segment of the mountain yellow-legged frog, and YT do not get trapped, injured or killed. Plastic mono-filament netting or similar material shall not be used at any of these projects because individuals of these listed species may become entangled or trapped in it. (Programmatic BO, Terms and Conditions 2a).

72) To avoid damage to the ground cover, soil, and the hydrologic function of meadows (Programmatic BO Project Specific 1y):

   a. Conduct restoration activities in the fall or when the water table is low to avoid conflicts with local aquatic/riparian species and habitat.
   b. Limit trips across meadow when possible.
   c. Avoid crossing wet meadow habitats (including by foot). Rehabilitate areas damaged from accessing restoration site (trailing, stream bank stability).
73) Unless otherwise agreed, trees felled into meadows would be left (no end-lining in meadows), with slash removed, and the resulting disturbance would be repaired where necessary to protect vegetative cover, soil, and water quality (per BMP 1.18). (Programmatic BO Project Specific 1y)

74) Tractor operations would be limited in wetlands and meadows. In order to limit turbidity and sediment production resulting from compaction, rutting, runoff concentration, and subsequent erosion use of mechanical equipment would be excluded in wetland and meadows except for the purpose of restoring wetland and meadow functions. Sediment and other pollutants would be controlled from entering streamcourses. The application of this BMP would be mandatory on all vegetation-manipulation projects as prescribed in the environmental documentation (per BMP 5.3). Specific protection measures would be established for each area that could incur adverse water-quality impacts (per BMP 1.18). (Programmatic BO Project Specific 1aa)

75) Adverse water-quality impacts associated with destruction, disturbance, or modification of wetlands would be avoided where possible (per BMP 7.3). Factors that would be evaluated include, but are not limited to, water supply, water quality, recharge areas, functioning of the wetland during flood and storm events, flora and fauna, habitat diversity and stability, and hydrologic function of riparian areas. Programmatic BO Project Specific 1dd)

76) Conduct restoration activities in the fall or when the water table is low to avoid conflicts with local aquatic/riparian species and habitat.

77) Limit trips across meadow when possible.

78) Avoid crossing wet meadow habitats (including by foot). Rehabilitate areas damaged from accessing restoration site (trailing, stream bank stability).

79) For mechanical equipment treatments within SMZs/RMAs, no turning of equipment would occur, back and forth movements only.

80) For prescribed burning inside meadows, only use propane torches to light fires (Programmatic BO General Measures 1g).

81) Allow fire to back into the meadow.

Species Specific Design Criteria
(The following Plan ID listed under each species are based on treatment proposed in the (date) Proposed action GIS layer. If treatments that overlap habitat are added to PlanID’s for alternatives or the Proposed Action within species habitat, those PlanID’s would need to be added to the lists below).

Sierra Nevada yellow-legged frog:

Known occupied habitats PlanID: TBD – need to determine if we have to assume occupied in suitable habitat: In addition to the protection measures listed above for TEPCS habitat and species, additional protection measures for known occupied habitat of SYLF (Endangered, Forest Service Sensitive Species) (Programmatic BO General Measures 1b):

82) From October 15th to June 15th no activity can occur within 25 meters any stream channel or meadow identified as SYLF occupied habitat to protect adult dispersal, breeding, egg masses and tadpoles in stream /meadow habitats (Programmatic BO General Measures 1b, Project Specific 1b).

83) In units within 25 meters known occupied habitats: on a daily basis, prior to starting work, inspection of the work site would take place to locate any SYLF individuals that have moved
into the area. If species are found directly within project area prior to work or during daily work, project activities would stop until individuals can be moved by the District Aquatic biologist to a safe location.

84) If water diversion is necessary for any project related activities, no de-watering of occupied stream habitats would occur during implementation, even if temporarily.

85) All equipment would be free of mud and dirt prior to bringing to within known occupied units to prevent the spread of Chytrid fungus. Refer to Appendix C of the BO.

86) Only use water for dust abatement within 25 meters of streams and hydrologically connected tributaries or meadows occupied SYLF.

87) No piling of materials within 100 feet of occupied stream or meadow habitat.

Yosemite toad

**Known occupied habitats Plan ID: TBD – need to determine if we have to assume occupied in suitable without 3 surveys**

In addition to the protection measures listed above for TEPCS habitat and species, protection measures for known occupied meadows located in the project area are as follows within 1250 meters of known occupied YT (Threatened, Forest Service Sensitive) meadows (Programmatic BO General Measures 1b):

88) All operations (including project related road maintenance and reconstruction) shall start 60 days after breeding is completed (Liang et al. 2010). Occupancy and timing of breeding would be determined annually by the District Aquatic biologist (Programmatic BO General Measures 1b, Project Specific 1b).

   a. Start date can be as early as July 30, or as late as September 7.

89) All operations shall end by October 1 to allow for overwintering migrations and protection of overwintering YT. End timing of Oct. 1 may be adjusted up to November 1st on an annual basis dependent on weather conditions (Programmatic BO Project Specific 1b).

90) All operations would cease for 24 hours after rainfall more than 0.1 inch occurs to allow for dispersal across terrestrial habitats (Programmatic BO Project Specific 1b).

91) Mechanical operations would cease before dusk and not continue until after dawn. Exceptions include log truck loading and road dust abatement. To minimize conflict with adult YT in the area, time dust abatement around the Cabin Meadow complex, operations would occur as late in the morning as possible (Programmatic BO Project Specific 1b).

92) On a daily basis, check around equipment for YT individuals that may have moved into the area prior to moving machines. Refer to handing procedures (#9)

93) For protection of adult microsites, apply the following to open, dry lupine areas:

   a. Were possible, flag open dry lupine areas as avoidance locations for all activities associated with the Project (including temp roads, skid trails, falling).

   b. Avoid working or walking in or crossing open dry areas where numerous rodent burrows and lupine are observed.

   c. Do not use open and dry lupine areas as turn-around locations, vehicle storage or landing sites.
Other

94) The FS would ensure that purchasers and their sub-contractors understand and adhere to water-quality BMP prescriptions formulated during the timber sale planning process to prevent and control erosion during timber sale operations. This would be accomplished by setting forth the purchaser’s responsibilities in the timber sale contract, and holding the purchaser accountable for actions of their sub-contractor (per BMP 1.13). – (Programmatic BO Project Specific 1o).

95) For soil disturbing treatments other than timber harvest (cover by other BMPs), preventative measures would be implemented that decrease sediment production and stream turbidity resulting from management activities e.g., disking, seed drilling, windrowing, that mechanically treat slopes. Preventative measures that would limit surface-disturbance activities would be identified for each specific site based on the slope, infiltration rate, permeability, and water-holding capacity of the soil of the site. Examples of preventative measures include extra ground cover requirements and/or buffers of streams and/or riparian areas for mechanical treatment (per BMP 5.1). (Programmatic BO Project Specific 1u).

96) A water quality monitoring plan would be part of an environmental document, a management plan, or a special use permit, or it would be developed in response to other needs to evaluate the implementation and effectiveness of a management prescription in protecting water quality (per BMP 7.6). (Programmatic BO Project Specific 1f).

97) In order to protect streamcourses and aquatic areas where diversion of the stream has resulted from timber management, unobstructed passage of stormflows would be provided, sediment and other pollutants entering streamcourses controlled, and the natural course of any stream restored as soon as practicable (per BMP 1.19) .(Programmatic BO Project Specific 1z).

Botanical

70. Avoidance of known FS Sensitive plant occurrences (short-leaved hulsea) in the Project active management units. There are three known occurrences of short-leaved hulsea, one in Plan ID 438 and the others in the expanded managed-wildfire boundary (no units assigned). Occurrence would be flagged with green and white flagging and areas marked with such flagging would be avoided by equipment, vehicles and any work unless cleared with a SNF botanist.

71. Avoid stream crossing with equipment or using mechanical work within SMZs in Reese Creek (Plan ID 123) and the unnamed tributary south of Reese Creek to protect Peltigera gowardii. P. gowardii is a FS Sensitive aquatic lichen species found in both of those streams.

72. Avoid traveling through fen habitat in meadow restoration areas; also, avoid any compaction or excessive travel in areas immediately upstream of the fen as well (50 feet minimum). The meadows with fen habitat in the meadow restoration treatment are: Bear Paw meadow, Exchequer Meadow, and 520M126.

73. Avoid driving vehicles or staging equipment on rock outcrop gravel pans, even if areas are not directly affected by management activities. There are several potential rock outcrop FS Sensitive plant species that may occur in the Project boundary (list of species will be provided in the Exchequer Botanical resources BE/BA); avoiding compaction or displacement of these rock pans would reduce impacts to these species.
74. Treat all known locations of bull thistle and wooly mullein if in or adjacent (≤ 200 feet) to a management unit with any proposed treatment. Treatments should be done before implementation of work begins; any follow-up treatments in subsequent years should also be done before ground-disturbing work begins for that year. A map of known weed locations will be produced in conjunction with the Botanical Resources BE/BA and Noxious Weed Risk Assessment.

75. All logging, planting, prescribed fire and road construction or maintenance equipment needs to be cleaned before being brought into the Project area. This needs to be done in order to reduce the risk of bringing in new infestations of invasive plants into the Project area. If the contractor or harvest inspectors cannot do this, a botanist should be brought in to inspect staged equipment.

76. Any new infestations of invasive plant species found in the Project during the period of project execution need to be mapped and avoided until treated by whatever methods a botanist or other resource specialist deems appropriate for control. Occurrences would be flagged with the noxious weed flagging - orange and black with the words “Noxious weed” on it. If the infestation is an A-rated weed or is considered problematic, no project work should occur in that area until the occurrence is totally controlled or eradicated (with botanist monitoring).

**Invasive plants/noxious weeds**

77. Do not implement planned activities for proposed action in or near (within 100 feet) of known weed occurrences until occurrence is treated.

78. Wash equipment and vehicles from off-project before being brought into the project area to reduce the potential for invasive plant spread in the Project area.

79. Any new occurrences of invasive plants needs to be mapped, flagged or noted and treated if possible before any adjacent treatment is implemented (within 100 feet of occurrence).

**Cultural Resources**

80. Project implementation would comply with the stipulations of the Programmatic Agreement Among the USDA Forest Service, Pacific Southwest Region (Region 5), California State Historic Preservation Officer, Nevada State Historic Preservation Officer, and Advisory Council on Historic Preservation Regarding the Processes for Compliance with Section 106 of the National Historic Preservation Act for Management of Historic Properties on the National Forests of the Pacific Southwest Region (Regional PA). This Project meets Stipulation 7.8(b)(2), Undertakings with Historic Properties, where protection measures specific to individual historic properties derived from the Standard Protection Measures (SPM) (Regional PA Appendix E) will be described in the Project cultural resource management report (Marsh 2015).

81. Prior to initiating Project activities, the District Archaeologist would be contacted to ensure appropriate protection measures for cultural resources are in place and understood (Regional PA, Appendix E, 1.3 (2)).

82. Historic properties would be avoided by ground disturbing activities (i.e. the use of ground-based mechanical equipment, piling, fire-line construction, etc.), in accordance with the Class I SPMs. Typical implementation of the SPMs is the practice of “flag-and-avoid” (SPM 1.1 and 1.3).  

83. Prescribed or controlled fire would be prevented from affecting certain flammable at-risk historic properties, including but not limited to the mining cabin and equipment on Exchequer Creek, the
log trapper cabin at Arkansas Meadow, and the sequoia log with carved dates in McKinley Grove. SNF Fire staff would work with the District Archaeologist to determine the appropriate and effective Class II SPMs (SPMs 2.2b).

84. Certain non-ground disturbing activities would be allowed within historic property boundaries, in accordance with the Class II SPMs. Certain proposed activities lack the potential to adversely affect the character of historic properties, and include but are not limited to the following:

- Archaeological resources may not be at-risk historic properties for effects from prescribed fire (in accordance with the Regional PA Appendix H, Region 5 Hazardous Fuels Protocol for Non-Intensive Inventory Strategies for Hazardous Fuels and Vegetation Reduction Projects). The SPMs of Protocol Stipulation 5.0 would be applied only to those historic properties defined as at-risk from the use of prescribed fire treatments.

- Removal of fuels mechanically or by hand (manual thinning with chainsaws) that would not affect at risk historic properties (SPM 2.2(b)), as approved on a site-specific basis in advance by contracting officials after they consult with the District Archaeologist.

- Removal of hazard trees from within historic property boundaries may take place in accordance with SPM 2.2(a) as approved on a site-specific basis in advance by contracting officials after they consult with the District Archaeologist.

- Linear sites (e.g. ditches) may be crossed by equipment, in areas where their features clearly lack historic integrity, on a site-specific basis in accordance with SPM 2.1(a), with approval in advance by contracting officials after they consult with the District Archaeologist.

85. The use of developed Forest transportation systems when the use is consistent with the terms of the Regional PA and would not have an adverse effect on historic properties may be approved by the District Archaeologist on a specific basis (SPM 1.2). Routine road maintenance and resurfacing where work is confined to previously maintained surfaces, ditches, culverts and cut and fill slopes where there are no known historic properties, or work is within a clearly disturbed context, would not affect cultural resources (Regional PA, Attachment D, 2.3(n)).

86. Other Cultural Resources: Traditional cultural properties, locations of contemporary Native American gathering, and other cultural resources identified through consultation with Native American tribes and individuals would be protected through avoidance by Project activity, or managed through Project implementation and consultation to enhance the resource (Regional PA; FSM 1563).

87. In the event of inadvertent effects or new discovery during implementation, the Forest would comply with Stipulation 7.10 of the Regional PA regarding the notification and consultation process.

**Recreation and Visuals**

88. During Project activities, access to dispersed camping areas and/or dispersed use areas that are on designated roads or designated trails would continue contingent upon the safety of the public (S&G 18)
89. To avoid conflicts with Forest visitors, a LOP would be established during the developed recreation site's peak season months which is between Memorial Day and Labor Day for Project activities within and directly adjacent to McKinley Grove Picnic Site (professional opinion; S&G 325).

90. Any damage to picnic site amenities (picnic tables, barriers, etc.), designated trails, or associated trail facilities (trail signs, bulletin boards, etc.) as a result of Project activities, would immediately be repaired or replaced to pre-Project condition (S&G 18).

91. If applicable, any dense thicket “walls” of young and intermediate trees along McKinley Grove Road would be thinned to improve visual access through the understory (S&G 25).

92. Low-intensity prescribed fire treatments conducted along McKinley Grove road would be patchy, irregularly shaped low-intensity burn patterns to minimize tree scorching, restore mosaic vegetative patterns of heterogeneity, remove woody debris, and enhance regeneration of the understory (S&G 25 and 26a).

93. Thin, pile, and burn pre-commercial thinning slash concentrations within view (up to 150-feet) McKinley Grove road prior to underburning to reduce understory fuels and mitigate visual disturbances of the prescribed fire (S&G 25 and 26a).

94. No prescribed fire treatments would be conducted within recreational sites, particularly McKinley Grove Picnic Site to avoid visibility of underburn remnants. Interpretive signs would be installed to describe the treatments to the public (S&G 25).

95. No burn piles or landings would be located within the boundaries of McKinley Grove Picnic Site (S&G 25 and 26a).

96. Visual disturbances (e.g. views of cut stumps, temporary roads, piles, landings, skid trails, etc.) would be treated or located to minimize their visibility as seen from McKinley Grove Road and McKinley Grove Picnic Site (S&G 25, 26a, and 26e).

**Engineering/ Transportation**

97. All NFS roads would be maintained to standards established in the FSH.

98. Road maintenance and reconstruction activities would be performed to support project access needs. Project design would insure drainage structures are functional and stable to prevent potential resource damage and degradation of water quality. (S&G 78, 79, 124, 206 and BMPs; 7709.58 (USDA FS 1992).

99. For dust abatement, water, oil, or magnesium chloride would be used. To minimize the potential for water quality impacts, compounds other than water would not be applied within 25 feet of stream channels, or in roadside or lead-out ditches (S&G 206).

100. Temporary roads required for unit access would be closed upon completion of use. Culverts would be removed, water bars would be constructed, the entrance would be blocked with a log and dirt berm, and the entrance would be disguised with brush to discourage public use (see BMPs 1.13, 1.17, 1.19, 2.2, 2.7, and 2.8).

101. Perform a final field review of project roads to determine reconstruction needs prior to project activities. Where economically feasible, place aggregate on existing native surface...
roads located in areas with High and Very High Soil Erosion Hazard ratings. Require aggregate on road slopes greater than 5% in areas with High and Very High Soil Erosion Hazard ratings. (S&G 129).

**Air Quality**

The following are best available control measures for prescribed fire as required under Section 190 of the Clean Air Act, as amended in 1990. The U.S. EPA developed implementation strategies and best available control measures for areas that are designated as in serious non-attainment for particulate matter less than 10 microns (PM$_{10}$) in 1992. Specific techniques to reduce fire emissions include the following (CH2M Hill 1995):

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

103. Avoidance techniques such as burning on cloudy days when the plume and residual smoke cannot be seen; burning during periods of atmospheric instability for better smoke dispersal; and burning during periods of low visitor use, would be utilized.

104. Techniques to optimize flaming combustion would be utilized, including burning piled fuels rather than broadcast burning, reducing the amount of soil in piles, and employing rapid ignition to create a high intensity fire.

105. All activities would conform to the State Implementation Plan.

106. A full conformity analysis would be conducted, as required by the Clean Air Act and the State Implementation Plan to assess whether the action produces less than de minimis emissions.

**References**


CH2M Hill. 1995. A Desk Reference for NEPA Air Quality Analysis. USDA FS, Region 6, Portland, OR.


USDA Forest Service. 2001b. First Amended Regional Programmatic Agreement Among the U.S.D.A. Forest Service, Pacific Southwest Region, California State Historic Preservation Officer, and Advisory Council on Historic Preservation Regarding the Process for Compliance with Section 106 of the National Historic Preservation Act for Undertakings on the National Forests of the Pacific Southwest Region (Regional PA).


