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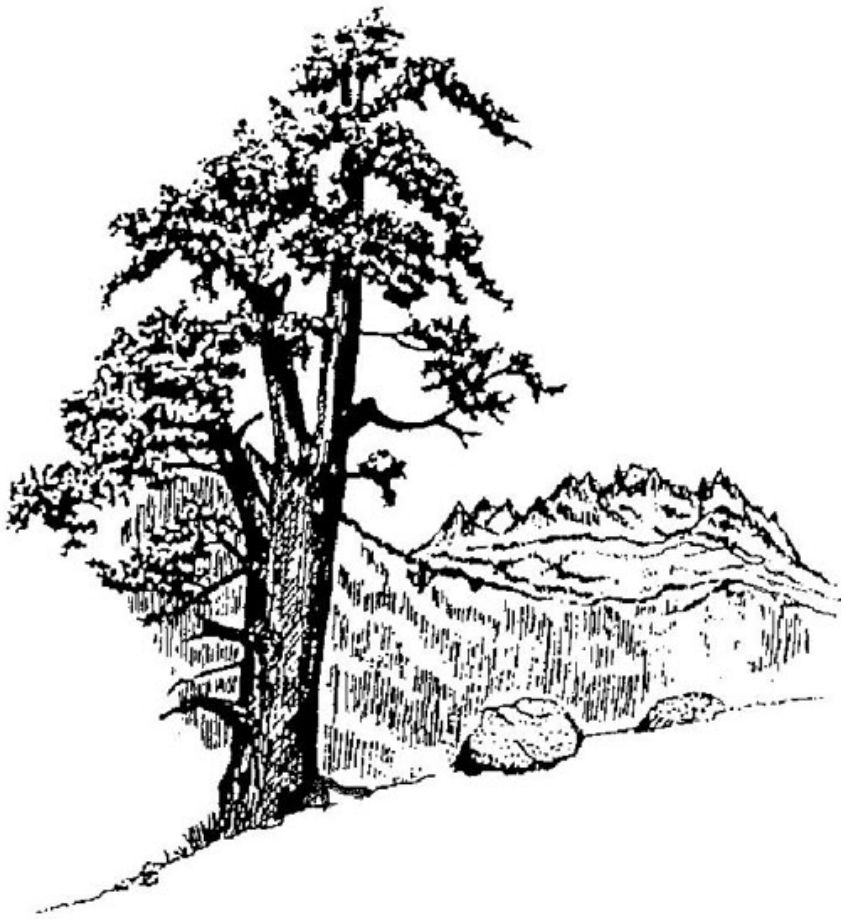
Final Environmental Impact Statement

Record of Decision

Sierra National Forest
Greys Mountain Ecological Restoration Project



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Abstract: A Final Environmental Impact Statement (FEIS) analyzing alternatives for the Greys Mountain Ecological Restoration Project (Project) on the Sierra National Forest is available for public review in the Bass Lake Ranger District Office. This Record of Decision documents the Deciding Officer's decision pertaining to the alternatives identified in the FEIS.

This FEIS analyzes the effects of two action alternatives designed to restore fire-adapted forests and create resilient, healthy forests. A no action alternative was also analyzed. The area affected by the proposal includes 9,600 total Project boundary acres within the Willow Creek and Fresno River watersheds, in the Southern Sierra Nevada. The Project is immediately north of the community of Bass Lake, California and south of Soquel Meadow, east of Nelder Grove Historical Area and west of Graham Mountain.

The purpose of the proposal is to achieve ecological restoration objectives and protect communities in the Wildland Urban Interface (WUI) from wildfire. The ecological restoration goals of the Greys Mountain Project is multi-faceted and includes the following: (1) increase forest resilience to insects, disease, and drought through prescribed fire and mechanical thinning treatments, (2) promote heterogeneity in forest structure for improving wildlife habitat, (3) decrease the occurrence of uncharacteristically severe wildfires and their impacts to ecosystems and watersheds, (4) promote native biodiversity, (5) restore degraded montane meadows, (6) improve habitat quality and connectivity for sensitive wildlife species, (7) decrease impacts of invasive species, (8) decommission and restore unneeded user defined vehicle trails, and (9) provide sustainable delivery of ecosystem services, such as clean water and carbon sequestration, in an era of changing climate.

Introduction

This Record of Decision (ROD) documents my decision on the Greys Ecological Restoration Project (Project) on the Sierra National Forest (SNF or Forest). The purpose of this project is multifaceted and includes:

- Strategically placing area treatments [known in the Sierra Nevada Forest Plan Amendment (SNFPA, ROD, USDA-FS, 2004) as SPLATs] on the landscape to reduce the intensity and spread of wildfires across the landscape and near communities and;
- Reducing inter-tree competition (stand density) to improve tree vigor and tree growth whereby providing increased stand resiliency to drought conditions, insect and disease attack and wildfire effects.

As this project is located in the Southern Sierra Fisher Conservation Area land allocation (2004 Sierra Nevada Forest Plan Amendment ROD (SNFPA 2004 ROD)), the Forest was mindful of the goal of retaining and maintaining fisher habitat and the desired condition canopy cover goals in female fisher home ranges. Effort was made to design the Project to meet the above purposes as well as the land management guidance.

Background

The Sierra National Forest Land and Resource Management Plan (SNF LRMP) was amended in 2001 by the SNFPA Record of Decision (ROD) (USDA-FS 1992, 2001b). In the 2001 SNFPA ROD Standards and Guidelines (S&Gs) for project planning were to focus on the modification of fire behavior through fuels treatments. These treatments were to have the highest priority in areas described as Wildland Urban Interface/Intermix (WUI). In 2004, a Supplemental EIS (USDA-2004a) was written to the SNFPA and a new ROD was signed (USDA-FS 2004b). This SNFPA 2004 ROD replaced the 2001 decision in its entirety. This decision recommended an ecosystem approach whereby the development and planning of projects would not only be based on fuels reduction treatments, but would create an overall approach by looking at all key elements within an ecosystem; however, WUI continued to be the highest priority area for treatments.

Ecological restoration is an important priority for the Forest Service Region that oversees the SNF (Region 5). The Region 5 Leadership Intent (http://www.fs.fed.us/r5/EcologicalRestoration/) states in part:

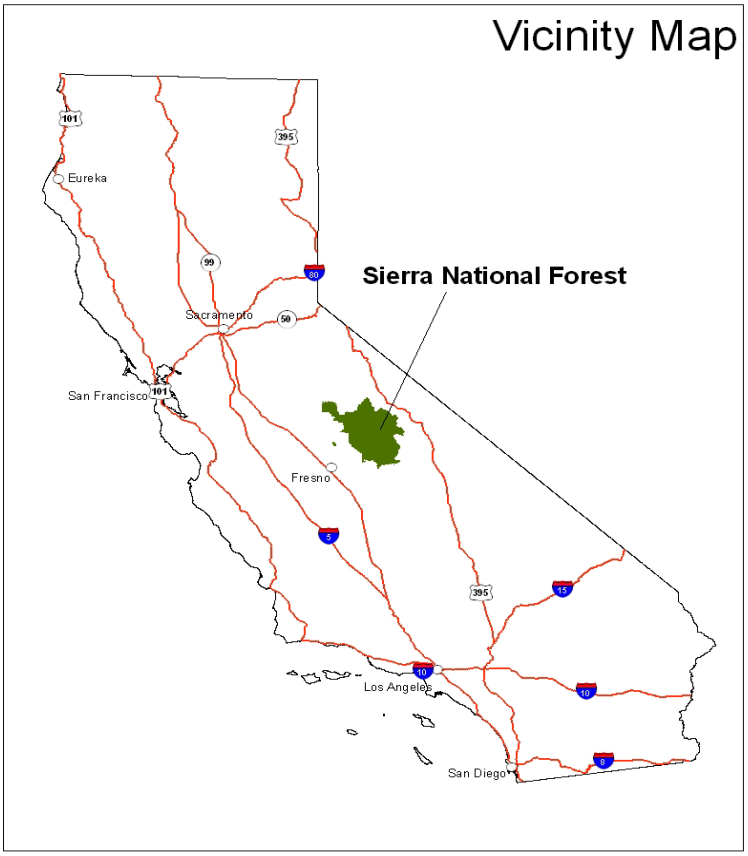
> *Activities to be promoted include, among others, forest thinning and prescribed fire to decrease fuel loading and increase forest heterogeneity; meadow and riparian restoration to improve watershed function; environmentally and ecologically sensitive fire management practices; invasive species eradication; and wildlife and fish habitat improvement.*

The project has been designed to meet the Forest's needs and to implement the Region 5 Leadership intent.

Location

The Project is located on the SNF in Madera County, California (See Vicinity Map, Figure 1). The Project area includes SNF System lands within the Bass Lake Ranger District of the SNF and includes portions of Township (T) 6 South (S), Range (R) 22 East (E), Sections 13, 14, 15, 16, 21, 22, 23, 24, 25, 26, 27, 28, 29, 32, 33, 34 and 35; T6S R23E Sec 18 & 19 and T7S R22E Sec 2&3. Mount Diablo Base and Meridian.

Figure 1-Vicinity Map



Purpose and Need

The objectives for this project are:

- Protect human communities from moderate/high intensity wild fires as well as minimize the spread of wildfires that might originate in urban areas into the forested lands created by unnaturally high levels of fuel ladders and dead and downed fuels.
- Improve resiliency in stands that are currently overstocked and are becoming more susceptible to attack from insects, diseases, drought conditions, and/or wildfire.
- Restore hydrologic function in five meadows that have vertically and laterally unstable stream systems and changed soil moisture conditions has resulted in conifer encroachment beyond the range of natural variability.
- Improve the quality and quantity of culturally significant vegetation which has deteriorated due to the absence of fire as a tool for maintenance and rejuvenation.
- Reduce the potential for undesirable damage from high intensity fire behavior to historical sites which are over grown with dense conifers and high fuels loads.

- Reduce resource damage caused by user-created vehicle routes in undeveloped recreation sites causing offsite movement of soil into streams and riparian areas that is reducing water quality for downstream users.
- Improve forest health conditions in developed recreation sites which are in a distressed state with mortality occurring and threatening public safety.
- Improve the integrity and characteristics that make cultural resources eligible for the NRHP by reducing fuels within cultural resource sites through hand thinning and piling with follow up burning, prescribed under burning, and mechanical treatments in an effort to reduce damage to the sites from the threat of intense forest fires, to decrease the potential for slope failure along railroad grades and stream channels, and to restore setting where setting in a key aspect of a site's integrity.

Decision

Based on the analysis of the purpose and need for action, the issues, the LRMP as amended and, current policies and regulations, the analysis of alternatives contained in the FEIS, public comments received, and other information in the project record, I have decided to implement Alternative 2 which was the Proposed Action in the FEIS. Alternative 2 includes the following actions within the Project area:

Table 1. Summary of Proposed Action treatments

Proposed Action Treatments	Units of Measure	
Structural Restoration Treatments		
Commercial Thinning	Acres	**1535**
Mechanical Fuels and Vegetation Treatments	Acres	**882**
Handwork Fuels and Vegetation Treatments	Acres	**124**
Mastication Fuels and Vegetation Treatments	Acres	**318**
Fuel Break Construction and Reconstruction	Acres	**325**
Reforestation	Acres	**50**
Meadow Restoration (Conifer Removal)	Acres	**13**
Meadow Restoration (WIN) (Watershed Improvement Need Site Work)	Acres	**36**
Developed Recreation Sites (Hazard Tree and Thinning)	Acres	**31**
Cultural /Historical Site Restoration	Acres	**100**
Noxious Weed Management	Acres	**10**
Wildlife Habitat Restoration	Acres	**3,607**[1]

[1] Acres of wildlife habitat would be improved through) 1. Reducing the risk of uncharacteristically severe wildfires; And 2. Promoting stand heterogeneity of forest vegetation, thereby making it more resilient to natural disturbances, and enhancing native wildlife species habitat and diversity. Units of measure for proposed treatments are approximate.

Range Maintenance (Stock Drive)	Miles	**7.6**
Road Maintenance	Miles	**56**
Road Reconstruction	Miles	**20.3**
Temporary Road construction	Miles	**0.25**
Designated OHV Trail maintenance	Miles	**5.5**
User Defined Vehicle Trail Reclamation	Miles	**0.42**
Process Restoration Treatments		
Prescribed Fire (Initial Entry)	Acres	**596**
Prescribed Fire (After structural restoration treatments have been completed)	Acres	**1855**
Total Process Restoration	Acres	**2,451**

Part of my decision includes the implementation of design criteria found in ROD Appendix B (as well as in the FEIS Chapter 2). These design criteria contain, among other resource protection actions, important actions designed to address fisher habitat that include:

- retention of large tree elements,
- clumpy, irregular treatments,
- retention of high canopy cover in female fisher home ranges, and
- retention of downed woody debris (SNFPA 2004 ROD p. 41 & 47).

My decision also includes the implementation of the BMP and Monitoring Plan described in ROD Appendix C & D respectively. To clarify my decision, ROD Appendix F includes a stand by stand description of the treatments included as part of my decision. The Project treatments are strategically placed on the landscape (SPLATs) to reduce the intensity and spread of wildfire. A treatment area map displaying this strategic placement can be found in ROD Appendix G.

Of the 9,600 total acres within the project boundary, approximately 3,575 acres were analyzed as areas where some form(s) of treatment are proposed (treatment areas). The remaining 6,140 acres have no treatments proposed due to slopes greater than 35 percent, standard and guideline limitations on treatment and/or no treatment is needed to meet the purpose and need.

In Alternative 2 (proposed action) the treatments would include:

- Commercially thin from below 10 – 30 inch dbh mixed conifer, pine, and white fir stands on approximately **1535** acres (*treats surface and ladder fuels, enhances heterogeneity in forest stand structure and reduces conifer stand density)*;
- Remove hazard trees and commercially thin within three campgrounds on approximately 31 acres (*Reduce conifer stand densities within developed recreation sites for public safety and increased stand resiliency as described in Chapter 1 Proposed Action);*
- Mechanically treat fuels and overstocked vegetation outside of commercially thinned stands on approximate**ly 882 ac**res *(treats surface and ladder fuels, enhances heterogeneity in forest stand structure and reduces conifer stand density);*

- *P*re-commercially thin by masticating approximately **318** acres of conifer stands and brush covered areas *(treats surface and ladder fuel**s,** enhances heterogeneity in forest stand structure, reduces conifer stand density, ties restoration treatment areas and fuel breaks together, as described in Chapter 1 Proposed Action)*;
- Plant and hand release treated openings within commercial thin and mastication treatment areas on up to **50** acres *(prepare sites within failed plantations for reforestation and release needs)*
- Treat slash concentrations within commercially thinned stands by a combination of tractor or hand piling and burning or mastication *(enhances heterogeneity in forest stand structure, reduces natural and activity generated surface fuel loads, ties restoration treatment areas and fuel breaks together,)*;
- Prescribe underburn on up to approximately **596** acres within 13 stands (prescribed fire only treatment) *(enhances heterogeneity in forest stand structure, ties restoration treatment areas and fuel breaks together, restore production and enhance vitality of plant material)*;
- Prescribe underburn within treatment areas H 2, 3 and 4, and T 1,2, 4, 5, 8, 9, 10, , 16, 17, 21, 26, 30, 31, 32, 33, 35, 38 and 39 on approximately **1,855** acres *(enhances heterogeneity in forest stand structure, ties restoration treatment areas and fuel breaks together, reduces fuel loadings to pre-1900 levels restore production and enhance vitality of plant)*;
- Construct and reconstruct three existing fuelbreaks on approximately **325** acres(*treat surface and ladder fuels to modify wildland fire spread and fire intensity levels, ties restoration treatment areas and fuel breaks together, restore production and enhance vitality of plant material)*
- Improve and restore native plant communities important to local Native American tribes for traditional uses. This will be accomplished within the areas that are planned for prescribed burning and will be completed by using prescribed burning and hand pruning with tools *(restore production and enhance vitality of plant material)*
- Reduce fuel loading and fuel ladders from encroaching conifers within prehistoric and historic sites by thinning and prescribed burning on approximately **100** acres *(improves the integrity that make cultural resources eligible for the)*;
- Restore degraded meadows by reducing encroaching conifers on approximately **13** acres *(restores degraded meadows)*;
- Restore hydrologic function through meadow stabilization on approximately **36** acres *(restores degraded meadows)*;
- Manually pull and/or prescribed burn of noxious weed patches on approximately **10** acres *(treats infestations of noxious weeds)*;
- Perform range stock drive maintenance by cutting out encroaching conifers and clearing stock drive tread over approximately **7.6** miles *(improves and maintains resources for range management activities*);
- Perform maintenance on approximately **56** miles of forest system roads *(improves and maintains existing forest transportation routes)*;

- Perform reconstruction on approximately **20.3** miles of forest system roads *(improves and maintains existing forest transportation routes)*;
- Construct **0.25** miles of temporary road *(Improve and maintain existing forest transportation routes within the project)*
- Restore approximately **0.42** miles of user defined OHV tracks (*restores user defined vehicle tracks and roads)* ;
- Perform annual trail maintenance on **5.5** miles of designated OHV trails. *(improve and maintain existing forest transportation routes within the project).*

Meadow Restoration Plans

My decision also includes meadow and Watershed Improvement Need (WIN) site restoration. **Table 2** lists meadow/WIN site locations and Figure 2 displays the location of these sites within the Project area. Appendix D includes a site map showing the location of each WIN site, rock cache location, and potential ingress route into the meadow.

Ten meadows have been selected for restoration. These meadows were identified as having multiple restoration needs, which include the physical repair of WIN sites, removal of encroaching conifers, and restoration of other related meadow degradation issues such as Off-Highway Vehicle (OHV) and/or road impacts.

Table 2. Meadows and WIN sites identified for restoration within the project area (ND = no quantified measurement of encroachment).

WIN Site	Meadow Number/Name	Identified as top five in Conifer Encroachment Study?	Acres of Encroachment	Total Acres of Structural Meadow Restoration
51295	503M7	Yes	2.5	3.0
51104	503M8	No	3.5	3.5
51038	504M132/Meserv Meadow	Yes	0.5	0.0
51246	504M198/Railroad Meadow	No	2.4	3.5
51244	504M208	No	0.1	0.3
51036	504M209/Poison Meadow	No	0.86	7.5
51037	504M211	Yes	0.0	3.3
None	504M212	Yes	0.75	0.0
51241	504M220/Chipmunk Meadow	No	ND	3.6
51245/51015	504M292/504M293	Yes	1.25	5.3
		Totals	**11.86**	**30.0**

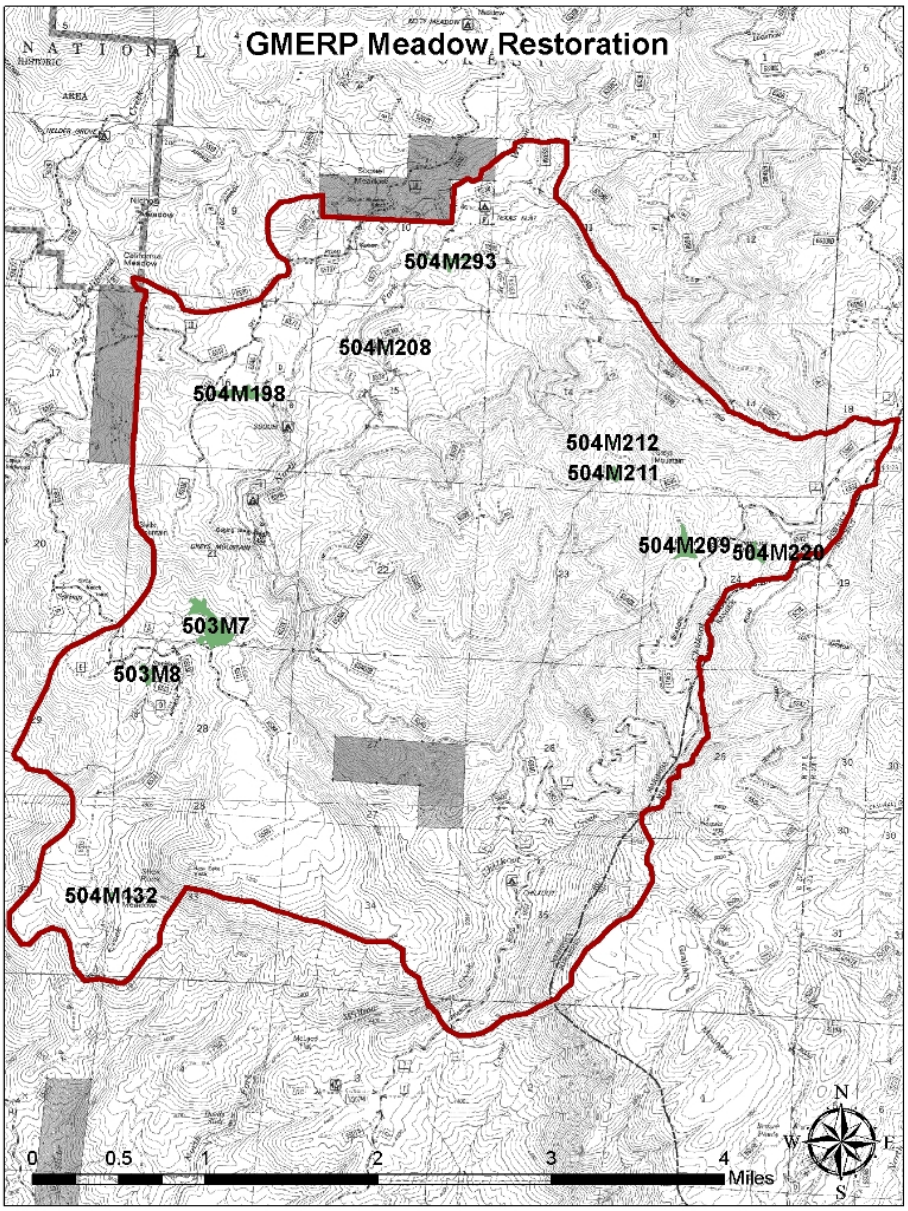


Figure 2. Locations of meadow restoration sites within the Greys Mountain ERP (note: Meadows 504M292 and 293 have been combined into one site).

Restoration methodology

Physical restoration designs are detailed in Appendix C. The restoration methods and designs will address essentially three types of erosional feature:

- Vertical instabilities (knick points and headcuts)
- Lateral instabilities (channel banks)
- Incised channels and/or straightened channels

Design Criteria Included in the Decision

Based on site specific review of the Project area, resource specialists identified design criteria to reduce potential impacts caused by the various alternatives. My decision includes implementation of the design criteria and Best Management Practices (BMPs) shown in the ROD, Appendix B and C respectively. These design criteria and BMPs minimize, reduce or eliminate impacts on sensitive resources.

Monitoring Included in the Decision

My decision includes the implementation of the Monitoring Plan found in Appendix E.

Best Available Science

I adopted all practicable means to avoid or minimize environmental harm in the design of this project. I included all of the project design criteria that I believe are necessary to avoid, minimize, or rectify impacts on resources affected by the implementation of this decision. My conclusions are based on a review of the record that is based on the best available science. The resource sections in Chapter 3 of the FEIS identify the effects analysis methodologies, reference scientific sources which informed the analysis, discuss responsible opposing views and disclose limitations of the analysis.

Rationale for My Decision

My decision to approve Alternative 2 is based on consideration of the purpose and need for action, the issues, the LRMP and associated amendments, current policies and regulations, the analysis of alternatives contained in the FEIS, public comments received, and other information in the project record. I considered the concerns expressed throughout this process relating to tree size, use of fire and wildlife impacts. I considered the emphasis on ecological restoration laid out in the Forest Service Region 5 Leadership Intent.

Alternative 2 is expected to substantially reduce the potential for high fire severity under all but the most extreme weather conditions which would protect the public and fire fighters; restore meadow to improve watershed function; improve wildlife habitat; benefit cultural resources; and improve forest health and resiliency.

Compelling Need for the Project

There is a need to restore the Greys Mountain Project (Project) area ecosystem to a system that is in balance and where the right species are growing in the right locations to allow for long term sustainability. Immediate action is needed to make this ecosystem more sustainable, more resilient, and healthier under current and future conditions. Ecologically healthy and resilient landscapes, rich in biodiversity, will have greater capacity to adapt and thrive in the face of natural disturbances and large scale threats to sustainability, especially under changing and uncertain future environmental conditions such as those driven by climate change and increasing human use.

Changes in one component of the ecosystem (such as the type of dominant trees, the density of trees, or hydraulic function of a meadow) result in corresponding changes to other ecosystem components (such as wildlife diversity and availability of water.) Currently the forest is too homogenous with too much non-fire resistant fir and too little fire resistant pine. Pine has

historically been the dominant tree over most of this area however with the suppression of fire and past railroad logging, shade tolerant fir and cedar have been outcompeting pine and have become dominant as well as growing at an unsustainable density. Additionally conifers are encroaching on meadows reducing meadow habitat. Changing meadow hydraulics are altering meadow characteristics threatening cultural resources and historic gathering sites.

The Project area is overstocked with tree stands proposed for treatment having tree densities too high for a sustainable healthy and resilient forest. The forest density has increased in the era of fire suppression to conditions that are out of alignment with the conditions for a healthy forest. With so many trees, the forest is under stress due to over competition and will not be able to adapt and overcome stressors in the environment such as drought, insect attack, air pollution, fire and climate change which will lead to more dead trees than is desirable (FEIS Chapter 3 Forest Vegetation/Silviculture Section).

Additionally the forest in its current condition is susceptible to uncharacteristic wildfire which can cause stand replacement. Fire is an important component of the forest ecosystem however the fire conditions that were in effect prior to fire suppression resulted in fires typically low to the ground and of moderate intensity. Fires, under current conditions would be more intense and would negatively impact natural resources, the public and firefighter safety. High fire severity is commonly characterized by complete mortality of the vegetation, soil damage, water pollution, ineffective suppression efforts with associated high financial costs, and loss of life and/or property (FEIS Chapter 3 Fire/Fuels Section).

Before fire suppression, many natural low-intensity fires (possibly as many as 20 based on projections from similar areas without suppression) would have occurred in the Project area. The lack of frequent mixed-intensity fires has caused timber stands to become overstocked with fire intolerant trees and shrubs, converting it to a fire susceptible forest type in which high intensity fires are more likely. Fire intolerant species tend to form unhealthy stands prone to uncharacteristically large and severe wildfires, drought-induced mortality, and increased outbreak of disease and insect infestation (Graham et al. 1999) (FEIS Chapter 3 Fire/Fuels and Forest Vegetation/Silviculture Sections).

Currently the Forest tends to have increased susceptibility to wildfire as trees have limbs that stay closer to the ground providing increased ability to take surface fires into the crowns in the form of single tree torching or group torching. With more fire resistant, shade intolerant pine fire behavior would be modified and there would be fewer trees dying (FEIS Chapter 3 Fire/Fuels Section).

Finding the Balance

I understand the importance of sustaining fisher populations particularly as this project is situated within the Southern Sierra Fisher Conservation Area. I carefully considered effects on the fisher (direct, indirect and cumulative) as part of my decision and balanced these with the Project needs. The Forest plans and designs our management to address the conservation of fisher as well as other wildlife species and other forest resources and uses. My decision may affect individual fisher but has been determined not to contribute to the need for Federal listing or result in loss of viability for fisher. The forest thinning I have decided upon retains key components important to fisher habitat including: the majority of the forest biomass including all large trees (>30 inches dbh) and nearly all moderate sized trees 20-30 inches dbh, as well as all oak trees, and all large

snags unless deemed a safety hazard. Additionally my decision includes extensive areas of no treatment actions (6,043 acres).

Although under my decision a total of 3556 acres will be treated, design criteria and LRMP, as amended, standards and guidelines dictate areas where treatments cannot occur to reduce and/or eliminate adverse effects on particular resources. It is estimated that excluding these sensitive areas, (for example, cultural resource areas, botanical species areas, wildlife habitat areas, and aquatic species areas), from treatment approximately 64 percent of the project area will remain untreated. Over the short-term, there will be a relatively low level of change in California Wildlife Habitat Relationship fisher habitat types as a result of thinning treatments and an increase in total fisher habitat over the longer term. Fisher rest site groups will be identified and retained, minimum canopy cover retention levels are established and protected. Enhancing habitat heterogeneity at multiple scales will benefit fisher. Tree removal and fuels reduction activities are expected to reduce the extent, severity and intensity of wildfires within and adjacent to treated stands while maintaining existing habitat functionality (FEIS Chapter 3 Wildlife and Design Criteria Sections).

At a forest-wide scale, there currently are 234 designated California spotted owl Home Core Range Areas (HRCAs)/Protected Activity Centers (PACs) which encompass 146,760 acres. Approximately 468,861 acres of suitable California spotted owl habitat currently exist on the Forest. Considering my decision's treatment activities, along with other ongoing actions, and reasonably foreseeable activities, less than one percent of suitable habitat on the SNF would be affected. Silvicultural prescriptions under my decision within California spotted owl PACs would maintain >60% canopy closure where available and treatments within spotted owl HRCAs would aim to maintain >50% canopy closure where available. Silvicultural prescriptions under my decisions outside of spotted owl PAC/HRCAs will maintain canopy cover of at least 50%, with a preference for at least 60%, immediately post treatment. These prescriptions focus on removing surface and ladder fuels, and thinning from below. There will be very few changes to habitat types as a result of my decision (FEIS Chapter 3 Wildlife Section).

Large trees (30"dbh and above), and all snags, will be retained during mechanized treatments, except where they pose an immediate safety hazard. My decision will not impede wildlife movement or dispersal to other currently connected suitable habitat areas because habitat connectivity will be maintained within and adjoining the Project area through Old Forest Linkages and non-treated areas. Because my decision will increase forest stand structure and heterogeneity, and retain high canopy cover, along with increasing large diameter trees there will be a long-term increase in California spotted owl suitable habitat over time. Based on the relatively stable geographic distribution and population levels of spotted owls in the area, my decision will not result in a loss of viability for the California spotted owl (FEIS Chapter 3 Wildlife Section).

Although I acknowledge that individual sensitive species may be impacted by my decision, the overall viability of sensitive species is preserved both at the Project level and landscape level. The benefits to the Forest in resiliency; and the benefits to the Forest, the public and to worker safety from reduced fire severity outweigh the impact to these individuals in my mind. Additionally in the long run, habitat for many Forest species will be enhanced as trees grow larger, large trees are more numerous, and the habitat is more heterogeneous making it a richer environment for wildlife. I am aware of the impacts to the environment and have decided that these impacts are acceptable in light of the benefits (FEIS Chapter 3 Wildlife Section).

Additionally to meet the ecosystem restoration objectives my decision will restore meadows in the Project area. My decision will improve the ecological condition and hydrologic function of the meadows and associated riparian channels. The meadow restoration activity will reduce erosion and impacts on water quality for downstream beneficial use, and thus will be a proactive protective measure to watershed resources and forest health. Direct benefits of the meadow restoration will be increased water storage and reduced erosion. The effect of this meadow restoration will move sites towards desired conditions (FEIS Chapter 3 Hydrology Section).

Additionally my decision includes reduction of meadow conifer encroachment. My decision targets removal of conifers on forest-meadow edges or small tree islands maximizing dispersal of meadow species. Conifer encroachment removal and channel restoration under my decision will increase the area covered by meadow or riparian vegetation. Trees that invade a meadow alter light and soil moisture available to herbaceous plants which leads to undesirable changes in species composition and biomass productivity. A decrease in conifer seedling establishment will occur as the meadow conditions improve from increased water storage under this decision and result in saturated soil for a longer period in the growing season inhibiting seedling establishment (FEIS Chapter 3 Hydrology Section).

The restoration and maintenance of Project area stock drive trails, OHV routes, and systems roads will also improve watershed condition and move the watershed and its subdrainages toward desired conditions. Subsoiling trails to de-compact the soil will allow the regeneration of native grasses and herbaceous plants and allow subsurface water to move freely down gradient. Roughly 0.231 acres of soil will be reclaimed back to its natural condition after subsoiling is completed (FEIS Chapter 3 Hydrology Section).

There are approximately 72 cultural resource sites and several miles of historic linear resources that have the potential to be affected by my decision. A reduction in fuels through thinning of vegetation including hand and mechanical treatments and prescribed burning will not only enhance the setting, design and feeling of cultural resources, it will also protect these resources from the devastating effects of high severity wildfires enabling the future preservation of these resources. Uncharacteristic wildfire would be devastating to maintaining the characteristics and values of cultural resource sites. Prescribed burning through designated cultural sites will reduce fuel loading and prevent future loss of data potential from excessive heat damage and minimize the need for suppression actions (FEIS Chapter 3 Cultural Resources Section).

I also considered the issues raised by the public during the analysis process. One key issue identified was the concern that the use of prescribed fire put homes at risk. My decision will increase the capacity for fire fighters to control fires at initial attack with minimized risk to their safety (and the public) and increased ability to keep these fires small in size with the use of direct attack tactics. Fires will drop from the tree crowns to the forest floor. Aerial firefighting resources will be better able to penetrate the canopy to aid ground resources with a moderately reduced canopy density. Prescribed fire treatments have been carefully designed under my decision to have clear boundaries to stop fire spread (FEIS Chapter 3 Fire/Fuels Section).

Another key issued raised were the diameter of the trees that were to be thinned. Some commenters expressed a desire to see only the smallest trees removed so that the Forest maximizes the size of trees. My decision supports the goal of large tree growth by increasing tree resilience and decreasing tree competition. Although I have chosen to remove trees up to 30 inch dbh, removal of larger size trees is selective and has been minimized by only being done where the need for maintaining forest resilience depended on it. I believe that my decision will result in more large trees in the long term than would result under the other alternatives (FEIS Chapter3 Vegetation/Silviculture Section). Additionally I reviewed the analysis which included an

alternative that thinned less and smaller trees. My reasons for not selecting this alternative are articulated in the next ROD section.

The public raised the key issue of maximizing the use of fire as a treatment technique. In my mind my decision does maximize the use of fire as a treatment tool in light of the dense high fuel conditions; the need to reduce tree density for forest resilience; the need to be strategic and selective in the trees removed to maximize wildlife habitat; environmental regulations including air quality requirements; and the need to protect the public and fire fighter safety. (FEIS Chapter 3 Fire/Fuels, Air Quality, Vegetation/Silviculture, Wildlife Sections and FEIS Appendix G Response to Public Comments.)

The public raised another key issue of allowing for opportunity of intense fire effects on the landscape which would enhance wildlife habitat for species that inhabit burned areas. It is expected that based on the design of the project that during burn implementation there will likely be pockets of fuels and thick vegetation that will created patches of high severity fire effects throughout the project burn areas. Past burn history has shown the project will induce some pockets of tree mortality from burning to create the desired habitat.

During the comment period, I heard concerns about the potential adverse effects of the Project on future snag densities and habitats for species that depend on snags. Commenters also expressed concerns that the thinning prescriptions could potentially reduce habitat quality for species that prefer stands with higher canopy cover and basal area, particularly the California spotted owl. I also heard concerns that the EIS did not adequately address black backed woodpecker habitat. I have carefully considered these concerns in the Responses to Public Comments (FEIS Appendix G) and have, in some cases, added to the analyses in the FEIS and supporting resource specialist reports to ensure these potential effects have been adequately explored and disclosed. I believe Alternative 2 strikes a responsible balance between meeting the needs to take action, as described above, while addressing public concerns regarding the potential adverse effects associated with ecological restoration activities.

The longer the Forest waits to restore the ecosystem, the more vulnerable the stands become to mortality caused by uncharacteristic wildlife and other stressors such as insects, parasites and climate change. This immediate need weighed on my decision to move forward even though there may be some unanswered questions.

Alternatives Considered in Detail but Not Selected

In addition to the selected alternative, I considered two other alternatives analyzed in detail, which are summarized below. I also have also considered three alternatives that were eliminated from detailed study:

- An alternative was suggested that would use high intensity fire to create high severity fire effects to create and increase snag habitat for avian wildlife species;
- An alternative was suggested that would use landscape scale fires to manage fuels and vegetation instead of logging.
- An alternative was considered that would allow mechanical treatment in 100 acres of subdrainage 503.0056.
- An alternative was considered that would “within the acres of natural forest proposed for mechanical/commercial thinning, instead of the live trees over 16” dbh being removed, the trees that would otherwise be marked for removal would instead be girdled or killed

in some other way in order to actively recruit more large snags for wildlife, or such trees would be felled to provide large downed log structure for small mammals, amphibians, and invertebrates".

- An alternative was considered that would limit treatments within fisher habitat, specifically the alternative would not allow treatments within the 0.4 and greater CBI predicted probability of occurrence model for fisher. This alternative was eliminated for several reasons:

(For more information on these alternatives see FEIS Chapter 2.)

Alternative 1 No Action Alternative: Under the No Action alternative, current management plans would continue to guide activities in the project area. This alternative was not selected because it would not meet the purpose and need of this project and allows the Forest to become more susceptible to attack from insects, diseases, drought conditions, and/or wildfire nor would it protect human communities from moderate/high intensity wild fires or minimize the spread of wildfires. None of the other project purposes would be met as well.

Alternative 3: In Alternative 3, treatment areas would remain the same as in Alternative 2, however treatments within these areas would include only those needed to reduce the surface and ladder fuels (within the lower and limited mid-level canopy levels) needed to achieve fire and fuels objectives. Under Alternative 3 there would be no additional treatments (i.e. additional thinning in the mid-level canopy) to fully address stand density and forest restoration objectives.

Although Alternative 3 addresses the need for surface and ladder fuel reduction, it does not address the need for conifer stands to be resilient to attack from insects, diseases, drought conditions. Conifer stands in the project area are well above normal stocking levels (stand densities) resulting in declining growth, health and resiliency, thus increasing a stand's potential for higher rates of mortality.

Environmentally Preferable Alternative

The environmentally preferable alternative is the alternative that will promote the national environmental policy as expressed in NEPA's Section 101. Ordinarily, this means the alternative that causes the least damage to the biological and physical environment; it also means the alternative which best protects, preserves and enhances historic, cultural, and natural resources.

Based on my consideration of the factors listed above and the effects disclosed in the FEIS, I consider Alternative 2 to be the environmentally preferable alternative. I believe the management actions under Alternative 2 protect and preserve important historic, cultural, and natural resources and maintain the quality of habitat needed to protect sensitive species. Alternative 2 provides different treatment intensities depending on stand conditions over 30 percent of the landscape as well as a large amount of acreage where no treatment will occur.

Public Involvement

A Notice of Intent (NOI) to prepare an Environmental Impact Statement for the Greys Mountain Project was published in the Federal Register on July 15, 2011. The notice asked that comments on the proposed action be received no later than 30 days after the publication date. The scoping letter was sent on June 6, 2011 to residents within 1.5 mile radius of the project area, to members and groups in the Native American community and to publics expressing interest in the project. The project was also listed in the SNF Schedule of Proposed Actions. On June 25, 2011 the FS held a public field trip to the project area. The scoping letter included an invitation to participate

in the field trip and a news release announcing the public meeting was sent to the Sierra Star (local newspaper) on June 17, 2011. The public field trip was attended by one individual from the local community.

There were four respondents, all of whom raised concerns and issues regarding the proposed project. All of the responses are in the project record on file at the Bass Lake Ranger Station.

Using the comments from the public, the interdisciplinary team developed a list of issues to address. A portion of these comments led to the development of Alternative 3.

The DEIS Notice of Availability was published in the Federal Register on December 16, 2011 with the comment period ending January 31, 2012. The document was made available on the SNF website and hard copies of the document, compact disks or letters of notification were mailed to 51 interested parties.

Public Comments on the DEIS

In response to the Forest's request for comments during the DEIS comment period, Seven interested parties submitted responses. The SNF documented, analyzed, and summarized public comments. Although only substantive comments are required to be responded to in NEPA regulation, the forest chose to respond to all comments submitted. One hundred and thirty five (135) comments were responded to and these responses can be found in FEIS Appendix G.

Tribal Government and Native American Interests

Tribal Governments and Native American Interests representing constituents in the Project area were sent all public correspondence and have consulted on aspects of the proposed projects. The following offices received mailing:

North Fork Mono Rancheria, Sierra Mono Museum, Southern Sierra Miwok Nation, Picayune Rancheria and the Mono Nation, a non-profit organization.

Changes between the DEIS and the FEIS

Based on both public comment and Forest Service review, changes were made between DEIS and FEIS. The following types of changes and clarifications were applied to the FEIS:

Data Omissions – In cases where omissions in data were identified by the Forest Service or the public, those omissions were fixed in the FEIS. Where data pertinent to the analysis was identified between DEIS and FEIS it was include and analyzed.

Corrections and Edits – Where typos or errors were identified they were corrected.

Clarifications – Public comment inspired the clarification of items in many sections of the FEIS. These clarifications ranged from adding a few words to help the reader more fully understand the content and rationale of a section to changing the treatment methods for two areas and creation of two new maps. The following proposed treatment areas were modified to a less intensive treatment method after public comments showed the land allocation provided only prescribed fire as a treatment:

T-18 and FX-9 were originally planned for pre-commercial and commercial thinning by hand and or mechanical methods but the WUI land allocation was removed during the planning process after field verifications showed the private property did not meet the WUI criteria. After the land

allocation was changed the treatments proposed were inadvertently not modified to reflect this change. Public review of the DEIS pointed out this error and the treatments were changed to correct method that was allowed for that land allocation which was prescribed burning only.

Additions in Response to Comments –These comments were evaluated and the reasons proposed alternatives were not included in the FEIS were explained. The proposed alternatives were included in the Alternatives Considered but Eliminated from Detailed Study in Chapter 2. Appendix E was created to display proposed treatments and acreage by area. More information regarding the effects of Alternatives 2-3 has been brought forward from the BA/BE to make the FEIS a more clear and informative summary of the BA/BE analysis. This includes providing more of the BA/BE direct, indirect and cumulative effects information for Alternatives 2-3. Map 18 and 19 have been created and added into Appendix A Map package as requested by commenters Edits and corrections to maps that displayed treatment area boundaries drawn on private lands have been made. Additional citations have been added in the Vegetation Section related to stocking levels, drought, insect and other stressors on trees as newer information is now available.

Significant Issues

Comments from the public and other agencies were used to formulate issues concerning the proposed action. No scoping comments were received from members or groups from the Native American community. Other comments received were either from the environmental community or the timber industry. The FS separated Project issues into two groups: significant and non-significant issues. Issues are statements of cause and effect, linking environmental effects to specific actions. Significant issues are issues with potentially significant impacts. The Council on Environmental Quality (CEQ) NEPA regulations explain this delineation in Sec. 1501.7, "…identify and eliminate from detailed study the issues which are not significant or which have been covered by prior environmental review (Sec. 1506.3)…" Project significant issues were used to design Alternative 3, create design criteria and focus the effects analysis.

The Forest Service identified the following significant issues during scoping:

1. *Improper use of prescribed fire may put homes at risk.*
2. *Allow for opportunity of intense fire effects on the landscape.*
3. *Use fire as a treatment method on a greater scale rather than timber removal.*
4. *Removal of trees over 10" dbh is unnecessary for reducing potential for high intensity fire.*
5. *Removal of trees up to 30" dbh is unnecessary for fire/fuels management and for reducing fire severity.*

Legal and Regulatory Compliance

My decision complies with the laws, policies, and executive orders listed below and described in Chapter 3 of the FEIS.

Forest Plan Consistency

My decision complies with all management direction contained in the SNF LRMP.

Findings Required by Other Laws and Regulations

The project was designed with the intent of integrating the management goals and objectives set forth in the SNF LRMP as amended (Chapter 1 FEIS) while meeting the purposes and needs of the Project.

The findings for other pertinent laws associated with this decision are listed below:

1. National Environmental Policy Act (NEPA)

   NEPA requires that Federal agencies prepare detailed statements on proposed actions that significantly affect the quality of the human environment to provide decision makers with a detailed accounting of the likely environmental effects of a proposed action prior to its adoption, and to inform the public of, and allow comment on, such effects. Resource specialist have compiled and utilized information relevant to the effects of the alternatives considered in the Greys Mountain Ecological Restoration Project FEIS. All DEIS substantive comments that have been summarized and responded to in Appendix G of the FEIS.

   I find that the environmental analysis and public involvement process complies with each of the major elements of the requirements set forth by the Council for Environmental Quality for implementing NEPA (40 CFR 1500-1508).

2. National Forest Management Act (NFMA)

   The National Forest Management Act (16 U.S.C. 1604) and the Multiple-Use Sustained-Yield Act of 1960 (16 U.S.C. 528–531) give direction to National Forests to develop National Forest Land and Resource Management Plans that (A) ensure consideration of the economic and environmental aspects of various systems of renewable resource management, including the related systems of silviculture and protection of forest resources, to provide for outdoor recreation (including wilderness), range, timber, watershed, wildlife, and fish; (B) provide for diversity of plant and animal communities based on the suitability and capability of the specific land area in order to meet overall multiple-use objectives, and for steps to be taken to preserve the diversity of tree species. As set forth by these Acts the SNF LRMP, as amended, sets specific S&Gs which are to be followed during project level planning and implementation. By the inclusion of design criteria as part of my decision to minimize or eliminate significant environmental effects from this project as well as the inclusion of standards and guidelines from the SNF-LRMP and SNFPA ROD as amended (USDA-FS 2004b) used to design this project, I have determined this Project complies with this Act.

3. Endangered Species Act (ESA) of 1973

   The Forest Service is directed to comply with this Act and has does so through Biological Assessments that are used to analyze the effects of the proposed alternatives. These assessments and evaluations make determinations on Federally-listed endangered, threatened, candidate and proposed species and their habitat. The analysis was conducted in part to determine whether formal consultation or conference is required with the United States Department of the Interior, Fish and Wildlife Service, pursuant to this Act.

   My decision, through the inclusion of design criteria for species covered under this Act, in consideration of the analysis and determinations contained in Biological Assessments and Evaluations for Botanical (J. Clines 2012), Aquatic Wildlife (P. Strand 2012), and

Terrestrial Wildlife (A. Otto 2012) species, is in compliance with the ESA. Additionally, as there are no federally threatened or endangered botanical, terrestrial wildlife or aquatic species potentially affected by the project, I find the project is in full compliance with the ESA (FEIS Chapter 3 Terrestrial, Botanical and Aquatics Sections).

4. Clean Water Act (CWA)

The Clean Water Act delegates authority for management of water quality to the states, and waives sovereign immunity for state and local laws pertaining to water-quality protection. Compliance with the federal CWA is primarily through the California Porter-Cologne Act as administered by the Central Valley Regional Water Quality Control Board Basin Plans and implementation of Best Management Practices (FEIS Chapter 3, FEIS Appendix B and ROD Appendix C). The Water Resources analysis concluded that my decision complies with the CWA through implementation of the design criteria and BMPs (FEIS Chapter 3 Hydrology Section).

5. Clean Air Act of 1970 (CAA)

The CAA provides for the protection and enhancement of the nation's air resources. Under the General Conformity Rule my decision has been determined to comply with this Act and the California State Implementation Plan through the implementation of treatments following Best Available Control Measures) for prescribed burning as well as rules and regulations established by the San Joaquin Valley Air Pollution Control District and Mountain Counties Air Pollution Control District as required under section 190 of this Act, as amended in 1990. No exceedance of the federal and state ambient air quality standards is expected to result from any of the alternatives (FEIS Chapter 3 Air Quality Section). For these reasons I find that this Project complies with the CAA.

6. National Historic Preservation Act (NHPA) of 1966

Section 106 requires federal agencies to consider the potential effects of a Preferred Alternative on historic, architectural, or archaeological resources that are eligible for inclusion on the National Register of Historic Places and to afford the President's Advisory Council on Historic Preservation an opportunity to comment. Section 110 requires federal agencies to identify, evaluate, inventory, and protect National Register of Historic Places resources on properties they control. Potential impacts to archaeological and historic resources were evaluated in compliance with Section 106.

In accordance with the Regional Programmatic Agreement (PA), a cultural resource identification effort was conducted of the Area of Potential Effect by a professional archaeologist. The goal was to identify cultural resources at risk of adverse effects from the proposed actions. No direct effects to cultural resources with archaeological values are anticipated from implementation of my decision. Specific protection and management measures derived from the PA would be applied to archaeological sites as project design measures (FEIS Chapter 2). All National Register eligible and potentially eligible properties would be managed for no effect (per the PA) from project activities (FEIS Chapter 2).

Cultural resource design criteria are established for all action alternatives and are based on stipulations within the PA. Because of the design criteria and the Project's compliance with the PA, I find my decision would be in compliance with historic preservation law, policy and regulation (FEIS Chapter 3 Cultural Resources Section).

Administrative Review or Appeal Opportunities

This decision is subject to appeal pursuant to 36 CFR 215. In accordance with the April 24, 2006 order issued by the U. S. District Court for the Missoula Division of the District of Montana in Case No. CV 03-119-M-DWM, only those individuals and organizations who provided comments during the comment period are eligible to appeal [36 CFR 215.11(a), 1993 version]. Appeals must be filed within 45 days from the publication date of the legal notice in the *Fresno Bee*. Notices of appeal must meet the specific content requirements of 36 CFR 215.14. An appeal, including attachments, must be filed (regular mail, fax, e-mail, hand-delivery, express delivery, or messenger service) with the appropriate Appeal Deciding Officer [36 CFR 215.8] within 45 days following the publication date of the legal notice. The publication date of the legal notice is the exclusive means for calculating the time period to file an appeal [36 CFR 215.15 (a)]. Those wishing to appeal should not rely upon dates or timeframe information provided by any other source.

Appeals must be submitted to Regional Forester, USDA Forest Service, 1323 Club Drive, Vallejo, CA 94592, (707) 562-8737. Appeals may be submitted by FAX [(707) 562-9091] or by hand-delivery to the Regional Office, at the address shown above, during normal business hours (Monday-Friday 8:00am to 4:00pm). Electronic appeals, in acceptable [plain text (.txt), rich text (.rtf) or Word (.doc)] formats, may be submitted to appeals-pacificsouthwest-regional-office@fs.fed.us with Subject: Greys Mountain Ecological Restoration Project.

For electronically mailed appeals, the sender should normally receive an automated electronic acknowledgment from the agency as confirmation of receipt. If the sender does not receive an automated acknowledgment of the receipt of the appeal, it is the sender's responsibility to ensure timely receipt by other means [36 CFR 215.6(a)(4)(iii)].

Implementation Date

If no appeals are filed within the 45 day appeal period, implementation of the decision may occur on, but not before, 5 business days from the close of the appeal filing period. When appeals are filed, implementation may occur on, but not before, the 15th business day following the date of the last appeal disposition.

Contact Person

The FEIS and supporting documents are available for public review at the Sierra National Forest, Bass Lake Ranger District, 57003 Road 225, North Fork, CA 93643, (559) 877-2218. For further information on this decision, contact Burt Stalter (bstalter@fs.fed.us), Interdisciplinary Team Leader at (559) 877-2218 extension 3208.

_____ _____

Scott G. Armentrout Date

Forest Supervisor, Sierra National Forest

Appendix A

Alternative 2 – The Proposed Action

An adaptive management study known as Sierra Nevada Adaptive Management Study (SNAMP), which studies Pacific fisher, focuses on an area directly west of the Greys Mountain Project. As the Greys Mountain Project falls within the Pacific fisher habitat zone, knowledge gained by the SNAMP project was utilized in the design of the Greys Mountain Project. Information used in developing the project alternatives includes: current movement patterns and 2008 through 2011 denning sites (both birthing and maternal) of Pacific fisher that have been radio collared and intensively monitored within and outside of the project area, and information about what type of habitat conditions are preferred by denning females. Protection measures in light of this new information were incorporated into the design measures for both action alternatives.

The Proposed Action adheres to the suite of standards and guidelines to selectively maintain and develop these habitats of large coniferous trees, hardwoods, overstory canopy gaps, tree group retention areas, understory vegetation retention areas, and conifers with structural defects in accordance with the LRMP as amended. Adherence to the required standards and guidelines would help ensure that the native wildlife populations would be sustained over the long-term, while also meeting other forest management goals and mandates, such as fuels management, forest health, and commodity production.

Tree Removal Methods

Under the Proposed Action, implementation of thinning strategies would be accomplished using mechanical and hand treatments to remove excess fuels, reduce stand densities, and restore large tree dominance, species composition and heterogeneity. These treatments consist of:

1. Commercial thin consists of two methods of commercial tree removal are envisioned in the alternatives. Commercial tree harvest is envisioned within the project area. This method involves manual tree felling followed by skidding the logs to the landing. With this method limbs and tops are removed in the woods and left. Mechanical tree removal uses harvesting machines to remove commercial-size trees greater than 10 inches dbh. Once felled whole trees are skidded to the landing where they are limbed and topped via a de-limbing machine. The residual limbs and tops remaining are piled and either burned or potentially available for biomass removal if circumstances allow. Commercial-size trees are hauled to a process mill and converted to lumber and generate revenue, while small biomass material is hauled to an electrical generation plant. Biomass removal requires appropriated funds. Harvest of commercial-size trees is done using ground based vehicles with rubber tires or tracks. These vehicles are often called skidders and are equipped with grapples or cables to transport trees or logs to a landing. Tractor logging occurs in areas with road systems and slopes that are consistently less than 35 percent slope. Some small areas over 35 percent slopes are also treated in this manner.

2. Pre-commercial thin of smaller sized trees less than 10 inches dbh for density management and fuel ladder reduction needs. These thinnings will be completed by hand with chainsaws and mechanically by mastication. Fuels created by these operations will be piled and burned and or underburned with prescribed fire.

3. Mechanical mastication (shredding) of biomass and fuels is typically accomplished by a mastication cutting head mounted on an articulating arm on a track-laying, low ground pressure vehicle. The cutting head chops the vegetation to a height of approximately 1-2 inches above

ground height. The equipment is able to treat vegetation on slopes up to 55 percent while having little ground impact. The debris is left on the ground where it rapidly decomposes and provides erosion protection while it is decomposing, or it is burned after it has dried out.

4. Hand cutting (also called pre-commercial thinning) involves the felling of unwanted trees, either with a chain saw or a machine feller, for burning in place or in preparation for piling.

5. Mechanical (tractor) piling of fuels for prescribed burning involves using heavy equipment to scrape slash and other debris into piles for burning.

6. Lop and Scatter involves cutting the limbs from felled trees and scattering them in the general area where the trees were cut to allow the nutrients from the branches to be returned to the soil.

Fuel Treatment Methods

Upon completion of the tree removal work FS personnel would apply prescribed fire to the area by using either pile burning or understory burning of pretreated stands to reduce activity-created slash and natural downed woody fuels. RX 1, 2, 3, 4, 5, 6, 7, 15, 22, 23 and 24 are designated for only understory burning as a treatment. Acres of prescribed fire are located in Table 1. Initial fuels treatments (first entry of understory burning and the pile burning) would be completed after treatment on each unit, but the units may be treated in different years. Treatment areas planned for understory burning would have multiple entries but in the post harvest burn areas, only 1 entry is planned for in the time span of this NEPA document. Any further burning in these areas would require analysis in another NEPA document. In the understory burning area alone, two to three entries over the first 15 – 20 years of the project may be necessary to reach and maintain the desired condition. In the post harvest burning areas understory burning would be accomplished at least once every ten years to reach and maintain desired conditions. Understory burning in untreated natural stands as well as treated stands are part of the Proposed Action. Reductions in hazardous fuels and the resulting fire behavior and severity would be consistent with the goals and objectives of the SNFPA (USDA-FS, 2004).

Fuel reduction treatments are used to lower the volume of flammable brush and slash across all emphasis areas. Prescribed burning occurs both in conjunction with tree removal and without tree removal. Actual protection levels would depend on how fast the brush and trees grow back following the fuel treatment or any subsequent site preparation treatments. Proposed fuels reduction would involve using prescribed fire in specific areas throughout the project area, thinning of some overstocked plantations, emphasis area treatments, and thinning from below. ‘Thinning from below” refers to the removal of subordinate and intermediate trees to reduce ladder fuels and reduce the competition for resources like sunlight and water. The following techniques would be used:

1. Understory burning: is a prescribed burn under an existing canopy of trees (hardwood or softwood), designed to reduce live and dead vegetation. This type of burning is completed in the fall or spring when fuel moistures are low enough to carry fire and still be within prescription parameters. Understory burning differs from broadcast burning as it has cooler temperatures to protect overstory vegetation. Permission to burn is granted by the San Joaquin Valley Air Pollution Control District (SJVAPCD). Mechanical treatments are not practical for Rx1 and Rx2 underburn units due to the location and slope present. Other than very expensive hand work, underburning is the only practical method available to tie treatment units together. To minimize ground disturbance, roads were used as the upper boundaries for the proposed burn units.

2. Pile Burning: involves burning piles created by hand labor or tractors. Usually kraft paper is used to protect an ignition point so piles can be burned in more cold and wet weather conditions. Pile burning is known to be of a higher intensity than broadcast burning and; therefore produces less particulate matter. Permission to burn is granted by the SJVAPCD.

3. Fire line: involves construction of areas that create a break in fuels used to control fire. Areas are scraped to mineral soil removing all organic material. The width of fire line varies from 2 feet around hand piles to 6 feet around tractor piles. Fire lines are used to contain fuel-burning treatments (understory burns, pile burns, jackpot burns, and broadcast burns) when natural barriers to fire are lacking. Fire lines are usually located on topographic features that make control operations easier for onsite personnel. These are usually ridgetops and drainage bottoms with flowing water.

How this Alternative was developed

Alternative 2 is a series of treatments that were developed over several years by a SNF interdisciplinary team in an attempt to restructure the forest and restore it to a resilient condition while minimizing adverse impacts to resources in the Project area that could result from changing weather patterns, drought stress, insect infestation, and wildfire. The alternative was developed to meet applicable landscape objectives consistent with the goals and objectives of the LRMP, as amended by SNFPA (USDA-FS, 2004) including:

1) Enhancement of shade intolerant (sun loving) trees through thinning;

2) Meeting habitat needs of sensitive species;

3) Reintroduction of fire to mimic historic forest structures and to reduce fuel loading and small diameter (less than 10 inches dbh) tree density to more pre-1900 levels);

4) Beginning to return stand structure and composition to more closely resemble historical conditions prior to railroad logging and increasing growth rates of residual trees to promote larger diameter, taller trees more quickly; and

5) Improvement of forest health and ecological resiliency through density management by thinning to promote resilience to changing weather patterns resulting in increased threats from insects, diseases, wildfire, and drought.

One of the resultant adaptive management studies known as Sierra Nevada Adaptive Management Study (SNAMP) focuses on an area directly west of the Greys Mountain Project. As the Greys Mountain Project falls within the Pacific fisher habitat zone, knowledge gained by the SNAMP project and utilized in the design of the Greys Mountain Project include; current movement patterns and 2008/2009/2010/2011 denning sites (both birthing and maternal) of Pacific fisher that have been radio collared and intensively monitored within and outside of the project area, and information about what type of habitat conditions are preferred by denning females.

Alternative Description

Of the 9,600 total acres within the project boundary, approximately 3,575 acres were analyzed as areas where some form(s) of treatment are proposed (treatment areas). The remaining 6140 acres have no treatments proposed due to slopes greater than 35%, standard and guideline limitations on treatment and/or no treatment is needed to meet the purpose and need.

In Alternative 2 (proposed action) the treatments would include:

- Commercially thin from below 10 – 30 inch dbh mixed conifer, pine, and white fir stands on approximately **1535** acres (*treats surface and ladder fuels, enhances heterogeneity in forest stand structure and reduces conifer stand density, increases the percentage and perpetuation of shade intolerant trees, increases diameter and height growth and vigor of residual trees, moves stands towards more historical composition as described in Chapter 1 Proposed Action)*;

- Remove hazard trees and commercially thin within three campgrounds on approximately 31 acres (*Reduce conifer stand densities within developed recreation sites for public safety and increased stand resiliency as described in Chapter 1 Proposed Action);*

- Mechanically treat fuels and overstocked vegetation on approximately **882** acres *(treats surface and ladder fuels, enhances heterogeneity in forest stand structure and reduces conifer stand density as described in Chapter 1 Proposed Action)*;

- Pre-commercially thin by masticating approximately **318** acres of conifer stands and brush covered areas *(treats surface and ladder fuels, enhances heterogeneity in forest stand structure, reduces conifer stand density, ties restoration treatment areas and fuel breaks together, as described in Chapter 1 Proposed Action)*;

- Plant and hand release treated openings within commercial thin and mastication treatment areas on up to **50** acres *(prepare sites within failed plantations for reforestation and release needs as described in Chapter 1 Proposed Action)*

- Treat slash concentrations within commercially thinned stands by a combination of tractor or hand piling and burning or mastication *(enhances heterogeneity in forest stand structure, reduces natural and activity generated surface fuel loads, ties restoration treatment areas and fuel breaks together, as described in Chapter 1 Proposed Action)*;

- Prescribe underburn on up to approximately **596** acres within 13 stands (prescribed fire only treatment) *(enhances heterogeneity in forest stand structure, ties restoration treatment areas and fuel breaks together, restore production and enhance vitality of plant material as described in Chapter 1 Proposed Action)*;

- Prescribe underburn within treatment areas H 2, 3 and 4, and T 1,2, 4, 5,7, 8, 9, 10, , 16, 17, 21, 26, 30, 31, 32, 33, 35, 38 and 39 on approximately **1855** acres *(enhances heterogeneity in forest stand structure, ties restoration treatment areas and fuel breaks together, reduces fuel loadings toward pre-1900 levels, restores production and enhance vitality of plant material as described in Chapter 1 Proposed Action)*;

- Construct and reconstruct three existing fuelbreaks on approximately **325** acres(*treat surface and ladder fuels to modify wildland fire spread and fire intensity levels, ties restoration treatment areas and fuel breaks together, restore production and enhance vitality of plant material as described in Chapter 1 Proposed Action)*

- Improve and restore native plant communities important to local Native American tribes for traditional uses. This will be accomplished within the areas that are planned for prescribed burning and will be completed by using prescribed burning and hand pruning with tools *(restore production and enhance vitality of plant material as described in Chapter 1 Proposed Action);*

- Reduce fuel loading and fuel ladders from encroaching conifers within prehistoric and historic sites by thinning and prescribed burning on approximately **100** acres *(improves*

the integrity that make cultural resources eligible for the NRHP as described in Chapter 1 Proposed Action);

- Restore degraded meadows by reducing encroaching conifers on approximately **13** acres *(restores degraded meadows as described in Chapter 1 Proposed Action)*;
- Restore hydrologic function through meadow stabilization on approximately **36** acres *(restores degraded meadows as described in Chapter 1 Proposed Action)*;
- Manually pull and/or prescribed burn of noxious weed patches on approximately **10** acres *(treats infestations of noxious weeds as described in Chapter 1 Proposed Action)*;
- Perform range stock drive maintenance by cutting out encroaching conifers and clearing stock drive tread over approximately **7.6** miles *(improves and maintains resources for range management activities as described in Chapter 1 Proposed Action* ;
- Perform maintenance on approximately **56** miles of forest system roads *(improves and maintains existing forest transportation routes as described in Chapter 1 Proposed Action)*;
- Perform reconstruction on approximately **20.3** miles of forest system roads *(improves and maintains existing forest transportation routes as described in Chapter 1 Proposed Action)*;
- Construct **0.25** miles of temporary road *(Improve and maintain existing forest transportation routes within the project as described in Chapter 1 Proposed Action);*
- Restore approximately **0.42** miles of user defined OHV tracks (*restores user defined vehicle tracks and roads as described in Chapter 1 Proposed Action)* ; and
- Perform annual trail maintenance on **5.5** miles of designated OHV trails. *(improve and maintain existing forest transportation routes within the project as described in Chapter 1 Proposed Action)*

More detail on these actions can be found in Chapter 1 Proposed Action (pg. **Error! Bookmark not defined.**).

Meadow Restoration Plans

This section outlines each meadow restoration plan in the project area. **Table 2** can be referenced for meadow/WIN site location; however this Chapter also includes a site map showing the location of each WIN site, rock cache location, and potential ingress route into the meadow. Ten meadows have been selected for restoration within the project area. (**Table 2**) These meadows were identified as having multiple restoration needs, which include the physical repair of Watershed Improvement Need (WIN) sites, removal of encroaching conifers, and management related issues such as Off-Highway Vehicle (OHV) and/or road impacts.

Table 3. Meadows and WIN sites identified for restoration within the Project area (ND = no quantified measurement of encroachment).

WIN Site	Meadow Number/Name	Identified as top five in Conifer Encroachment Study?	Acres of Encroachment	Total Acres of Structural Meadow Restoration

51295	503M7	Yes	2.5	3.0
51104	503M8	No	3.5	3.5
51038	504M132/Meserv Meadow	Yes	0.5	0.0
51246	504M198/Railroad Meadow	No	2.4	3.5
51244	504M208	No	0.1	0.3
51036	504M209/Poison Meadow	No	0.86	7.5
51037	504M211	Yes	0.0	3.3
None	504M212	Yes	0.75	0.0
51241	504M220/Chipmunk Meadow	No	ND	3.6
51245/51015	504M292/504M293	Yes	1.25	5.3
		Totals	**11.86**	**30.0**

Vegetation Treatments

Physically degraded meadows (i.e., meadows suffering from excessive gully erosion) will often have lowered ground water tables, which in turn can lead to accelerated conifer encroachment outside the range of natural variability. This phenomenon may also be related to or have been exacerbated by fire suppression over the last several decades. As the density of encroaching conifers increases, so will the rate of evapotranspiration, which will continue to lower the ground water table and encourage even more conifer encroachment. To stop this cycle and allow for ground water recovery and more water availability, removal of conifers that are encroaching within the meadow should be done before or during other restoration activities. Thus it is proposed that conifers up to 12" dbh be removed from the meadows to help reduce the depletion of ground water. Select cedar and/or fir trees within the project meadow (>12" dbh) may be girdled for snag creation if the area is deemed snag deficient.

An internal Forest Service study of conifer encroachment was conducted for the project area (Gallegos, personal communication, 2011). Five meadows were identified as having significant encroachment since the late 1940's (**Table 2**), and additional acreage estimates of encroachment were made for the other meadows. It is proposed that a total of approximately 12 acres of encroaching conifer be removed from the selected meadows (no other woody vegetation is recommended for removal). These treatments are consistent with the Sierra Forest Plan Amendment, Riparian Conservation Objects, Standard and Guide 105 (USDA, 2004).

Appendix B Design Criteria

The design criteria listed by resource area below are included in and are an integral part of each action alternative analyzed in detail within this document. They directed the design of treatment areas, the design of treatment types and/or are direction to follow during implementation. In listing these as part of all action alternatives, they are considered when analyzing the direct, indirect and cumulative effects of each alternative and have been incorporated to minimize potential environmental impacts of the management actions proposed by alternatives. As listed, they are a subset of the management direction provided in the SNF-LRMP (USDA-FS 1992) as amended by the 2004 SNFPA (USDA-FS 2004b) and 2007 SNF MIS standard and guidelines (S&G); applicable Forest Service Manuals and Handbooks; and Best Management Practices (BMP). The design criteria are also based on past implementation experience; the best available science and/or to address significant issues.

Cultural Resources

Cultural resources would be protected through implementation of Standard Protection Measures of the Regional Programmatic Agreement (PA), the primary protection measure being avoidance for all project activities, including resource design criteria. The District Archaeologist would approve all landings; borrow sources, and temporary roads prior to Project implementation as needed.

In addition, where the proposed action is to reduce fuel loading and fuel ladders within prehistoric and historic sites, the cultural resources would not be managed under the above referenced measures. Instead the following design criteria would be followed in order to address the purpose and need, and comply with applicable regulation and policy.

1. For prehistoric and historic cultural sites with heavy fuel loading, treatment measures by way of hand thinning brush and understory would utilize chainsaws to thin fuels. Brush shall be piled for future burning **outside** site boundaries in prehistoric sites. Piles may be placed **within** historic sites where there are no wooden components and away from features. Pile locations would be delineated through coordination with the District Archaeologist and where necessary, hand lines shall be constructed around piles to contain fire.
2. For prehistoric cultural sites with heavy fuel loading, treatment measures by way of low-intensity burning through cultural sites may occur. Handlines would be constructed **outside** site boundaries where necessary to control direction of the fire. This would be done in coordination with the District Archaeologist and fuels personnel. Underburning would only occur in sites with a potential for a low intensity fire focused on cleaning out the understory.
3. For prehistoric and historic cultural sites with heavy fuel loading, thinning of forest stands may occur through mechanical treatment. Should identified tree stands need to be thinned in order to meet forest stand health requirements, those trees that can be reached from the site edge by a feller-buncher and would be cut and removed from prehistoric sites without disturbing the ground. Mechanical equipment may enter historic sites to reach trees to be cut in areas with no observed cultural deposits or features in coordination with the District Archaeologist.
4. An archaeologist would monitor all fuel reduction activities within and around cultural resource sites during implementation if necessary.

5. If necessary, all cultural resource sites would be delineated prior to implementation.
6. Gathering areas would be improved through hand thinning and piling and underburning of fire-dependent species.
7. The cultural resource sites within WIN sites are currently unevaluated and must be treated as eligible. To mitigate the potential adverse effect, a determination of eligibility shall be conducted for these sites and any adverse effects mitigated prior to project implementation.
8. Harvest activities of potential hazard trees would avoid historic campground features in accordance with Standard Resource Protection Measures of the Regional PA

Botany: Forest Service Sensitive Plants

1. All short-leafed hulsea populations will be flagged for avoidance (SNF 1992 LRMP S&G #s 67 and 68, SNFPA 2004 ROD S&G # 125).
2. Open granitic and/or gravelly areas in or adjacent to units M2, T-8, T-17, and T-21 will not be driven through for project implementation (except for on existing system roads) nor used for parking of vehicles, heavy equipment nor used as log landings. This is to ensure protection of the Yosemite bitterroot (known to occur near units M2 and T8) and suitable habitat for the following sensitive plant species that have not been discovered in the project area but may exist: Mono Hot Springs evening primrose, and Kelloggs' lewisia. (SNF 1992 LRMP S&G #s 67 and 68, SNFPA 2004 ROD S&G # 125).

Noxious Weeds

1. All heavy equipment used for implementing the project will be washed before arriving on site to remove soil and seeds of noxious weeds. This is to ensure that weed seeds or propagules are not inadvertently introduced into the project area (SNFPA 2004 ROD S&G # 38 and 39; USDA Forest Service FSM 2081.3, Timber Sale Contract Clause B.6.35). See Appendix D of this document for more details.

Geology/Soils

1. Leave a 100-foot wide buffer of 100 percent soil cover below large rock outcrops. These areas have a high potential to generate runoff that can cause accelerated erosion on soils down slope (FS Handbook).

2. Conduct mechanical equipment operations (mechanical thinning and biomass removal equipment, log skidders and tractor-piling operations) when the soil is sufficiently dry in the top 12 inches to prevent unacceptable loss of soil porosity (soil compaction). Field checking by a soil scientist would be done to determine if operations could continue under moist soil conditions. "Maintain 90% of the soil porosity over 85% of an activity area (stand) found under natural conditions" (BMP; FS Handbook).

3. Subsoil and water bar skid roads and trails in areas where soil compaction exceeds 15% of a treatment area (BMP; FS Handbook).

4. Limit mechanical operations, where sustained slopes exceed 35%, except where supported by on-the-ground interdisciplinary team evaluation. Apply slope limitation to mastication treatment units (FS Handbook; SNF-LRMP S&G).

5. Maintain 50% soil cover over all treatment areas. Where shrub species predominate, attempt crushing before piling to create small woody fragments left scattered over the site for soil cover and erosion protection (FS Handbook; SNF-LRMP S&G).

6. Maintain at least five well-distributed logs per acre as large woody debris (LWD) representing the range of decomposition classes defined in the Regional Soil Quality Standards and Guidelines (SNF- LRMP and SNFPA ROD S&G).

7. To avoid adverse soil disturbance, the soils would need to have soil moisture content below 14% to minimize the potential of detrimental soil disturbance.

Recreation/Lands/Special Uses

Lands and Special Uses

A number of the proposed activities may affect areas under special use permit. Forest Service project managers would notify permit holders and agencies, in person or writing, when Project activities including mastication, pre-commercial thinning and/or understory proscribed fire would be implemented that may affect their authorized special uses or agency jurisdictions. A list of permit holders is located in the Project record. Forest Service managers responsible for implementation would work with permit holders to ensure authorized improvements and/or right-of-ways are clearly identified on all contracts and visible during Project implementation. Appropriate protection measures would be put in place.

The following design criteria allow the Forest to meet commitments specified in special use permits:

1. Use of apiary site (in unit T39) for project activities would be upon notification to the permit holder prior to project activities occurring.
2. If the apiary site would be used for staging or landing, The site would be cleaned of debris and brought back to pre-project condition.
3. The apiary site consists of a flat area surrounded by an electric fence where up to 100 hives of bees are located. The electric fence would be protected and any damage to fence or apiary site shall be repaired immediately.
4. To avoid vibration disturbances to the occupied apiary site by project activities, the permitted bee keeper would be notified in advance of project activities.
5. During project activities, continue to provide access to private property authorized under permit (located between units T28 and T29). The private road authorized under permit is native surfaced, 12-feet wide and approximately 950 feet long leading from road 6S10 to the Sturrock property at Soquel.

6. During project activities, continue to provide access to a Forest Roads and Trails Act (FRTA) easement providing access to private property located in unit T38. The easement would be used for project activities only after arrangements have been made to pay or perform pro-rata share of road maintenance. Project activities would not interfere with grantees use of road.
7. Ensure the culvert containing electronic equipment, satellite data transmitter and wooden walk way to the Madera Irrigation District stream gauging station (T16, T4, located on the stream bank of Willow Creek adjacent to a bridge near the Greys Mountain campground) continues to be accessible and is not damaged by project activities.
8. During preliminary activities and during implementation of project activities, protection of Madera Irrigation District ditch tender cabin (a wooden structure and gate off of spur road 6S10A) is necessary (T29).
9. The Forest Service has permanent full public easements for Road 6S10 across private property in the Paradise Springs and Soquel areas. Commercial hauling would be allowed across the easement only after arrangements have been made to pay or perform pro-rata share of road maintenance.

Mining

1. One mining claim is located in the project area in units (T31, T33, T34, and T37). There are no active operations occurring at this time. Consultation and coordination with District Minerals staff regarding mining activity status would take place when activities occur in affected project areas.

Developed Campgrounds, Dispersed Camping and Use Areas, Designated Motorized trails.

Developed Campgrounds

The Forest Service operates 4 developed campgrounds in the project area;

In developed campgrounds:

1. To avoid conflicts with Forest visitors, a limited operating period (LOP) would be established during the developed campgrounds' peak season months which is between Memorial Day and Labor Day for Units T4, 7, 9, 38.
2. Outside the LOP and contingent upon the safety of the public, developed campgrounds would be fully accessible to the public on week-ends.
3. Stump cuts would be flush cut to ground and treated with borax.
4. Slash or fuels treatment would be completed soon after treatment to ensure developed campgrounds are clear of accumulated slash, limbs and cull logs, i.e. removed, piled, burned and/or chipped.
5. Any damage to developed campground structures such as fire rings, tables, bulletin boards, site barriers as a result of project activities would be repaired or replaced immediately, to pre-project condition.
6. The location of landings and staging areas for project equipment within developed campgrounds would be in coordination with district recreation staff.

Dispersed Camping and Dispersed Use Areas

Several heavily used, popular dispersed recreation sites including the Texas Flat Overflow, Soquel Overflow, and Madera Ditch dispersed area; Slide Rock and Moon Rock are located in the project area and are accessed by Forest Service system roads. 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 Forest visitor.

Designated Motorized Trails

1. The designated motorized trails in the project area would not be used for skidding, hauling, or moving equipment. Note: All designated motorized trails are marked with a brown fiberglass carsonite post with decals showing trail number, skill level and vehicle type markers are posted at the beginning and end of the trail.
2. If necessary, movement of equipment across designated trail would be only at a right angle to trail, only at selected areas of the designated trail and upon consultation with Recreation OHV Staff.
3. If "gouging" or berms occur as a result of moving equipment across a designated trail, trail would immediately be repaired to ensure the safe passage of the Forest visitor and brought up to Forest Service motorized trail standards.
4. A clearing limit of 3 feet (from each side of a designated trail) would be established. (FSH 2309.18 Trails Management Handbook)
5. Designated trails would be kept clear of any debris or forest material, burned or otherwise. This includes material with-in trail clearing limits.
6. Directional felling and yarding away from designated trails is required.
7. Stump cuts adjacent to designated trails and within clearing limits, would be flush cut to ground and treated with borax.
8. During project activities, access to the designated trails would continue contingent upon the safety of the Forest visitor.
9. A as a result of project activities, any damage to designated trails or associated trail head facilities, such as trail signs, bulletin boards, or barriers would immediately be repaired or replaced to pre-project condition.

Wildlife – Terrestrial

Specific Management Provisions

Forest Service requirements for managing Federally Listed and Forest Service Sensitive species and their habitats are defined in the following documents.

- National Forest Management Act (NFMA)
- Forest Service Manual and Handbooks (FSM/FSH-2670)

- Endangered Species Act (ESA)
- (SNF-LRMP) as amended by (2004 SNFPA)

In addition to the LRMP standards and guidelines, the following management actions would help maintain and/or enhance important Pacific fisher and American marten habitat for all action alternatives considered. These measures include information from the 2008 Conservation Biology Institute Document "Baseline Evaluation of Fisher Habitat and Population Status and Effects of Fires and Fuels Management on Fishers In the Southern Sierra Nevada, Final Report to USDA Forest Service Pacific Southwest Region" (Spencer et al 2008); "An Ecosystem Management Strategy for Sierran Mixed-Conifer Forests" (North et al 2009); and Sierra Nevada Adaptive Management Study Integration Team discussions, fieldtrips to the project area, as well as Land Allocations.

1. Maintain highest canopy cover possible to meet the prescription within stands, aim for 60% immediately post-harvest.
2. Thinning would not remove any trees larger than 30-inch dbh (SNFPA ROD, pg. 50).

3. Protect all suitable fisher denning habitat with a (LOP) from March 1 through June 30. This LOP would protect reproductively active fisher and young that may be present in the project area from treatment actions during their denning and early rearing periods.

4. Snags would be felled only if they meet the definition of a danger tree, have the potential to fall across prescribed fire control lines, and/or pose a threat to firefighter safety during prescribed fire implementation. Both OSHA 29 CFR 1910.266(c) and FSH 6709.11, glossary define a "danger tree" as *"A standing tree that presents a hazard to employees due to conditions such as, but not limited to, deterioration or physical damage to the root system, trunk, stem or limbs, and the direction and lean of the tree."* Down logs created as a result of snag felling would remain in the stand where needed to meet down log requirements of S&G #10. Snags not meeting the criteria of a danger tree will remain as standing snags within the project area.

5. Retain dense groups of larger trees (greater than 30-inch dbh) with touching crowns at the rate of approximately one group per 2.5 to 3.5 acres. Ideally these groups would contain "defect" trees, those that have cavity and platform creating defects (mistletoe, rot, fork topped, broken limbs and tops) for pacific fisher denning and resting sites. Within these large tree groups, all trees over 20" dbh will be retained. These large tree groups will have a residual basal area of 240 ft^2 or more for mixed conifer and 210 ft^2 or more for pine and in many instances may reach 300 to 400 ft^2 per acre. Retention of these large tree groups with higher basal areas and the inclusion of defect trees are designed to maintain the integrity of suitable fisher denning and resting sites throughout the treatment units. Non-treated areas within proposed treatment units, such as riparian areas and steep slopes, will also provide extensive areas of tree group retention as no treatments will be occurring in these areas.

6. In certain incidences, small (five to ten acre) pockets or inclusions of decadent, high quality, dense fisher/spotted owl habitat that are identified in the field during project layout may be dropped from commercial treatment upon field review by the district biologist. A number of predominant trees are often observed within these types of inclusions, which may be remnant old forest pockets not previously logged during the extensive railroad logging that occurred on the district throughout the turn of the century. Due to the high habitat value present in these stands, and in accordance with Standard and Guideline #90 from the SNFPA ROD, this unique habitat inclusion may be removed from the treatment unit and will not be available for commercial entry.

7. Conifers with structural decadence, and/or the potential to become future dead tree snags, would be retained throughout the non-treatment areas of the project area. To maintain decadent stand characteristics within the treatment units, conifers >16"inches dbh with structural decadence and/or the potential to become future snags would be identified for retention within the treatment areas. Standard and Guideline #11 provides direction for retention of these structural elements. Within treatment units, conifers with the greatest existing or potential for structural decadence will be retained at an average of 1 every 100 feet. Conifers would be selected using the following characteristics listed in order of priority: evidence of known or potential cavities; broken top; conks or other heart-rot indicators; mistletoe or other abnormal witches broom formation or other diseased or insect damaged trees; teakettle branches; forked top; or broken large branches.

8. All black oaks would be retained throughout the project area. Within the treatment areas, conifers would be removed that overtop those black oaks, or that otherwise restrict sunlight from reaching them (e.g. from the south and west) now or within 15 years following treatment; the amount of conifer removal will be limited by the overall basal area thinning prescription thresholds. Hiding cover around oaks, such as shrubs and small trees would be retained around 2-3 decadent oaks per acre. These oak retention areas will be protected with a buffer area 35 feet from the bole, or to the dripline, whichever is greater, where no thinning or fuels treatments would occur.

9. Promote diversity in pine plantations by creating 1/10 acre openings associated with young black oaks between 1"inch and 12"inches dbh to encourage diameter growth of the oak through increased sunlight, release the oak from competition, and encourage future stand heterogeneity. To achieve this, Ponderosa and Jeffrey pine trees within pine plantations would be removed from a 180° swath on the Southern aspect around crowded young black oaks for a 50 foot radius. Additional Ponderosa and Jeffrey pine trees directly adjacent to the oak on the northern aspect may need to be cut to eliminate competition for space within the over-story and would be identified at the marker's discretion. Other species that may be present within plantations such as cedar, fir, sugar pine, and giant sequoia would not be removed to maintain current diversity where it exists. (S&G #3; #26).

10. Shrub and understory diversity would be retained throughout the project area. All understory vegetation would be maintained in Old Forest Linkages associated with riparian areas (cooler, moister sites); black oak buffer zones; as well as areas where no treatment would be conducted such as heritage resource sites, botanical areas, slopes >35%, and rocky areas. Tree species associated with riparian areas, such as dogwoods, alders, and willows would not be removed. In addition, post sale treatments would retain pockets of understory growth spread throughout the treatment units so that an additional 15-20% of the total understory growth would be maintained in 1/10 acre pockets within plantations and ¼ acre pockets within wild stand treatment units.

11. The district biologist would be notified immediately if a nest or den of any TESCP species is discovered within or adjacent to a treatment area so that proper protection measures can be identified and implemented.

12. All temporary roads and skid trails necessary for project implementation would be obliterated or decommissioned according to the USDA Forest Service (BMP) 2-26 (USDA 2000).

13. Standards and Guidelines 28 and 29 provide guidance for developing and maintaining adequate habitat connectivity within riparian areas. Recent studies (Spencer 2008; North et al 2009) have also shown that fisher utilize riparian areas as travel corridors between high quality habitat. To provide for this habitat connectivity, design criteria have been developed to incorporate and expand upon established riparian area management zones; i.e. Streamside Management Zones (SMZ) and Riparian Management Areas (RMA) associated with perennial streams (Class I). The forest wildlife biologists have termed these zones (OFL). They incorporate and expand upon the measures required for SMZs and RMAs. OFLs consist of buffers measuring 300 feet total on either side of perennial streams. Design criteria for these Old Forest Linkages are detailed in Table 5.

Table 4. Riparian Area Management Zones

Distance from Perennial Stream*	**Vegetation Management Activities Allowed within zone**	**Zone Designation**
0-50 feet	No activities allowed	SMZ/RMA/OFL
50-100 feet	No ground disturbing equipment allowed into area (dozers, skidders, etc.) Activities allowed include hand-felling of trees smaller than 12”inches dbh, pile-burning, and equipment reach-in with boom arm. Canopy cover is to remain ≥60%.	SMZ/RMA/OFL
100-150 feet	Mechanical entry is allowed. Trees	OFL

	≤12" dbh may be removed for fire and fuels reduction purposes by equipment. Canopy cover is to remain ≥60%.	
150-300 feet	Mechanical entry is allowed. Thinning from below would occur. Canopy cover is to remain ≥60%.	OFL

*Distance from Perennial Stream is measured and applied to each side of the stream from bank-full left and bank-full right.

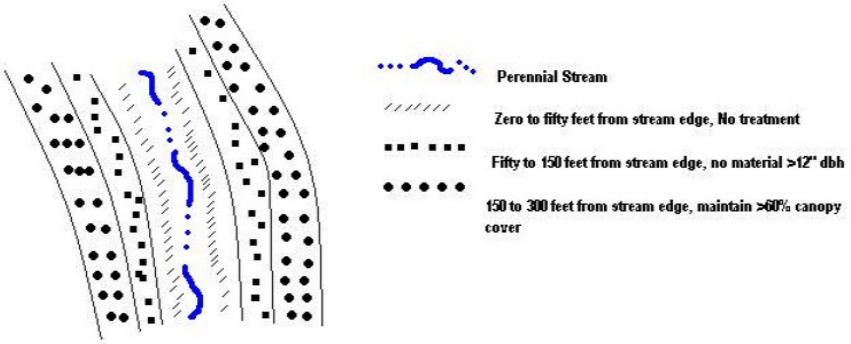


Figure 1: Associated Bounds and Treatments within Old Forest Linkages

Wildlife – Aquatics

Current Known Information

Generalized SMZ designation is outline in **Table 5** based on stream class and mapped in the Project Hydrology Report.

Table 5. Summary of Relationship between Riparian Area Criteria

Feature Type	RCA Width	Stream Class	SMZ Width	RMA Width
Perennial Streams	300 feet	I	At least 100 ft	100 feet
Seasonally Flowing Streams	150 feet	II	At least 75 ft	N/A
		III	At least 50 ft	
		IV	At least 25 ft	
		V	None required	

Streams in Inner Gorge	Top of inner gorge	Varies		
Special Aquatic Features (fens, bogs, springs, seeps, lakes, ponds, wetlands, etc.)	300 feet	N/A	N/A	100 feet

Streamside Management Zones (USDA-FS 1992 (S&G 33 and 71); USDA Forest Service 2000 (BMP 1-8)) are mapped in the Project Hydrology Report. Activities within Class I streams are identified under the OFL prescription under Terrestrial Wildlife. Specific to MYLF:

Class I MYLF occupied (USDA-FS 1992 (Forestwide goal and objective 9, S&G 40): two known sites in analysis area (Soquel and Tex Flat). The extent of the populations will be delineated as part of the herpetology (amphibian) surveys. Occupied habitat would apply the OFL prescription of 150 feet.

1. Applicable to all SMZs:

1. Heavy mechanical equipment would not be allowed within SMZs.
2. To protect bank stability, do not cut stream bank trees (trees with drip line extending to or over edge of stream bank).
3. Do not cut any tree located within a channel.
4. When lighting piles, start burn from one end only to allow escape route for any species inhabiting piles.
5. No prescribed fire lighting into SMZs, but fire can creep into zone.

For water drafting (USDA-FS 2000 (BMP 2-21), a screened intake device and pumps with low entry velocity would be used to minimize removal of aquatic species, including juvenile fish, amphibian egg masses and tadpoles, from aquatic habitats. A hydrologist or aquatic biologist would approve water-drafting sites.

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, additional species protection measures may need to be imposed by the district fisheries and aquatic biologist.

M**ountain Yellow-legged Frog:**

1. Class I MYLF occupied (USDA-FS 1992 (Forestwide goal and objective 9, S&G 40): two known sites in analysis area (Soquel and Tex Flat). The extent of the populations would be delineated as part of the amphibian surveys. Occupied habitat would apply the OFL prescription of 150 feet. In addition to the above requirements for all SMZs:

1. Treatments within the outer 100 feet of the SMZ would be limited to those prescribed for Pacific fisher.

2. Hand treatments of non-merchantable trees could be implemented within the inner 50 feet of the SMZ, although piled material should not be left within 50 feet.
3. Project activities would occur after June 15th.

4. No heavy equipment would enter the SMZ.
5. Treatments within the outer 100 feet would be limited to those prescribed for Pacific fisher.
6. Hand treatments of non-merchantable trees could be implemented within the inner 50 feet of the SMZ, although piled material should not be left within 50 feet.
7. Project activities occur after June 15th.

Special Aquatic Features (USDA-FS 2004 (S&G 91):

Do not allow mechanical equipment within 100 feet of meadows or other special aquatic features. This requirement includes treatment areas: T2, 17, 26, 27, 32, 33, 36, 37, 38, 42, 44, 46, 47, all Rx treatment areas.

Hydrology

Design measures to protect water quality and ensure watershed health are detailed by BMPs described in the *Water Quality Management for Forest System Lands in California*, (USDA, 2000), the Riparian Conservation Objective Standards and Guides as set forth in the SNF LRMP (USDA, 1991) as amended by the 2004 SNFPA . General project BMPs with their corresponding design measures are listed in Appendix B.

Soil and Water conservation Practices Handbook, Sierra National Forest Supplement No.1, (FSH2509.22) provides standards for the establishment and management of SMZ's. Included is the incorporation of RMA's and their functional/hierarchical relationship to SMZ's.

All stream courses in the project area would be protected and assigned SMZ's). The stream courses mapped on the Project Area Maps provide information for development of watercourse protection measures such as:

1. Skidding would be designed in a manner to skid logs away from the drainages and cross drainages at designated locations.
2. Skidding would not occur across perennial creeks, and limited treatment could occur in streams with riparian vegetation.
3. Any project generated material that would cause obstruction of storm flows would be removed.
4. All channels have SMZ's, which are equipment exclusion zones. Materials may be end-lined out of this zone.
5. Perennial streams would have a minimum SMZ of 100 feet; seasonally flowing/intermittent streams would have a minimum SMZ of 50-75 feet and ephemeral channels would have a minimum SMZ of 25 feet based on field investigations. The chart below provides a summary of SMZ by Stream Class (**Table 6**).

6. Treatment in prescribed burn units would avoid direct lighting for prescribed fire within riparian vegetation and or within the SMZ of stream channel; prescribed fires may back into riparian vegetation areas or SMZ's.
7. Within RCAs reduce as much as possible ground disturbing impacts (i.e., soil compaction, vegetation disturbance, etc.).
8. Best Management Practices Evaluation Program form T01 would be utilized to evaluate implementation on those units with SMZ's and other aquatic protection requirements.

Most units have avoided crossing stream channels. The exception is 4th order ephemeral draws. Fuels treatments should be laid out to utilize designated and/or existing crossings.

Table 6. Streamside Management Zone designation by stream class

Stream Class	Minimum Ground Cover Density (%)	SMZ Width (ft) 30% Slope	SMZ Width (ft) 40% Slope	SMZ Width (ft) 50% Slope	SMZ Width (ft) 60% Slope	SMZ Width (ft) 70% Slope
I	50	100	130	160	190	220
II	50	75	105	135	165	195
III	50	50	80	110	140	170
IV	50	25	45	65	85	105
V	50	0	0	0	0	0

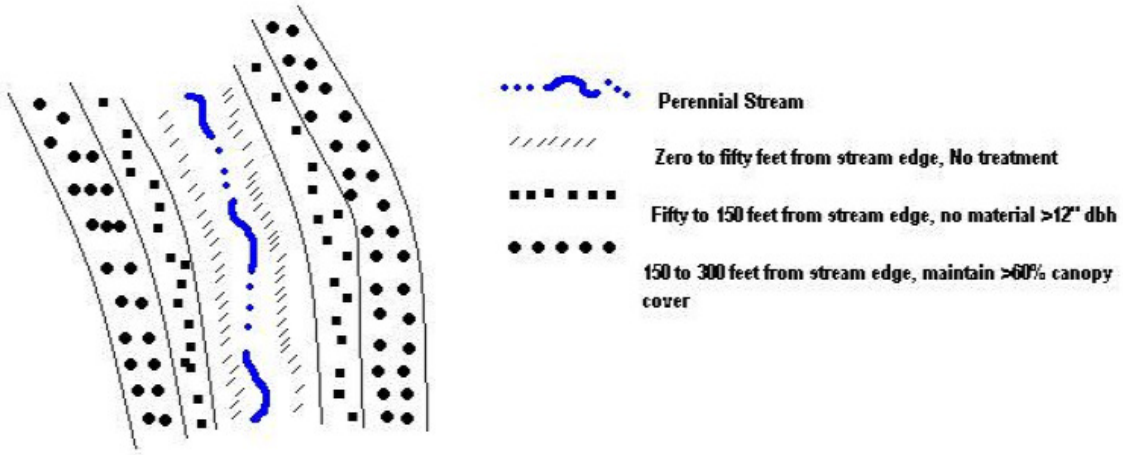


Figure 2. Associated Bounds and Treatments within Old Forest Linkages

Meadow Restoration

1. Wildlife and botanical surveys would be conducted prior to any restoration activity to ensure protection of those resources and compliance with all relevant BMP's.
2. All encroaching conifers approved for removal (up to 12" dbh) would be felled, lopped-and-scattered, bucked in place, or bucked and carried to the meadow edge. All conifer material would be left as biomass, burned or used in the restoration structures.
3. In all cases, native vegetation (e.g., sod) removed during restoration activities would be saved and preserved for later planting. Areas of bare soil in the floodplain would also be planted with native willows to expedite and enhance the stabilization process. Willows would be either cultivated or harvested locally from the same meadow(s) or meadows in the same watershed and at the same elevation range.
4. Water would be dammed and diverted around the restoration areas during construction. This would be done either by pumping the water using a portable pump or by gravity draining impounded water using a 10" inch flexible corrugated plastic pipe. Diverted water would be put back into the channel at the bottom of the meadow or spread on the meadow surface.
   Rock used to build step-pool structures would come from local forest stock piles. Currently, rock comes from the tunnel talus at Powerhouse 8 off Forest Road 8S03.
5. All ingress-egress by equipment would occur only when soil moisture conditions are low and the ground firm. If equipment does need to enter the meadow, it would only travel and work on the periphery (or dry portions) of the meadow, and in all cases, ½"inch to ¾"inch plywood and or ½"inch polyethylene mats would be laid down along the equipment route in order to distribute the load more uniformly over the meadow surface and mitigate any tread damage that may occur.
6. Any ingress routes enlarged and/or created for equipment to access to the meadow(s) would be obliterated upon completion of the project or properly closed if access to the project area is required for maintenance within the first five years after completion.
7. Refueling of equipment would occur at least 100 feet from any riparian area.
8. To allow vegetation to recover and to protect the area(s) from trampling damage by cattle stock, enclosing the restoration areas would be done for two years. To offset the potential loss of available water for stock, offsite watering systems can be evaluated on a case-by-case basis and be installed in coordination with the Range specialist and the permittee.

Prescribed Fire:

1. For the SMZ's defined, a minimum protective ground cover of 50% would be established and continuously maintained from October 15th to June 15th of each year consisting of any combination of living plants, litter, slash, and duff.

   - Living plants must be at least 5 feet high to qualify as protective ground cover.
   - Litter and/or slash must be at least 2 inches deep and made up of material 4 inches or less in diameter to qualify as protective ground cover.
   - Duff or humus must be 2 inches deep to qualify as protective ground cover.

- The 50% ground cover would be determined by using a series of random 100 point transects.

2. Where ground cover is less than the required 50% minimum, treatment would be applied to increase the protective efficiency of the SMZ/RCA to minimum standards. Treatments may include the establishment of living plants, introduction of litter, slash, or other treatments as prescribed by the district hydrologist or fisheries biologist.
3. Prescribed burning within SMZ/RCA may be implemented as follows: hand piling and burning, jackpot burning, and/or broadcast burning provided that the ground cover is not reduced more than 50%. If the protective ground cover is reduced more than 50%, then protective mitigation measures would have to be employed under the guidance of the district hydrologist or fisheries biologist.
4. Treatment in prescribed burn units would avoid direct lighting for prescribed fire within riparian vegetation and or within 5 feet of the edge of stream channel; prescribed fires may back into riparian vegetation areas.
5. Living woody, riparian vegetation would not be willfully killed, destroyed or removed. Riparian vegetation includes but is not limited to the following species:
    - Maples (Acer species)
    - Alders (Alnus species)
    - Dogwoods (Cornus)
    - Poplars, cottonwoods, aspens (Populus species)
    - Oaks (Quercus species)

6. Enough streamside shading would be maintained so as not to adversely affect the existing temperature regimes (confer with Phil Strand, Fisheries Program Manager for more information and guidance for shading requirements).

Roads

Forest Service system roads and temporary roads used for project activities would be constructed or brought to maintenance level 3 standards and follow relevant water quality protection BMP's (Appendix C). Roads used in subdrainage 503.0056 would be repaired and rocked (especially at points of hydrologic connectivity and high stream bypass potential –**Table 7**, **Figure 3**) to mitigate the very high CWE potential in this subdrainage.

Table 7. Roads that have hydrologically connected drain points and culvert problems in subdrainage 503.0056.

Subdrainage	Road	Drain Points Hydrologically Connected to Streams or Meadows	Stream Crossings with Non-Functional Culverts
503.0056	06S011	3	3

	06S013	6	0
	06S013Y	4	0

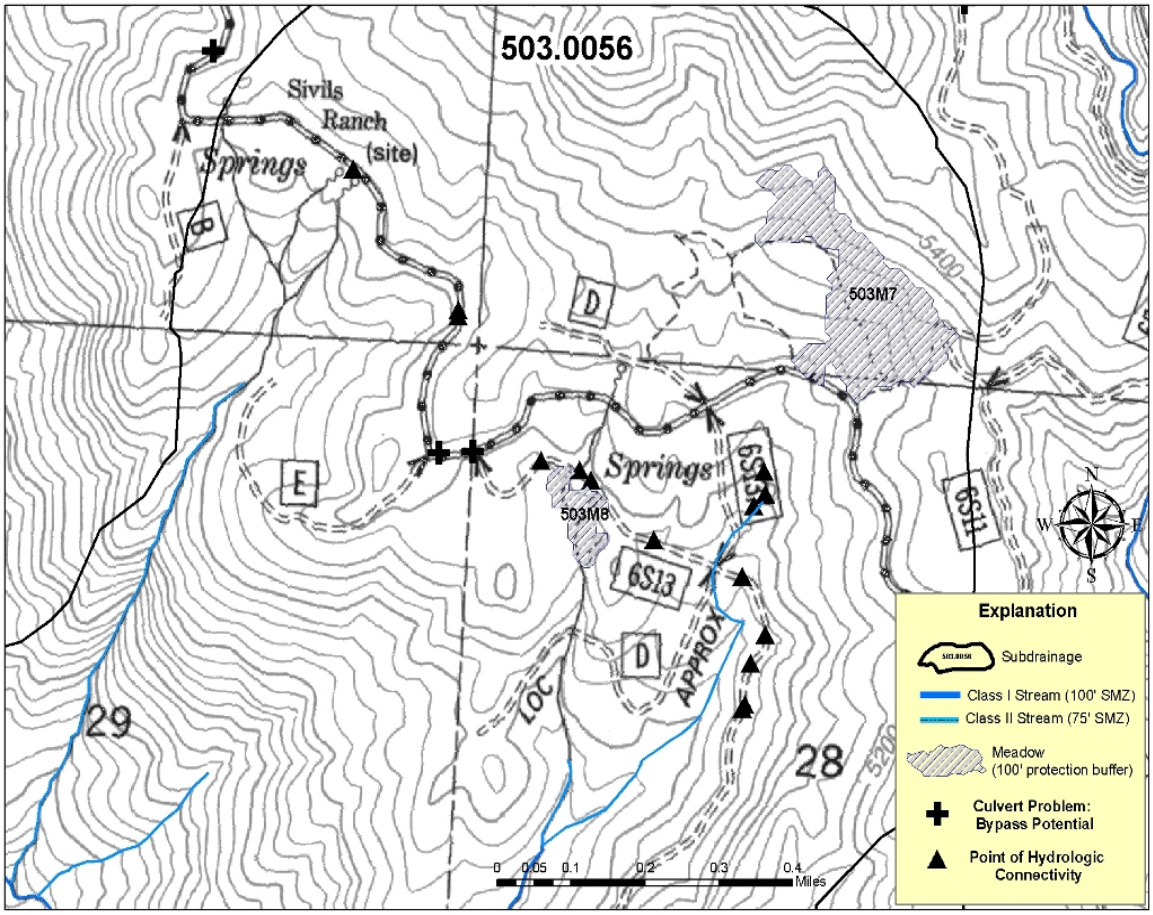


Figure 3. Points of hydrologic connectivity and bypass potential along system roads in subdrainage 503.0056. Repair of the crossings (i.e., culverts) and relocation of the hydrologically connected drain points should be part of the road maintenance plan for 06S0

Stream Crossings

The greatest potential for the proposed action or Alternative 3 to affect the hydrologic connectivity of streams and aquatic habitat exists at stream crossings. To minimize the potential for project-related effects on hydrologic connectivity, existing crossings would be used whenever possible. In the event that it is necessary to construct a temporary crossing, the methods used for construction would be selected to avoid or minimize detrimental soil and vegetation disturbance and to maintain hydrologic connectivity between upstream and downstream features. All temporary crossings would be removed following the completion of project-related activities and would be treated as necessary to restore to pre-project conditions (final approval of treatment to pre-project conditions would be done by the Timber Sale Administrator *after* consultation with the district hydrologist and/or forest fisheries biologist). Implementation of the activity-specific BMP's (Appendix B) would further ensure that hydrologic connectivity in streams and special aquatic features not be adversely affected by the proposed action or Alternative 3.

Silviculture

1. An LOP would be imposed in well stocked stands heavy to fir (over 50% fir) where operations could begin August 1st or later when the sap is not running (fir bark is much more easily dislodged when the sap is running than later in the year). The District Silviculturist would determine which stands require a LOP during the thinning layout phase.
2. Based on SNFPA ROD (USDA-FS 2004b) S&Gs for mechanical treatments, as well as design criteria, silvicultural prescriptions would be written utilizing thinning from below techniques with basal area levels for stand species composition.
3. To minimize the threat of insect attack, all pine logs created as a part of harvest operations would be removed from the sale areas as either logs or biomass material within 6 weeks of creation. Unutilized pine material would not be concentrated but spread to dry quickly or chipped and spread. Pine logs greater than 3 inches in diameter that are created between July 1st and October 15th and left in the stand would not exceed 8 feet in length.
4. Commercial thinning operations taking place before July 1st or after October 15th in pine stands would require additional measures to minimize creation of pine slash concentrations. Additional bucking of slash may be needed to minimize creation of favorable insect breeding habitat. Any pine logs greater than 3 inches in diameter created after October 15th or before July 1st left in the stand should not exceed 4 feet in length. Precommercial thinning of pine stands should not take place before July 1st or after October 30th each year.
5. Where whole tree yarding is utilized, careful consideration must be given to the protection of the residual trees from damage. Rub trees (previously designated for removal) and/or rub logs should be retained where needed to minimize damage. These would then be removed upon completion of yarding. Skid trails should be as straight as possible and approved prior to skidding. Landing size should be kept to a minimum especially in areas where additional trees must be felled to create landings. To minimize landing size, logs/biomass should be removed as quickly as feasible from landings during skidding operations and not allowed to accumulate.
6. During post sale treatments, 15 to 20 percent of the understory growth would be retained within plantations and wild stands in pockets approximately 1/10 acre in size. (When determining understory pockets to be retained, understory pockets around oaks, groupings of larger diameter trees, steep slopes, draws, etc. within treatment units would be included.) Understory pockets would not be retained in locations where they would jeopardize the effectiveness of planned fuels treatments.
7. To minimize damage to the residual stand, such as loss of canopy and hiding cover and reproduction needed to maintain stand structure and down logs, underburning in proposed T underburn stands should be undertaken during the spring when duff and down log moisture content is high and before actively growing trees become susceptible to excessive damage. Where concentrations of existing and/or created slash are present, spot piling may be needed prior to burning. Following thinning and prior to underburning, each stand proposed to be underburned should be reviewed by the District

Silviculturist and the Fuels Officer to formulate prescriptions that ensure proper measures are in place to accomplish desired results.

8. To minimize damage to the residual stand during slash piling, tractor size should be limited to a D-5 or smaller size tractor.

Fire/Fuels

SNFPA ROD (USDA-FS 2004b) S&G #1, 2, 3, 4, and 5 addresses fuels treatments. S&G #1, 2, 3, 4, and 5 implementation criteria include:

The utilization of prescribed fire to maintain appropriate levels of surface and ladder fuels to meet fire and fuels objectives would be conducted in prescribed fire treatment areas and units identified in the proposed action. To reduce the potential impacts (fire effects) that may occur with the implementation of prescribed fire, the following criteria would need to be considered in the areas where prescribed fire would be used:

1. Prescribed fire areas should be considered where there are larger residual trees (of size less susceptible to fire damage) with light fuel loadings, and/or areas where conifer reproduction is not being used for re-generation of openings.
2. Prescribed fire will be conducted as outlined in a burn plan, to minimize effects to trees during active growing period and within Spotted owl, Goshawks, and Pacific fisher denning habitat areas.
3. The best available control measures (BACMs) for prescribed fire would be done as required under Section 190 of the Clean Air Act, as amended in 1990.
4. Prescribed fire should be used during the late fall, winter, late spring or early summer, to minimize effects to trees during active growing period and within Pacific fisher denning habitat areas.

Air Quality

1. Avoid cumulative impacts to air quality by coordinating prescribed burning activities within the Forest, with burning activities conducted by others (SNF LRMP 1992 S&G # 216)
2. Mitigate fugitive dust impacts on air quality by including dust abatement as a requirement for construction activities that have potential to generate dust (SNF LRMP 1992 S&G # 217).
3. Avoid prolonged effects from prescribed burning activities on air quality by burning only on Air Quality Control Board (AQCB) approved burn days when satisfactory wind dispersion conditions prevail (SNF LRMP 1992 S&G # 218).
4. Participate with AQCB to qualitatively define air quality control regulations and guidelines and effects of air quality on the Forest, from sources outside the Forest (SNF LRMP 1992 S&G # 219).
5. Obtain appropriate permits prior to conducting prescribed burning activities (SNF LRMP 1992 S&G # 220).

6. Incorporate air quality management considerations into fire management (SNF LRMP 1992 S&G # 230).
7. Employ commonly used reduction techniques such as burning units after harvest before new live fuels appear; burning in the springtime prior to "green-up," burning when 1,000-hour fuels (woody debris larger than 3 inches in diameter) moistures are high, and burning when the duff is wet (after fall precipitation, or during winter and spring).
8. Employ avoidance techniques such as burning on cloudy days when the plume and residual smoke cannot be seen, burning during periods of atmospheric instability for better smoke dispersal, and burning during periods of low visitor use.
9. Employ techniques to optimize flaming combustion, including burning piled fuels rather than broadcast burning, reducing the amount of soil in piles, and employing rapid ignition to create a high intensity fire.
10. Ensure that all activities conform to the State Implementation Plan (SIP)
11. As part of prescribed fire implementation, burn bosses are to make observations on a regular basis of the smoke conditions that are being created by implementation. These include the travel direction and dispersion quality of smoke such as smoke settling into smoke sensitive areas and continued or potential for visibility degradation especially across main travel routes. When possible, lighting techniques and/or burn operations are changed to minimize the continuance of these impacts.

Engineering

1. Perform road maintenance, reconstruction, and new road construction activities to support project access needs in accordance with the standards and guidelines established in the Forest Plan, Forest Service Handbook 7709 and 6709, as well as the Bass Lake Ranger District Hazard Tree guidance (BLRD Hazard Tree EA 2006)..
2. Maintain all National Forest System roads to standards established in the.58. Insure drainage structures are functional and stable to prevent potential resource damage and degradation of water quality. (S&G #78, #79, #124, #206 and BMP's)
3. 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. (S&G #129)
4. Close all temporary roads required for unit access upon completion of use; remove all culverts, rip and ditch landings, construct waterbars, block the entrance with a log and dirt berm, and disguise the entrance with brush to discourage additional traffic.
5. Roadways would be managed for safe passage by road users. This would include the management of hazards associated with roadside vegetation, including the identification and mitigation of danger (hazard) trees. A danger tree, as defined in Forest Service Handbook (FSH) 7709.59, Chapter 40, is a standing tree (live or dead) that presents a hazard to people due to conditions such as, but not limited to, deterioration or physical damage to the root system, trunk, stem, or limbs and the direction of lean of the tree (FSH 6709.11, Glossary). Selection criteria guidelines for the marking and removal of danger trees would be tiered to the BLRD Hazard Tree Environmental Assessment, (USDA-FS 2006a).

Water could be available for dust abatement during project activities; however, water may not be drafted from creeks if the stream flow is less than 1.5 cubic feet per second. Other methods of dust abatement such as trip restrictions, speed reductions, or approved dust oil may be considered as an alternative to using water. Disposal of clearing slash would be by pile and burn or chipping. Stumps may be treated by scattering beyond the toe-of-fill and below the road surface. When feasible, roads would be out sloped to reduce concentrations of water and soil erosion.

Appendix C – Best Management Practices Specific to Greys Mountain Project

BMP Name, Objective, and Direction	Application to the Greys Mountain Project
BMP 1-1 Timber Sale Planning Process: To incorporate water quality and hydrologic considerations into the timber sale planning process.	Implemented through the Riparian Conservation Objectives/Forest Plan Consistency report, specification of operational BMPs, Environmental Analysis including interdisciplinary team office and field discussions, and incorporation of water quality protection measures in the Timber Sale Contract for the GRERP EIS.
BMP 1-4 Use of Sale Area Maps (SAM) and/or Project Maps for Designating Water Quality Protection Needs: To ensure recognition and protection of areas related to water quality protection delineated on a SAM or project map.	The sale administrator and purchaser will review these areas on the ground prior to commencement of ground disturbing activities. Examples of water quality protection features that will be designated on the project map include: 1) Location of stream courses and riparian zones to be protected, including the width of the protection zone for each area. 2) Wetlands (meadows, lakes, springs, etc.) and other sensitive areas (such as shallow soils) to be protected. 3) Boundaries of harvest units, specified roads and roads where hauling activities are prohibited or restricted, areas of different skidding and/or yarding methods, including post-harvest fuels treatments, and water sources available for purchaser's use.
BMP 1-5 Limiting the Operating Period of Timber Sale Activities: To ensure that the purchasers conduct their operations, including erosion control work, road maintenance, and so forth, in a timely manner, within the time frame specified in the Timber Sale Contract.	The purchaser's contract operation period will be limited to contract-specified periods when adverse environmental effects are not likely. The Sale Administrator will close down operations due to rainy periods, high water, or other adverse operating conditions in order to protect resources.
BMP 1-8 Streamside Management Zone Designation: To designate a zone along riparian areas, streams and wetlands that will minimize potential for adverse effects from adjacent management activities. Management activities within these zones are designed to improve riparian values.	Streamside management zones (SMZs) have been supplemented with RMAs and RCAs (USDA 2004b) as described in the Design Measures section of the EIS. Within SMZs, the constraints defined in Sierra Supplement No. 1 (USDA Forest Service, 1989) apply. This includes no self-propelled ground based equipment, a minimum groundcover of 50%, and shade canopy may not be modified in a way that affects stream temperature. Modifications to these guidelines are possible where site-specific needs exist if the action is reviewed by a hydrologist or fisheries biologist.

BMP Name, Objective, and Direction	Application to the Greys Mountain Project
BMP 1-9 Determining Tractor Loggable Ground: To minimize erosion and sedimentation resulting from ground disturbance of tractor logging systems.	Limit ground skidding and machine piling with tractors to slopes less than 35%. Endlining can be used to remove logs from steeper slopes. Ground disturbance on areas of shallow soils, notably soils adjacent and abutting to rock outcrops, will be avoided.
BMP 1-10 Tractor Skidding Design: By designing skidding patterns to best fit the terrain, the volume, velocity, concentration, and direction of runoff water can be controlled in a manner that will minimize erosion and sedimentation.	The sale administrator and purchaser will designate all skid trails prior to ground disturbing activities. If uncertainty arises regarding potential resource impacts of skid trail location, consult with an earth science specialist (i.e., hydrologist, aquatic biologist, or soil scientist).
BMP 1-12 Log Landing Location: To locate new landings in such a way as to avoid watershed impacts and associated water quality degradation	The following criteria are to be used by the Sale Administrator when evaluating landings: a. The cleared or excavated size of landings will not exceed that needed for safe and efficient skidding and loading operations. Trees considered dangerous will be removed around landings to meet the safety requirements of OSHA. b. Selected landing locations will involve the least amount of excavation and fill possible. Landings must be located outside of SMZs. c. Locate landings near ridges away from headwater swales in areas that will allow skidding without crossing stream channels, violating SMZs, or causing direct deposit of soil and debris to a stream. d. Locate landings where the least number of skid roads will be required, and sidecast can be stabilized without entering drainages or affecting other sensitive areas. Keep the number of skid trails entering a landing to a minimum. e. Position landings such that the skid road approach will be nearly level as feasible, to promote safety and to protect soil from erosion. f. Avoid excessive fills associated with landings constructed on old landslide benches. g. Construct stable landing fills or improve existing landings by using appropriate compaction and drainage specifications. In some cases, using an existing landing located within an RCA or CAR is preferable to constructing a new landing outside of it. These situations will be reviewed on a site-by-site basis by an earth science specialist (aquatics, hydrology, geology, or soils).

<table>
<tr><th>BMP Name, Objective, and Direction</th><th>Application to the Greys Mountain Project</th></tr>
<tr><td>BMP 1-13 Erosion Prevention and Control Measures during Timber Sale Operations: To ensure that the purchasers' operations will be conducted reasonably to minimize soil erosion.</td><td>Timber purchaser responsibilities for erosion control will be set forth in the Timber Sale Contract. Equipment will not be operated when ground conditions are such that excessive damage will result. The kinds and intensity of control work required of the purchaser will be adjusted by the sale administrator to ground and weather conditions with emphasis on controlling overland runoff, erosion, and sedimentation.

Erosion control work required by the contract will be kept current. At certain times of the year this means daily, if precipitation is likely or weekly when precipitation is predicted for the weekend. Erosion prevention measures must be applied no later than October 1 and immediately upon completion of activity begun after November 1.

If the purchaser fails to perform seasonal erosion control work prior to any seasonal period of precipitation or runoff, the Forest Service may temporarily assume responsibility, complete the work, and use any unencumbered deposits as payment for the work.</td></tr>
<tr><td>BMP 1-16 Log Landing Erosion Protection and Control: To reduce the impacts of erosion and subsequent sedimentation associated with log landings by use of mitigating measures.</td><td>Landings will be properly cross-ditched, ripped (if soils are compacted), re-contoured (as necessary), and mulched after use and before the winter precipitation period, whichever comes first. Excess material not needed for erosion control can be piled and burned. Upon completion of the project, consult with the hydrologist or soil scientist to determine the need for additional soil protection measures.</td></tr>
<tr><td>BMP 1-17 Erosion Control of Skid Trails: To protect water quality by minimizing erosion and sedimentation derived from skid trails.</td><td>Erosion control measures will be installed on all skid trails, tractor roads, and temporary roads. Erosion control measures include, but are not limited to, cross ditches (water bars), organic mulch, and ripping.

Cross ditches will be spaced according to the guidelines below, maintained in a functioning condition, and placed in locations where drainage would naturally occur (i.e., swales). The level of maintenance will be contingent upon existing or predicted weather patterns as determined by the Sale Administer (see BMP 1-13).

Minimum Cross Drain Spacing
<table><tr><td>% Slope</td><td>Maximum Spacing</td></tr><tr><td>0 - 15</td><td>125 feet</td></tr><tr><td>15 - 35</td><td>45 feet</td></tr></table></td></tr>
<tr><td>BMP 1-18 Meadow Protection during Timber Harvesting: To avoid damage to the ground cover, soil, and hydrologic function of meadows.</td><td>Mechanical equipment is not permitted in meadows. Additionally, the SNF has implemented a 100' protection buffer around meadows that are equipment exclusion zones. Access is not permitted in meadows or the 100' buffer unless specifically authorized by an aquatic biologist and/or hydrologist.</td></tr>
</table>

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

BMP Name, Objective, and Direction	Application to the Greys Mountain Project
BMP 1-21 Acceptance of Timber Sale Erosion Control Measures before Sale Closure: To ensure the adequacy of required erosion control work on timber sales.	The sale administrator must inspect erosion control measures to ensure their adequacy prior to accepting closure on the unit and/or sale. The effectiveness of erosion control measures will be evaluated using BMPEP protocols (see Monitoring Plan) after the sale area has been through one or more wet seasons. This evaluation is to ensure that erosion control treatments are in good repair and functioning as designed before releasing the purchaser from contract responsibility. The purchaser is responsible for repairing erosion control treatments that fail to meet criteria in the Timber Sale Contract, as determined by the Sale Administer, for up to one year past closure of the sale.
BMP 1-22 Slash Treatment in Sensitive Areas: To maintain or improve water quality by protecting sensitive areas from degradation which would likely result from using mechanized equipment for slash disposal.	All burn piles made with mechanical equipment must be located outside of the SMZ. Hand piles will be kept at least 20 feet away from all streams, meadows, springs, seeps, and other sensitive aquatic areas.
BMP 2-1 General guidelines for the Location and Design of Roads: To locate and design roads with minimal resource damage.	The following considerations are incorporated into the planning process of road location and design. These measures are preventative, apply to all transportation activities, and indirectly protect water quality: a) Transportation facilities will be developed and operated to best meet the resource management objectives with the least adverse effect on environmental values. b) The location, design, and construction of roads will include the use of the IDT. c) Sensitive areas such as wetlands, inner gorges, and unstable ground will be avoided to the extent practicable. d) Stream crossings will be designed to provide the most cost efficient drainage facility consistent with resource protection, facility needs, and legal obligations.
BMP 2-2 Erosion Control Plan: To mitigate and control erosion through effective planning prior to initiation of construction.	Any new construction would be subject to erosion control measures as per an IDT approved plan that may include but not be limited to waterbar installation, sediment fencing, culvert installation and armoring, placement of straw waddles, approved straw cover and/or slash and any other method necessary to mitigate erosion and sediment routing in the project subdrainage(s).

BMP Name, Objective, and Direction	Application to the Greys Mountain Project
BMP 2-3 Timing of Construction Activities: To minimize erosion by conducting operations during minimal runoff periods and when soils are dry and less prone to compaction.	Ground-disturbing activities will occur when soils are dry. In some cases soils may never dry sufficiently. Ground-disturbing work that occurs off of existing roads will occur during the dry season and will reduce ground disturbance as much as possible.
BMP 2-5 Road Slope Stabilization Construction Practices: To reduce sedimentation by minimizing erosion from road slopes and slope failure along roads.	An adequate soils and geologic investigation will be conducted when finalizing new road construction designs for: correct cut and fill steepness based on the angle of repose for the type of material; methods to handle surface runoff; and necessary compaction standards and surfacing needs.
BMP 2-7 Control of Road Drainage: To minimize the erosive effects of water concentrated on roads, to disperse runoff from road surfaces, to lessen sediment yield from roaded areas, and to minimize erosion of the road prism.	Newly constructed or reconstructed roads will be designed to reduce hydrologic connectivity and soil erosion wherever feasible. The sale administrator or other Forest Service representative will ensure that roads are adequately maintained during project implementation to ensure that road drainage features function as designed.
BMP 2-9 Timely Erosion Control Measures on Incomplete Roads and Stream Crossing Projects: To minimize erosion and sedimentation from disturbed ground on incomplete projects.	Erosion control must be completed before the rainy season (usually October). Preventative measures for timely erosion control include: Removal of temporary culverts, culvert plugs, diversion dams, or elevated stream crossings. Installation of temporary culverts, side drains, flumes, cross drains, diversion ditches, energy dissipaters, dips, sediment basins, berms, debris racks, or other facilities needed to control erosion. Removal of debris, obstructions, and spoil material from channels and floodplains. Planting vegetation, mulching, and/or covering exposed surfaces with jute mates or other protective material.
BMP 2-10 Construction of Stable Embankments: To construct embankments with materials and methods which minimize the possibility of failure and subsequent water quality degradation.	Roadways will be designed and constructed as stable and durable earthwork structures with adequate strength to support the treadway, shoulders, subgrade and road traffic loads.

BMP Name, Objective, and Direction	Application to the Greys Mountain Project
BMP 2-11 Control of Sidecast Material During Construction and Maintenance: To minimize sediment production originating from sidecast material during road construction or maintenance.	Sidecasting is not permitted within SMZs. Waste areas must be located where excess material can be deposited and stabilized.
BMP 2-12 Servicing and refueling equipment: To prevent pollutants such as fuels, lubricants, bitumens and other harmful materials from being discharged into or near rivers, streams and impoundments, or into natural or man-made channels.	Storage of hazardous materials (including fuels) and servicing and refueling of equipment will be conducted at pre-designated locations outside of RCAs and CARs. If fueling and/or storage of hazardous materials are needed within RCAs or CARs, those sites must be reviewed and approved by the District Hydrologist or Aquatic Biologist. Additional protection measures, such as containment devices, may be necessary.
BMP 2-13 Control of Construction and Maintenance Activities Adjacent to SMZs: To protect water quality by controlling construction and maintenance actions within and adjacent to SMZs so that SMZ functions are not impaired.	Construction and maintenance fills, sidecast, and end-hauled materials will be kept out of SMZs except at designated crossing sites to minimize the effect to the aquatic environment.
BMP 2-14 Controlling In-Channel Excavation: To minimize stream channel disturbances and related sediment production.	There will be no in-channel or streambank excavation during any phase of project activities unless authorized by the district hydrologist or aquatic biologist.
BMP 2-16 Stream Crossings on Temporary Roads and Skid Trails:	Mechanical equipment crossing of perennial and intermittent (generally class I – III) streams is not permitted unless approved by the district hydrologist or aquatic biologist. Ephemeral streams (stream class IV and V) may be crossed at designated locations as agreed upon by the sale administrator and purchaser. Designate skid trails to avoid stream crossings and SMZs wherever possible. Designated crossings must be as perpendicular to the channel as possible and avoid sensitive soils and riparian vegetation damage. Stream banks must be repaired upon completion of the project.

BMP Name, Objective, and Direction	Application to the Greys Mountain Project
BMP 2-19 Disposal of Right-of-Way and Roadside Debris: To ensure that organic debris generated during road construction is kept out of streams so that channels and downstream facilities are not obstructed.	If slash generated by road work is disposed of within SMZs, it will be piled and burned or chipped. Material may also be removed from the SMZ for disposal.
BMP 2-21 Water Source Development Consistent with Water Quality Protection: To supply water for roads and fire protection while maintaining existing water quality.	Water drafting will not occur in streams when the base discharge is less than 1.5 cfs, and will not draft more than 50% of the ambient discharge over 1.5 cfs. New drafting sites would be approved by the District Hydrologist or Fisheries/Aquatic Biologist and located to minimize sediment and maintain riparian resources, channel condition, meadow integrity, and aquatic species viability and habitat. Approaches will be as near perpendicular to the stream as possible and will be gravel surfaced or otherwise stabilized. If water-drafting is required, pumps with low entry velocity and suction strainers with screens less than 2 mm in size (1/8 in.) will be used.
BMP 2-22 Maintenance of Roads: To maintain roads in a manner that provides for water quality protection by minimizing rutting, failures, sidecasting, and blockage of drainage facilities, all of which can cause erosion, sedimentation, and deteriorating watershed conditions.	Roads needed for project activities will be brought to current engineering standards of alignment, drainage, and grade before use, and will be maintained through the life of the project. Roads will be inspected at least annually to determine what work, if any, is needed to keep ditches, culverts, and other drainage facilities functional and the road stable.
BMP 2-23 Road Surface Treatment to Prevent Loss of Materials:	Surface stabilization will be considered where grades exceed 12% or road is within riparian conservation areas.
BMP 2-24 Traffic Control During Wet Periods: To reduce road surface disturbance and the rutting of roads, and to minimize sediment washing from disturbed road surfaces.	On roads not designated for all weather or winter haul, heavy equipment operations will be limited until the period after the soil has dried in the top 12 inches in the spring.

BMP Name, Objective, and Direction	Application to the Greys Mountain Project
BMP 2-26 Obliteration or Decommissioning of Roads: To reduce sediment generated from temporary roads, unneeded system and non-system roads by obliterating or decommissioning them at the completion of the intended use.	Temporary roads will be obliterated after serving their intended purpose for this project. This includes: (1) road effectively barricaded; (2) road effectively drained by measures such as re-contouring or outsloping to return surface to near natural hydrologic function; (3) a well distributed mulch or organic cover provides at least 50% cover, or road surface is re-vegetated using local native species; (4) sideslopes are reshaped and stabilized to match the natural contour (as necessary); and (5) stream crossings are removed and natural channel geometry is restored. If non-local mulch is used (such as straw), it must be approved by the Forest Service botanist as weed free.
BMP 6-1 Fire and Fuel Management Activities: To reduce public and private losses and environmental impacts which result from wildfires and/or subsequent flooding and erosion by reducing or managing the frequency, intensity and extent of wildfire.	The project action alternatives are designed to achieve the desired conditions of BMP 6-1.
BMP 6-2 Consideration of Water Quality in Formulating Fire Prescriptions: To provide for water quality protection while achieving the management objectives through the use of prescribed fire.	Prescribed burning is planned at the minimum intensity and severity necessary to achieve management objectives, and each Burn Plan will incorporate all relevant design measures from this EIS.
BMP 6-3 Protection of Water Quality from Prescribed fire Effects: To maintain soil productivity, minimize erosion, and minimize ash, sediment, nutrients, and debris from entering water bodies.	Fires will be allowed to back into riparian vegetation, but direct lighting within riparian vegetation will not occur. All fire lines within RCAs and CARs will be water barred per BMP 1-17 spacing requirements. Fire lines within RCA (i.e., 150 ft., seasonal streams, and 300 ft. perennial streams, springs, and meadows) will be designed and constructed to reduce sediment entry into channels. Fire lines in RCAs will cross perpendicular to streams and follow the natural landscape contour as much as possible. Fire lines within the SMZ will be hand cut. Waterbars will be placed on either side of each stream crossing to prevent or reduce sediment entry into streams.

BMP Name, Objective, and Direction	Application to the Greys Mountain Project
BMP 6-5 Repair or Stabilization of Fire Suppression Related Watershed Damage: To stabilize all areas that have had their erosion potential significantly increased, or their drainage pattern altered by suppression related activities.	In the event of a wildfire, protection of resources would be evaluated under the Burned Area Emergency Response, assessment and treatment Implementation protocol.
BMP 6-6 Emergency Rehabilitation of Watersheds Following Wildfires: To minimize as far as practicable: 1.) loss of soil and onsite productivity; 2.) overland flow, channel obstruction and instability; 3.) threats to life and property both on-site and off-site	In the event of a wildfire, protection of resources would be evaluated under the Burned Area Emergency Response, assessment and treatment Implementation protocol.
BMP 7-3 Protection of Wetlands: To avoid adverse water quality impacts associated with destruction, disturbance, or modification of wetlands.	Ground disturbing activities will not occur in wetlands or meadows.
BMP 7-4 Oil and Hazardous Substance Spill Contingency Plan and Spill Prevention Containment and Countermeasure (SPCC) Plan: To prevent contamination of water from accidental spills.	A spill contingency plan and spill prevention and countermeasure plan (SPCC) must be prepared if hazardous materials (including fuels and oils) stored on the Sierra National Forest exceed 1320 gallons, or if a single container exceeds 660 gallons. The plan will at a minimum include: the types and amounts of hazardous materials located in the project area, pre-project identified locations for hazardous materials storage and fueling/maintenance activities (must be located outside of RCA and CAR unless prior approval by District Hydrologist or Aquatic Biologist is obtained), methods for containment of hazardous materials and contents of on-site emergency spill kit, and a contingency plan (including contact names with phone numbers) to implement in the event of a spill. The SPCC plan must be approved by the Forest Service prior to project implementation.

Stream Crossing Design Measures

Traditionally, live stream crossings for skid trails or temporary roads, were constructed by excavating the crossing, placing a culvert in the stream, and filling around the pipe with fill dirt. When the project was complete, the culvert and fill dirt were removed, usually with the bulldozer. This practice caused excessive sediment input into the stream, along with much disturbance of the stream banks. Rehabilitation work consisted of placing waterbars on each bank of the stream along with grass-seed and straw. The grass-seed/straw combo was placed from stream bank to the first waterbar ditch, on each bank, depending on slope gradient.

Cut-to-Length (CTL) machines changed the way operations were conducted in the woods. The harvester/tree processor establishes their route of travel (forwarding trails) through the unit. The harvester cuts trees down, delimbs and produces logs along these trails, all the while leaving the resulting limbs and tree tops (slash) in the trails as a "slash mat" for ground cover. The forwarder follows the harvester, driving over the "slash mat" to pick up the logs and returns to the landing. This procedure works well when abundant material is available in the stands;

The placement and removal of the log fill is accomplished with the harvester, which can grasp the processed logs with its cutting-head, feed wheels and limb knives. This allows the logs to be lifted into and out of position, much like a crane or boom. This not only reduces or eliminates the amount of soil disturbance and stream sediment loading, but the amount of the distubed area is greatly reduced.

For perennial streams, a minimum of an 18" culvert should be used with the slash and small logs (4-8" dbh) to build the crossing. Culvert sizing should be such that a 25 year flood event could pass with no static head development upstream of the culvert. It would be best to consult the district hydrologist and roads engineer for proper watershed analysis and culvert sizing prior to construction.

Inspection of the channel before and after the construction of the crossing will need to be done by the district hydrologist to determine if any restoration is required. Any stream disturbance will have to be restored to pre-disturbance conditions. No fill material (i.e., soil) should be used in the crossing.

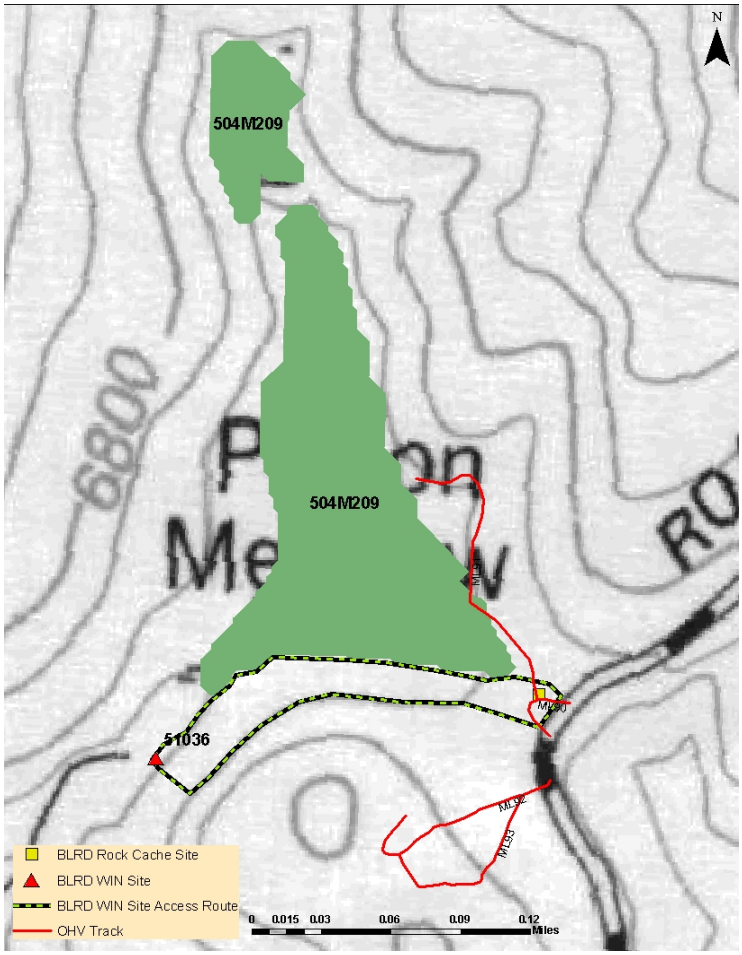


Figure 4. Map of WIN 51036 in Poison Meadow (meadow 504M209); red triangle denotes main WIN features.

WIN 51037 (504M211/212)

Rock step pools would be built to address the two headcuts (P **Error! Bookmark not defined.**). Local rock could be used, or a rock cache could be located along FS Road 6S99 with easy access to the toe of the meadow. Meadow 504M212 is located 0.1 miles north of meadow 504M211. There are no WIN sites identified in this meadow (thus no physical restoration is planned), but there has been 0.75 acres of conifer encroachment identified through satellite and aerial photo review. Physical restoration and/or stabilization efforts will restore/preserve approximately 3 acres of meadow 504M211 (**Table 2**).

Appendix D

WIN 51015 (504M292/293)

Headcuts and knick points would be repaired by installing rock step pool structures (Appendix C). Minimal ground clearing and brushing would be done for small tractor or power wheelbarrow access. Rock caches would be located off of FS Road 6S36, and 6S38 for each of the two large headcuts (**Figure 5**). Split rail fencing along FS Road 6S36 would be installed to discourage OHV use in meadow. The east end of the meadow has very high conifer encroachment (approximately 1.25 acres). Physical restoration and/or stabilization efforts will restore/preserve approximately 5 acres of this meadow (**Table 2**).

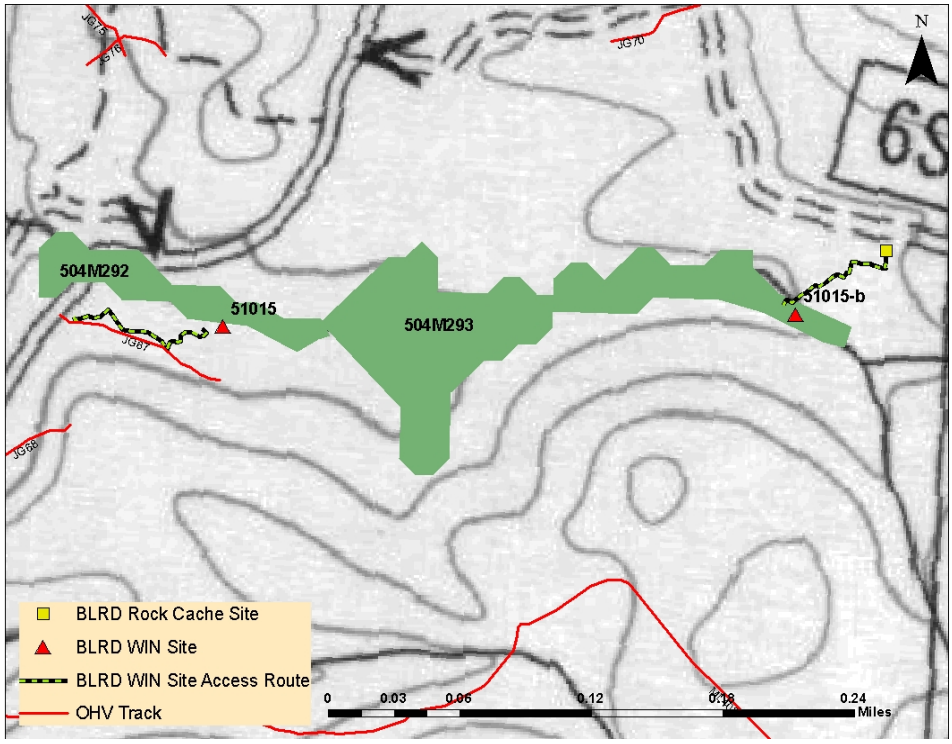


Figure 5. Map of WIN 51015 in meadow 504M292 and 504M293; red triangles denote main WIN features.

WIN 51036 (Poison Meadow 504M209)

Reconstruction and repair of existing structures would be done. A rock cache would be located in a very large turnout on Beasore road just south of the meadow. Minimal brushing and ground clearing would be done to allow access. There is a medium level of conifer encroachment in the northern portion of meadow approximately 0.86 acres (11%). Some split rail fencing and signage would be needed along track ML91 to discourage OHV use of the meadow. Physical restoration and/or stabilization efforts will restore/preserve approximately 7.5 acres of this meadow (**Table 2**).

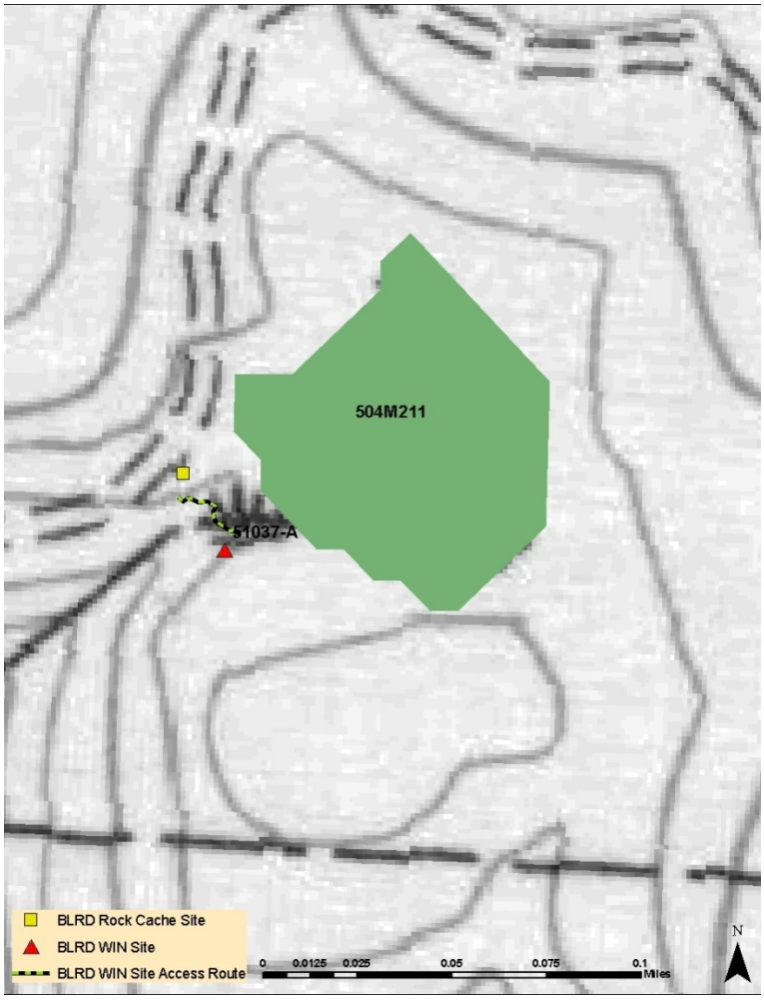


Figure 6. Map of WIN 51037 in meadow 504M211; red triangles denote main WIN features.

WIN 51038 (504M132)

Physical stabilization of this feature is not recommended at this time, but the structure should be monitored annually. The meadow was part of a historic ranch site and has many apple trees still in evidence. Additionally, the soil moisture conditions seem to have promoted the development of alder and willow trees throughout the meadow. There is some conifer encroachment by shade tolerant cedars and some small ponderosa saplings. There is an estimated 0.5 acres of encroachment. It is recommended that the existing conifers (up to 12” dbh) be removed, but no other woody vegetation is proposed for removal.

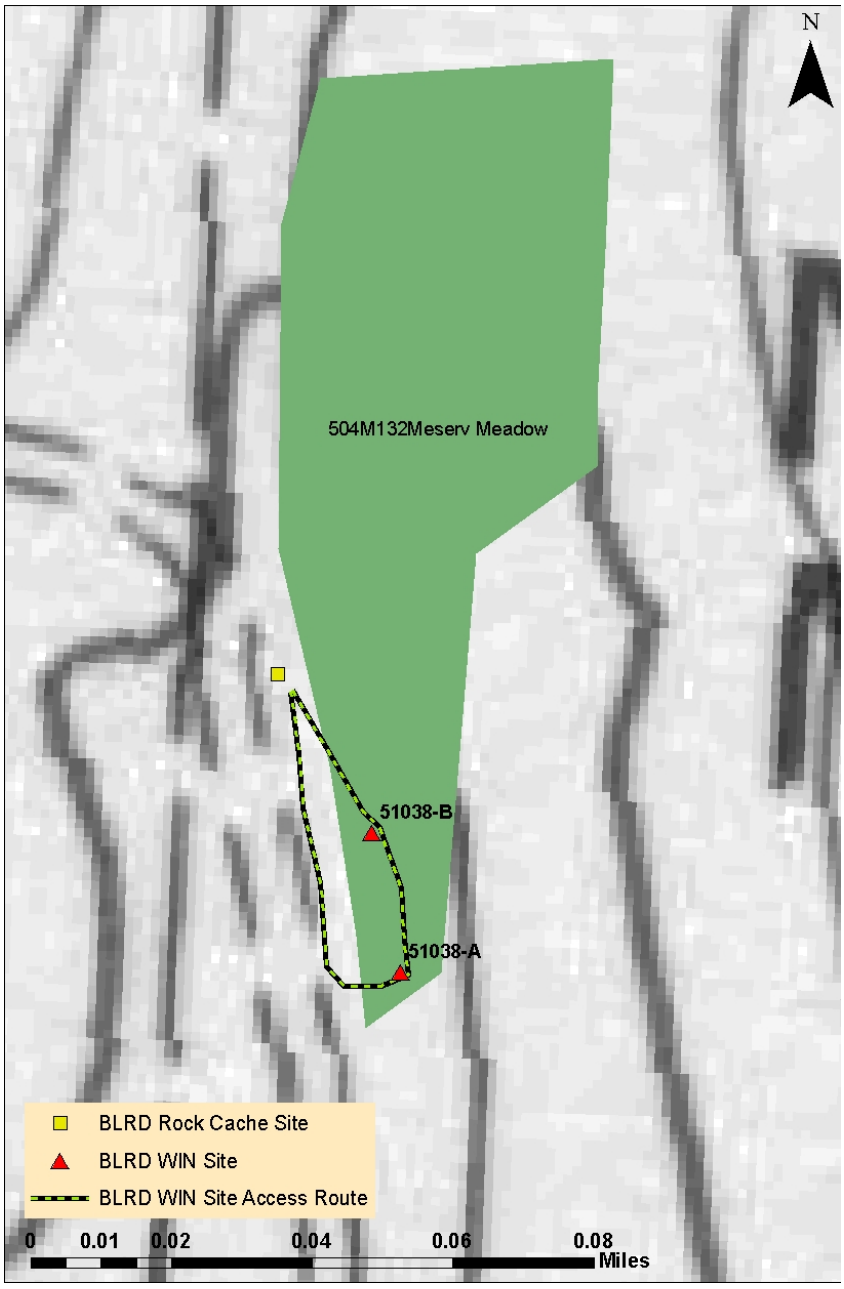


Figure 7. Map of WIN 51038 in Meserve meadow (meadow 504M132); red triangles denote main WIN features.

WIN 51104 (Progeny Meadow 503M8)

Large ruts in southeast portion meadow from 4x4 truck use would be repaired. Primary access route is west of the meadow along a closed road/skid trail; this trail would be used to repair existing rock structures, and transport rock and equipment in to each headcut. The cache and

access routes on the east side of the meadow are primarily to be used for the repair of the deep ruts in the meadow. Conifer encroachment is high throughout meadow (approximately 3.5 acres).

Split rail fencing would be put up along FS Road 6S13 to discourage further degradation due to OHV use. Rock step pool structures would be built to stop headward erosion of the headcuts (Appendix C). Sand, native soil and local sod may be used to fill OHV ruts. Physical restoration and/or stabilization efforts will restore/preserve approximately 3.5 acres of this meadow (**Table 2**).

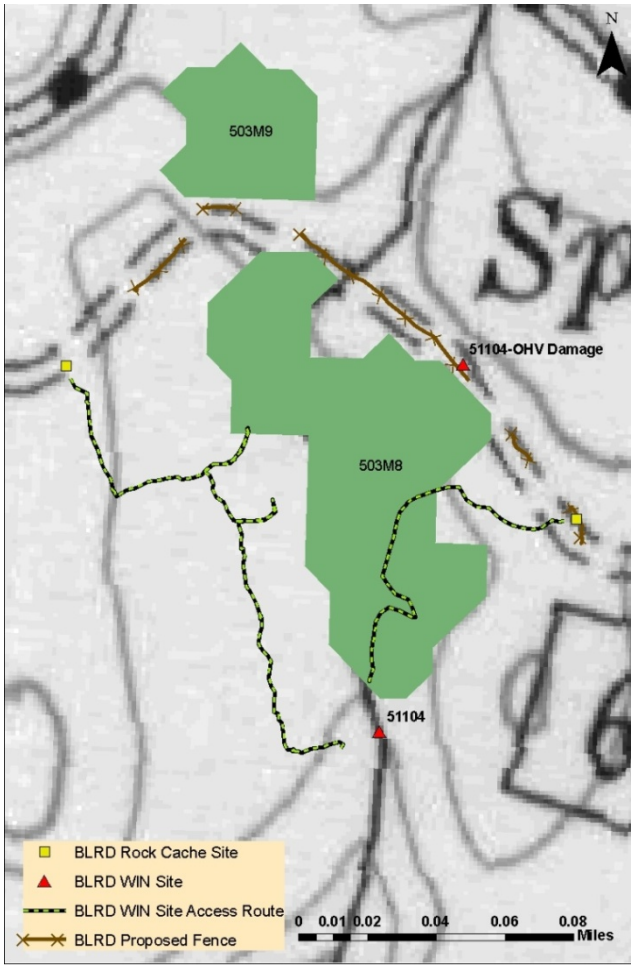


Figure 8. Map of WIN 51104 in Progeny meadow (Meadow 503M8); red triangles denote WIN features.

WIN 51241 (Chipmunk Meadow 504M220)

A trail would be built through manzanita and buckbrush between the meadow and Beasore road to allow access for power wheelbarrows or a small tractor. The most topographically suitable area for the trail has been depicted on the map (**Figure 9**). Due to the small dimension of the headcut, local rock would be used to create a step pool or a log step fall structure using trees from the

surrounding area would be built. Physical restoration and/or stabilization efforts will restore/preserve approximately 3.6 acres of this meadow (**Table 2**).

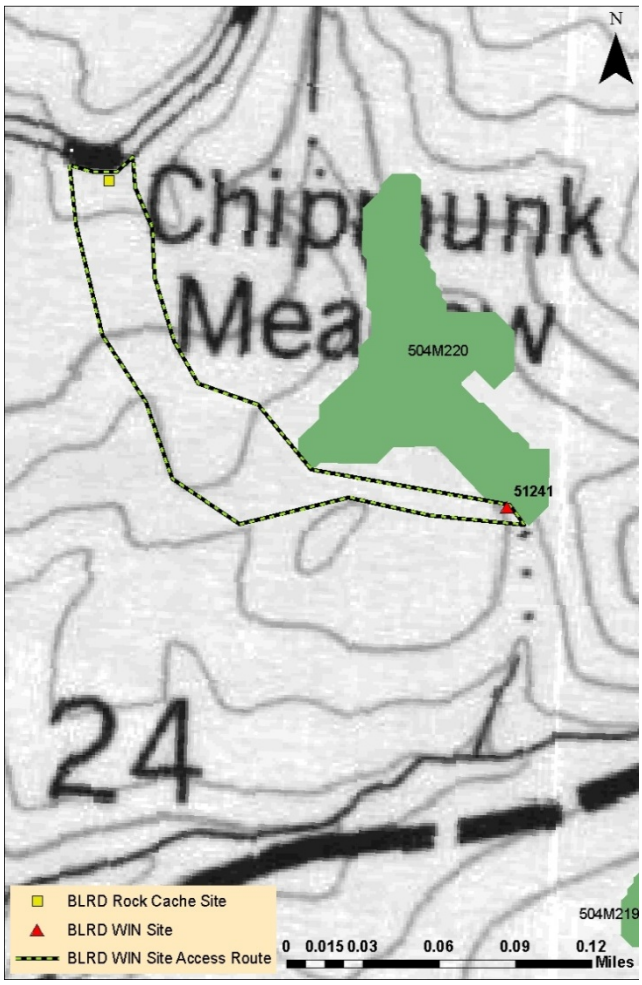


Figure 9. Map of WIN 51241 in Chipmunk meadow (Meadow 504M220); red triangle denotes main WIN feature.

WIN 51244 (504M208)

Access is easy from 6S38, and a rock cache would be located at the junction of 6S38 and 6S38X. Split rail fencing would be constructed along FS Road 6S38 to discourage OHV use in meadow. Rock step pools and rock rundowns would be constructed (Appendix 3). Physical restoration and/or stabilization efforts will restore/preserve approximately 0.3 acres of this meadow (**Table 2**).

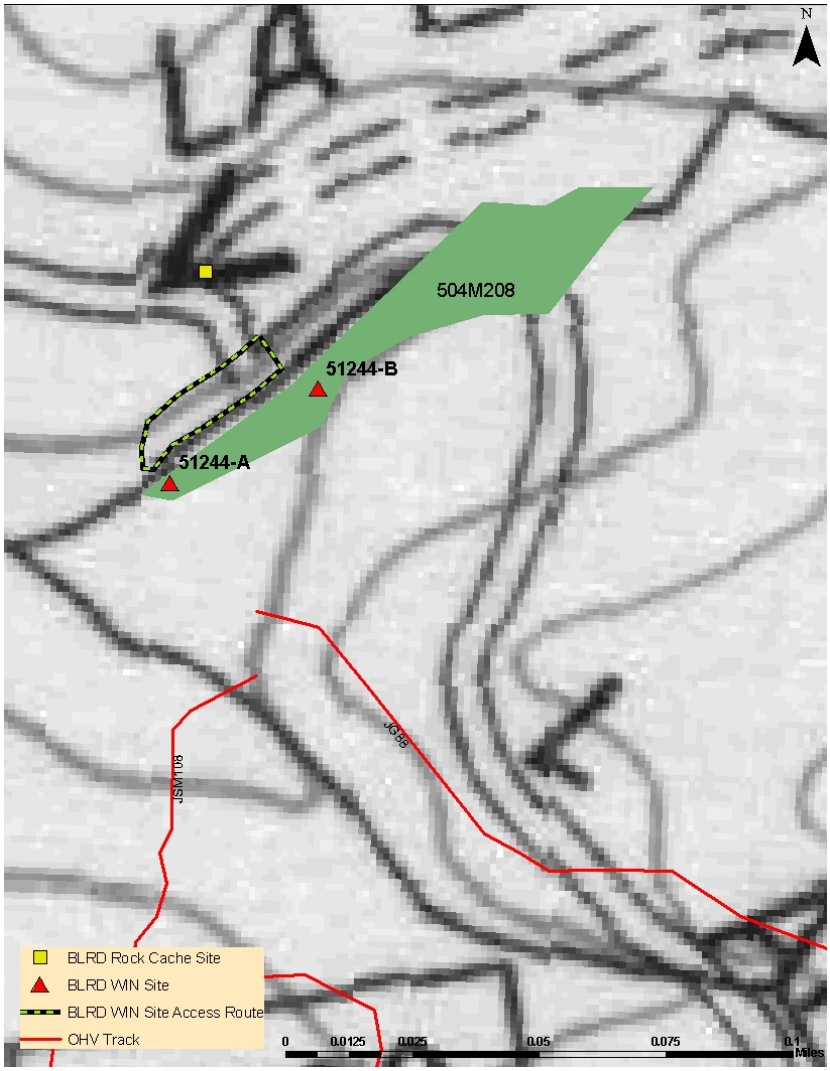


Figure 10. Map of WIN 51244 in meadow 504M208; red triangles denote main WIN features.

WIN 51246 (Railroad Meadow 504M198)

Barriers would be installed to prevent access to the meadow.

An existing breach in the railroad bed would be widened by several feet to lessen the impact from livestock trailing and allow overland flow to move from the west to east end of the meadow during high flow. Conifer encroachment is very high in the west end of the meadow near 6S11 (head of meadow) at approximately 2.4 acres (~50%). Physical restoration and/or stabilization efforts will restore/preserve approximately 3.5 acres of this meadow (**Table 2**).

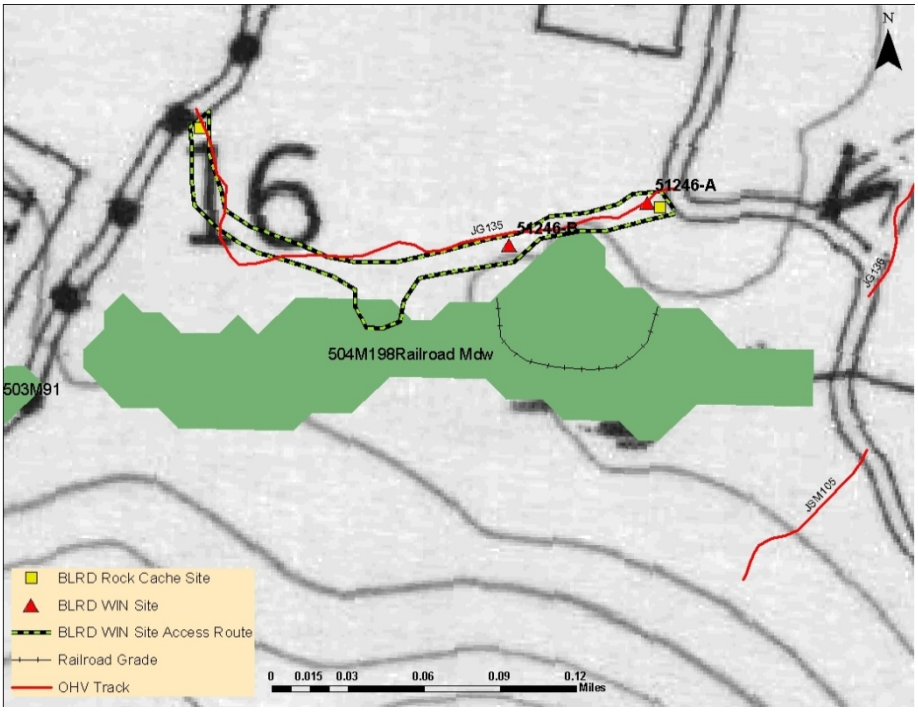


Figure 11. Map of WIN 51246 in Railroad meadow (Meadow 504M198); red triangles denote WIN features.

WIN 51295 (503M7)

User created tracks will be barricaded and signage installed on both ends of the trail to prevent OHV access the track will be sub soiled to decompact the soils and allow regeneration of native vegetation Adequate water bars would be constructed to prevent surface erosion. Downed trees and slash along the track alignment that will be cut during the conifer encroachment treatment project would be distributed.

Conifer encroachment is very high in small pockets of the lower SE and upper NW ends of the meadow (approximately 2.5 acres). Physical restoration and/or stabilization efforts will restore/preserve approximately 3.0 acres of the true meadow segments (**Table 2**).

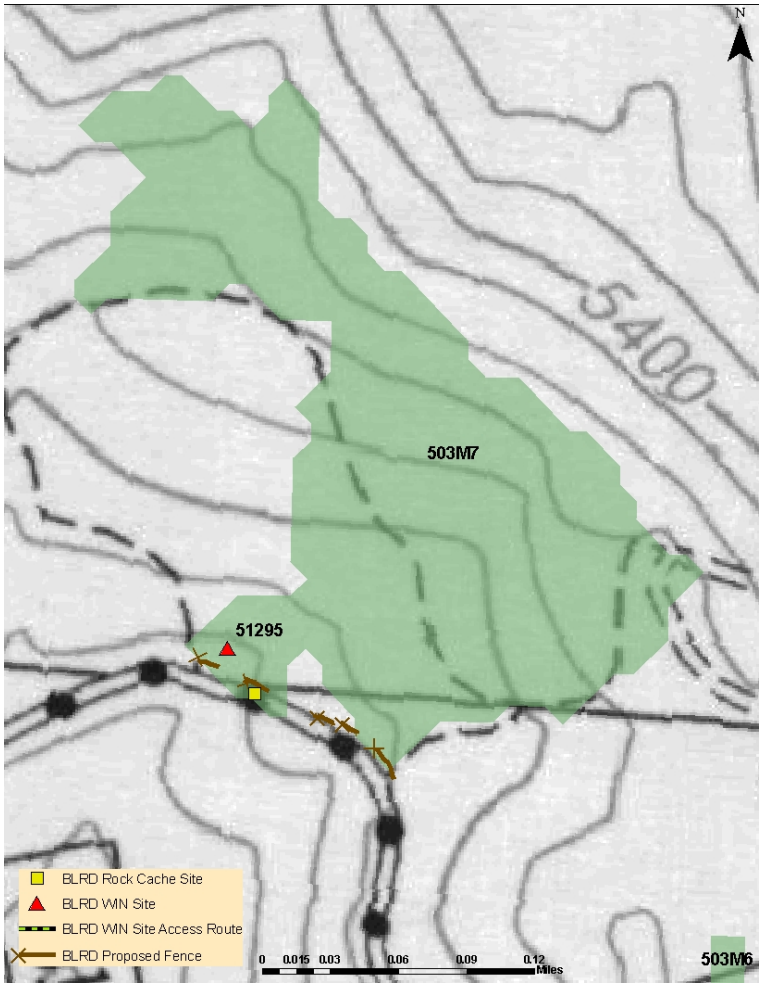


Figure 12. Map of WIN 51295 in meadow 504M7; red triangles denote main WIN features; darker green polygons represent the true meadow components.

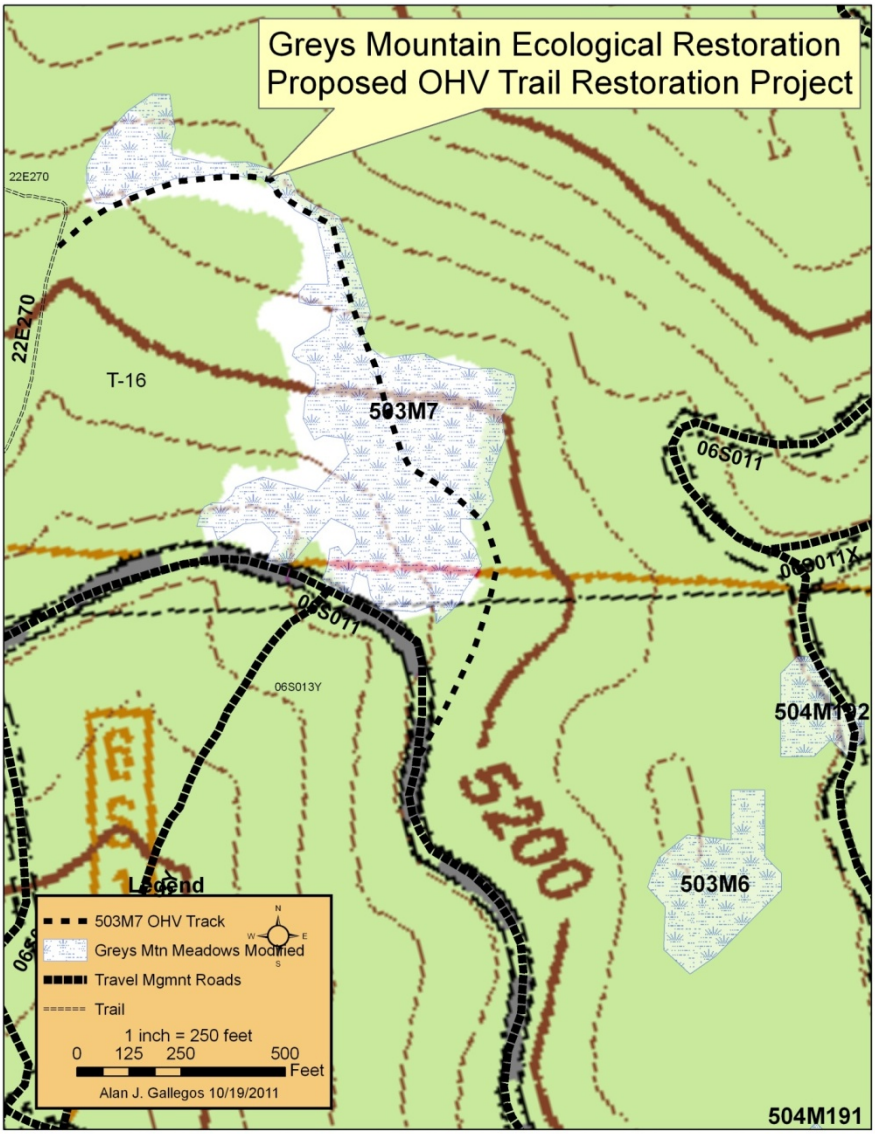


Figure 13. Map showing the alignment of the OHV track through meadow 503M7. This track will be restored to improve soil productivity and allow for native vegetative recovery.

Appendix E Monitoring Plan

Cultural Resources

Monitoring would be necessary to ensure that identified protection measures are effective (Regional PA, Stipulation IV and Interim Fuels Protocol, Stipulation VI) and proposed treatment measures have had no adverse effect to cultural resources. Monitoring shall occur within 1 year post-project implementation to assess short-term effects and then at intervals of once every three years for twenty years to assess long-term effects.

Botany

Post project; monitor the Sensitive Plant occurrences within the project area to assess their presence and condition. Monitor for three to five years to ascertain that the noxious weeds have been eradicated successfully.

Geology/Soils

Monitoring of soil conditions would be conducted on a selection of activity areas to determine if soil S&Gs and soil management objectives are being met**.** Eleven soil transects have been established in the project area to determine existing soil conditions. Six of these soil transects would be repeated after treatment is implemented.

Monitoring would be accomplished in accordance with the National Forest Soil Disturbance Monitoring Protocol (USDA Forest Service, 2009). Soil monitoring would be conducted along transects according to the protocol after the proposed treatments. Soil monitoring should be designed to determine the extent of detrimental soil compaction from mechanical treatments. Soil cover should be determined from both mechanical treatment and prescribed fire. After implementation of the proposed action, pre-treatment soil transects should be re-established in activity areas and post-treatment soil transects should be repeated along the same transect that were established for the pre-treatment soil transect. Timing for conducting post-treatment soil transects is important to determine soil cover after prescribed fire, especially soil cover condition going into the following winter.

Monitoring of meadows would consist of establishing photo monitoring points that would record the extent of existing conifer encroachment. Photos would be taken initially before treatment and every three years for 15 years. Additional monitoring of the reclaimed OHV trail within meadow 503M7 would be completed primarily looking for the regeneration of native plants and grasses along the trail and for the occurrence of unauthorized OHV usage.

Terrestrial Wildlife

It may be possible to lessen the potential effect of CWE in subwatershed 503.0056 by reducing the number of acres treated within the HUC8 subwatershed or reducing the miles of system road. In addition, correcting problems with road drainage and surface erosion of the road surface could reduce effects from a CWE. If all of the treatments proposed within this subwatershed are adopted, a Stream Condition Inventory Plot should be established downstream of the site and include V* (Hilton and Lisle 1993) to measure possible effects to aquatic habitat.

Range

Establishment of additional long term meadow condition and trend monitoring plots for Texas Flat Meadow and Progeny Meadow sites are recommended in order to assess meadow ecological status and trend and trend and also to determine the effectiveness of the channel restoration and conifer removal on these ecological factors.

Fire/Fuels

Monitoring of the conditions following initial treatments would be completed to determine if additional treatments are needed to meet fire and fuels objectives. Particular attention would be given to those treatment areas associated with SPLATs and DFPZs surrounding the identified communities, as these are the priority areas within the project for follow-up treatments to reduce surface fuels, if needed.

Air Quality

As part of prescribed fire implementation, burn bosses are to make observations on a regular basis of the smoke conditions that are being created by implementation. These include the travel direction and dispersion quality of smoke such as smoke settling into smoke sensitive areas and continued or potential for visibility degradation especially across main travel routes. When possible, lighting techniques and/or burn operations are changed to minimize the continuance of these impacts.

Appendix F Stand by Stand Description of Treatments

Table 8 Proposed Treatment Acres by Area and Method

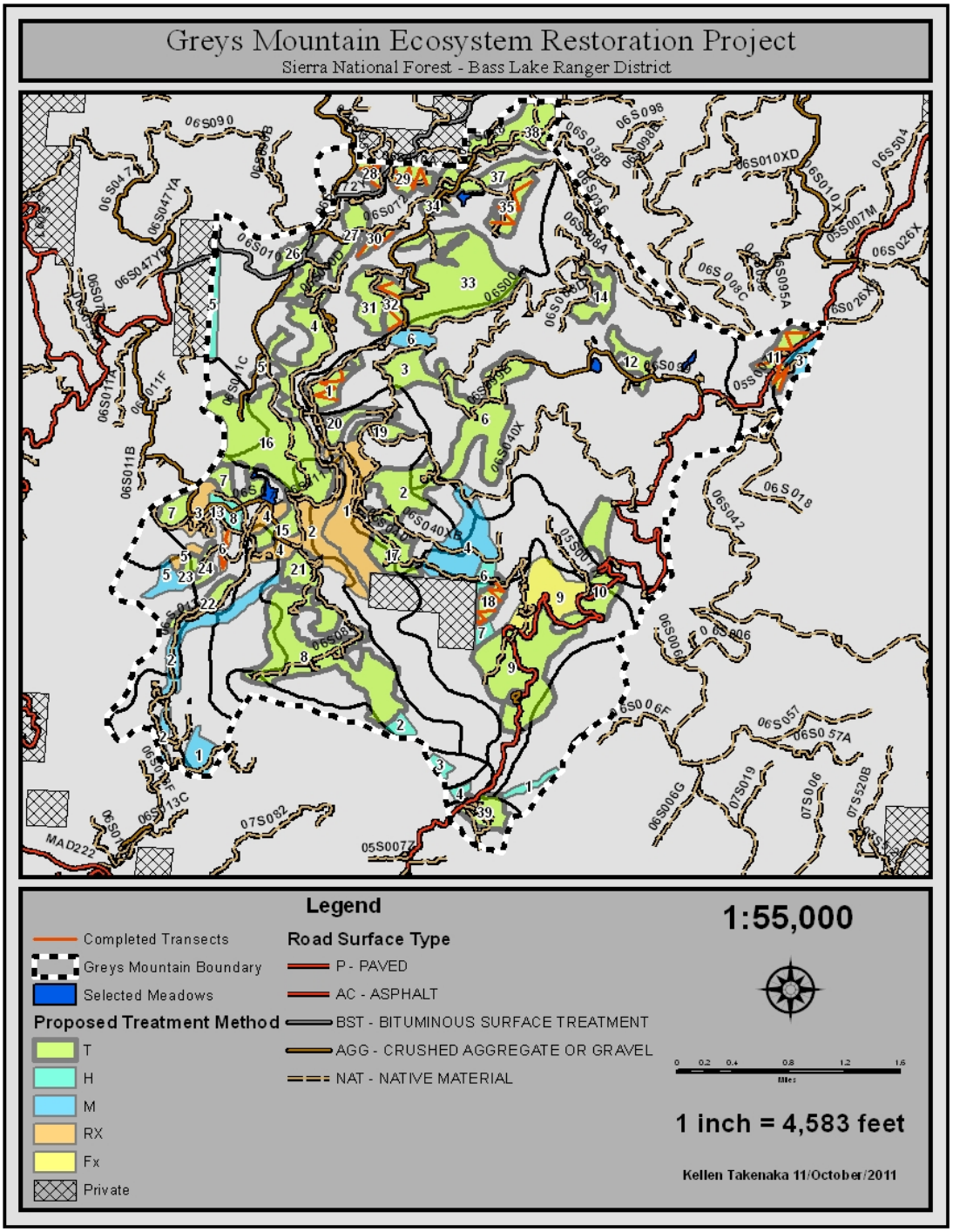
Treatment #	Commercial Thinning	Commercial Thinning in Fuelbreak	Commercial Thinning Total Acres	Potential Precommercial Thinning by Mastication or Hand thin w/Dozer Piling	Mastication	Prescribed Burning (Post Thinning)	Prescribed Burning Only Treatment	Precommercial Thinning w/Hand Piling	Meadow Conifer Removal	Reforestation	Noxious Weed Eradication	Analyzes Area Total
T-1	34		***34***	7		41						41
T-2	76		***76***	21		97						97
T-3	25		***25***	27								52
T-4	117		***117***	19		136						136
T-5	1	5	***6***			6						6
T-6	27		***27***	147								174
T-7	13		***13***			13						13
T-8	137	58	***195***	75		270						270
T-9	147		***147***	87		234						234
T-10	38		***38***	52		90						90
T-11			***0***	48								48
T-12	15		***15***	26								41
T-13	2		***2***	1								3
T-14	34		***34***	13								47
T-16	124	86	***210***	65		275						275
T-17	22		***22***	32		54						54
T-19	15		***15***	9								24
T-20	31		***31***									31
T-21	7	26	***33***	6		39						39
T-26	9	19	***28***			28						28
T-27	20		***20***	25								45
T-28	19		***19***									19
T-29	29		***29***	5								34
T-30	16		***16***	3		19						19
T-31	43		***43***	10		53						53
T-32	29		***29***	5		34						34
T-33	133		***133***	116		249						249
T-34	4		***4***	12								16
T-35	34		***34***	11		45						45
T-37	48		***48***	13								61
T-38	47		***47***	47		94						94
T-39	45		***45***			45						45
Nonstocked Areas (Within T Areas)										50		50
Subtotal	*1341*	*194*	***1535***	***882***		*1822*				***50***		***2467***
FX-9							97					97
Subtotal							***97***					***97***

Treatment #	Commercial	Commercial	Commercial	Potential	Mastication	Prescribed	Prescribed	Precommercial	Meadow	Reforestation	Noxious	Analyzes

	Thinning	Thinning in Fuelbreak	Thinning Total Acres	Precommercial Thinning Mastication or Hand thin w/Dozer Piling		Burning (Post Thinning)	Burning Only Treatment	Thinning w/Hand Piling	Conifer Removal		Weed Eradication	Area Total
T-18							30					30
RX-1							133					133
RX-2							91					91
RX-3							43					43
RX-4							49					49
RX-5							13					13
RX-6							12					12
RX-7							35					35
RX-15							35					35
RX-22							30					30
RX-23							11					11
RX-24							17					17
Subtotal							***499***					***499***
H-1								13				13
H-2						15		15				15
H-3						10		10				10
H-4						8		8				8
H-5								29				29
H-6								15				15
H-7								10				10
H-8 (Progeny)								24				24
Subtotal						**33**		**124**				***124***
M-1					33							33
M-2					92							92
M-3					23							23
M-4					120							120
M-5					26							26
M-6					24							24
Subtotal					***318***							***318***
Mdw 503M7									3			3
Mdw 503M8									0.9			0.9
Mdw 504M132									1.2			1.2
Mdw 504M198									2.4			2.4
Mdw 504M208									0.1			0.1
Mdw 504M209									0.9			0.9
Mdw 504M293									2			2
Subtotal									***10.5***			***10.5***
Chilkoot CG	5											5
Greys Mountain CG	17											17
Texas Flat CG	9											9
Subtotal	***31***											***31***
Project Wide (As needed)											10	10
Subtotal											***10***	***10***
Grand Total	1372	194	**1566**	**882**	**318**	1855 **	**596**	**124**	**10.5**	**50**	**10**	**3556.5**

** The acreage burned will be over the same thinned acreage so this will not be double counted in the grand total of the acres. Only the bold numbers were summed for total. Estimated commercial thinning acreages do not include SMZs, archaeological sites, large tree groups and other aggregations where commercial thinning will not occur within potential treatment areas. 30 percent of the estimated commercial thinning acreage may require post harvest precommercial thinning and dozer spot pile of slash concentrations.

Appendix G Map Displaying Strategic Placement of Treatment Areas


Greys Mountain Ecosystem Restoration Project
Sierra National Forest - Bass Lake Ranger District
Legend
Completed Transects
Greys Mountain Boundary
Selected Meadows
Proposed Treatment Method
T
H
M
RX
Fx
Private
Road Surface Type
P - PAVED
AC - ASPHALT
BST - BITUMINOUS SURFACE TREATMENT
AGG - CRUSHED AGGREGATE OR GRAVEL
NAT - NATIVE MATERIAL
1:55,000
1 inch = 4,583 feet
Kellen Takenaka 11/October/2011