ENVIRONMENTAL ASSESSMENT

USDA Forest Service

Dragon Project

Eagle Lake Ranger District, Lassen National Forest

Lassen County, California

Introduction

Eagle Lake Ranger District (ELRD) of the Lassen National Forest (LNF) is proposing the Dragon Project. The proposed action is consistent with the 1992 *Lassen National Forest Land and Resource Management Plan* (LRMP) and 1993 *Record of Decision* (ROD) as amended by the *Sierra Nevada Forest Plan Amendment* (SNFPA) FSEIS and ROD (2004), and the *SNFP Management Indicator Species Amendment* (2007).

The Dragon Project was scoped on August 7, 2012. The scoping document stated the ELRD intended to use the analysis and objection process identified under H.R. 1904, known as the *Healthy Forests Restoration Act* (HFRA) of 2003. It was later determined the Dragon Project was not authorized as a HFRA project. On March 27, 2013 a new Final Rule was published in the Federal Register creating a Pre-Decisional Administrative Review Process (36 CFR 218) that expanded the objection process to non-HFRA projects. This rule established a pre-decisional objection process for projects and activities implementing land management plans in lieu of the post-decisional appeal process (215) previously used by the agency. The Dragon Project will be implemented under this new 36 CFR 218 rule.

Differences are disclosed with notation such as "*addition*" or "*clarification*" where minor changes to the proposed action occur within this document. Where minor changes were made, the old wording is crossed out and the new wording is written in *italics*. References for citations within this document may be found within the specialist's reports for the Dragon Project, located in the Dragon Project record, which is itself located at Eagle Lake Ranger District (ELRD). See the Environmental Consequences section of this Environmental Assessment (EA) on page 36 for a list of specialist's reports incorporated by reference for the Dragon EA.

The Dragon Project was considered to evaluate opportunities to enhance and restore declining aspen and meadow communities. The surrounding landscape was evaluated for potential opportunities to increase forest resiliency and improve ecosystem function. Four distinct areas were identified during project development and grouped based on logistics, since these areas share the same transportation system that would be used during project implementation.

Past and present land use and management has led to increased tree densities, altered species composition, and increased surface, ladder, and canopy fuels within the project areas, resulting in landscapes less resilient to inherent disturbances, such as fire, insects, and disease, which occur in this area. The objectives of the proposed treatments in the Dragon Project are based on creating both landscape and forest stand heterogeneity to contribute to landscape resiliency, protecting wildlife habitat components, enhancing understory vegetation, increasing soil moisture availability, and providing for fuels reductions to decrease fire behavior. The following activities are proposed under the Dragon Project and are discussed in further detail below: fuels treatments, vegetation treatments, riparian and watershed improvements, and forest transportation system management.

Project Area

The project area is within the Harvey Management Area (MA 12), as identified in the LNF LRMP, encompassing 1,734 acres of National Forest System (NFS) land. This project area is roughly 27 air miles northwest of Susanville, California, just east and southeast of the Blacks Mountain Experimental Forest. It includes portions of Township (T) 32 North (N), Range (R) 8 East (E), Sections 5 through 8, 17, and 18, and T33N, R8E, Sections 3 through 5, 8, 9 and 34 of the Mount Diablo Meridian (Figure 1). The project area consists of four separate areas: near Windy Gap Well, Aspen Flat, Puls Camp, and a small aspen unit in the White Horse Well area.

Topography varies from broad and flat to sloping terrain with elevations from approximately 5,600 feet to 6,400 feet. Most slopes within proposed treatment areas are less than 35 percent, with some short pitches that exceed 35 percent.

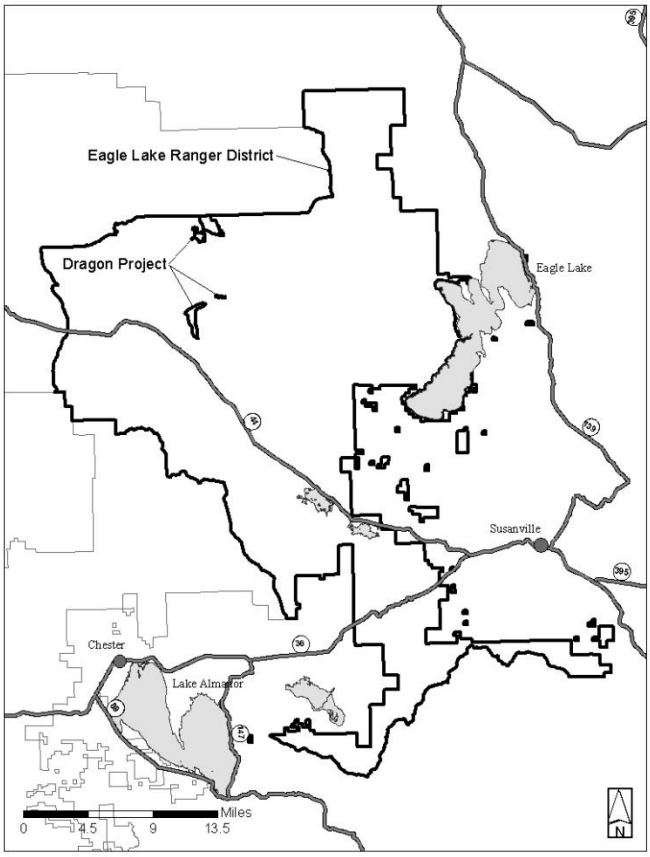


Figure 1: Vicinity map.

The primary vegetation type within the project is eastside pine forests, along with aspen, meadow, shrub, and riparian communities. The eastside pine forests have different stand structures relative to the topographic position, (e.g. slope, aspect, and slope position), resulting in different vegetative composition and density. Non-forested communities include wet and dry meadows as well as bitterbrush / sagebrush flats. Non-forested communities are found at the lower elevations, along the valley floor, or where higher water tables occur. Upland forest types occur on slopes above the flats with ponderosa and Jeffrey pine occupying the lower slopes, and white fir becoming more prevalent with increasing elevation. Tree density increases along this topographic gradient ranging from non-forested in the low areas to forested upland areas. Predominant tree species within the project area include ponderosa pine (*Pinus ponderosa*), Jeffery pine (*Pinus jeffreyi*), white fir (*Abies concolor*), and incense cedar (*Calocedrus decurrens*), and stands of aspen (*Populus tremuloides*). Common shrub species include sagebrush (*Artemesia tridentata*; *A. arbuscula*), bitterbrush (*Purshia tridentata*), goldenbush (*Ericameria bloomeri*), tobaccobrush (*Ceanothus velutinus*), chinquapin (*Chrysolepis sempervirens*), manzanita (*Arctostaphylos patula*), and rabbitbrush (*Ericameria nauseosa*). Plantations of various sizes and age classes occur in the project area but are not proposed for treatment in the Dragon Project.

There are no designated wildlife allocations such as Northern goshawk and California spotted owl PACs or HRCAs within the project boundaries that would require canopy cover restrictions in vegetation treatments.

Purpose and Need

The purpose of fuels and vegetation management on the LNF, as per the LRMP as amended, includes but is not limited to the following: protect and restore the desired conditions for meadow and aspen ecosystems, reduce the wildfire threat to human communities as well as to ecosystems and natural resources by treating hazardous fuels, maintain ecosystem functions, and decrease the cost of fire suppression. Additionally, there is a need for site-specific treatments that are cost-effective and contribute to community stability. There is a need to move all the vegetation types within the proposed project area towards their respective desired conditions that are based on topographic position, fuel conditions, health and ecosystem function. Specific objectives include:

1. healthy forest conditions that are characterized by a more open and spatially heterogeneous forest dominated by fire-resistant tree species[1], and reduced surface, ladder, and canopy fuel loads where periodic low-intensity surface fires can be reintroduced;

2. forest areas with reduced tree densities that decrease risk of mortality from insects, drought, disease, and fire;

3. functioning aspen, meadow, bitterbrush / sagebrush flats, and riparian systems that contribute to landscape diversity; and

4. watersheds with functioning hydrologic processes.

Additional objectives include:

5. cost-effective treatments that contribute to community stability; and

6. management of the transportation system.

Historical information provides insight on forest structure and patterns that were produced with active fire regimes indicating how resiliency was achieved for this landscape. Past management actions including fire suppression, grazing, and timber harvest have led to landscapes characterized by forests with smaller average diameter trees and denser canopies. These factors have also resulted in a loss in the spatial extent and ecological function of aspen, meadow, shrub flats, and riparian areas due to conifer encroachment compared to historical conditions. This information was used to develop treatment prescriptions designed to trend stands towards the desired conditions for the vegetation types within the project areas.

The Dragon project was designed to improve forest resiliency by reducing stand densities and creating spatial heterogeneity within stands and across topographic gradients. Variable density thinning, prescribed fire, and conifer removal are treatments designed to modify the current forest structure to

[1] Fire-resistant trees are characterized as having a lower probability of being injured or killed by fire; locally, these species are primarily ponderosa and Jeffrey pines, as well as incense cedar.

resemble conditions that would be created by historical fire behavior and fire return interval associated with differences in slope position, aspect, and slope steepness. Proposed treatments would also make treated areas more resilient to projected climate change effects including warming temperatures that would increase drought stress making forests within the project area more susceptible to pest and pathogens, reduced snow pack, and early spring run-off leading to longer fire seasons.

Increased spatial heterogeneity would improve many ecological functions such as increased soil moisture availability during the growing season, increase understory vegetation and also manipulates fuels to influence burn intensity and provides for a variety of wildlife habitats. Increased soil moisture availability increases plant vigor that increases plant resiliency to pests and drought conditions. Understory vegetation contributes to a wide variety of ecosystem services and ecological functions including forage, hiding cover, and represents almost all of the plant diversity and provides many important attributes for a wide range of organisms in western conifer forests (Shevock 1996; Loft et al 1987). The proposed objectives in the Dragon project are in line with Region 5 Ecological Restoration Leadership Intent (USDA FS, 2011) and the actions designed to meet these objectives are explained further below.

The Dragon Project Transportation Analysis (TAP) and Watershed Analysis/Landscape Analysis (WA/LA) (hereby incorporated by reference) were also used to develop management objectives and recommendations. These analyses were interdisciplinary team (IDT) efforts to identify differences between existing and desired conditions.

Design of treatment prescriptions in the proposed action were informed by site-specific stand exam data. Basal area and canopy cover descriptions were derived from modeling this data with the Forest Vegetation Simulation (FVS) program. Fuels effects indicators were derived from modeling this data with the Forest Vegetation Simulator-Fire Fuels Extension (FVS-FFE).

Throughout the Dragon Project area, vegetation treatments are designed to meet both ecological and vegetative objectives consistent with GTR 220 (North et al 2009) and as an outcome also meet fuels objectives. Fuels and vegetation treatments could be co-located in the project area to meet all desired conditions.

Fuels Treatments

The 2004 SNFPA ROD emphasizes management of hazardous fuels with strategic placement of fuels treatments across broad landscapes to modify wildland fire behavior by interrupting potential fire spread causing fires to burn at lower intensities, thereby reducing the size and severity of wildfires. This would be accomplished in the Dragon Project area by various area vegetation and fuels treatments along with the creation of defensible fuel profile zones (DFPZ) (see discussion below). These treatments, along with previous area and DFPZ treatments that have been completed across the ELRD contribute to the broad landscape approach discussed in the 2004 SNFPA ROD. Fuels treatment objectives include reducing and rearranging surface fuels, removing ladder fuels, increasing canopy base heights, and disrupting

contiguous forest canopy by removing canopy fuels. Canopy fuels are modified to reduce the potential for spread of crown fire. The Dragon Project is designed to treat fuels throughout the entire project area.

Desired fire behavior throughout the entire Dragon Project area is for fire to remain on the surface with a flame length of less than four feet under 90th percentile weather conditions and increased torching indices. Fire behavior is the manner in which a fire reacts to available fuels, weather, and topography. Available fuel is the only factor that can be changed through management actions. Reducing surface fuels is directly correlated to decreased flame lengths. The torching index (TI) is a measure of how susceptible a stand is to the vertical movement of fire; this is called a passive crown fire. The higher the TI, the less susceptible a stand is to the vertical movement of fire. Reducing ladder fuels and raising the canopy base height within a stand is directly correlated to an increased TI and the reduced potential for passive crown fire. Achieving the desired fire behavior conditions would reduce the expected fire intensity and severity if a wildfire were to burn in the project area. Each major area in the project has different existing fuels conditions, and is discussed separately below.

Fire behavior within the eastside pine stands of the Windy Gap area (Map 2) is predicted to have average flame lengths of 7 feet. Currently, the flames lengths do not meet the desired condition for this area. The torching indices and canopy base height within some of the stands in this area also do not meet the desired conditions.

Table 1: Windy Gap Fire Behavior and Effects Indicators Under 90th Percentile Weather Conditions.

Effects Indicators	Existing Condition		Desired
	Windy Gap - Eastside Pine		
	average	range	
Flame length (feet)	7	7†	<4
Fire type	Surface	Surface	Surface only
Torching Index (TI)	32	14 to 50	>30
Canopy Base Height (CBH) (feet)	24	16 to 32	15-25

Source: Forest Vegetation Simulator-Fire Fuels Extension (FVS-FFE), Fire and Fuels Report ELRD
† Modeling indicates all stands within these vegetation types would have the same flame length, therefore range values are one value.

Fire behavior within the eastside pine stands of the Aspen Flat area (Map 1) is predicted to have average flame lengths of 18 feet. Currently, the flames lengths and fire type do not meet the desired condition for this area. The torching indices and canopy base height within some of the stands in this area also do not meet the desired conditions.

Table 2: Aspen Flat Fire Behavior and Effects Indicators Under 90th Percentile Weather Conditions.

Effects Indicators	Existing Condition		Desired
	Aspen Flat - Eastside Pine		
	Average	Range	
Flame length (feet)	18	6 to 38	<4
Fire type	Passive Crown	Surface to Passive Crown	Surface only
Torching Index (TI)	14	0 to 66	>30
Canopy Base Height (CBH) (feet)	12	4 to 37	15-25

Source: Forest Vegetation Simulator-Fire Fuels Extension (FVS-FFE), Fire and Fuels Report ELRD

The 1999 HFQLG FEIS developed DFPZs that were defined as areas where fuels have been modified to reduce the potential for a crown fire and to allow fire suppression personnel a safer location from which to take action against wildfire. Suppression efficiency would be improved within the DFPZ by creating an environment where wildfires would burn at lower intensities and fire firefighting production rates would be increased because less ground fuels and small diameter trees would need to be cleared for fireline construction or backfiring. Although the 2004 SNFPA ROD does not speak to DFPZs specifically, many of the 2004 ROD goals and objectives for fire and fuels mirror the goals defined for DFPZs, such as: 1) strategically placing fuel treatments across landscapes to interrupt potential fire spread; 2) modify canopy fuels to reduce the potential for spread of crown fire; and 3) removing sufficient material in treatment areas to reduce wildland fire intensity, thereby contributing to more effective fire suppression and fewer acres burned. One important objective of a DFPZ that is not clearly stated in the 2004 ROD focuses on the importance of firefighter safety and providing a base for suppression activities to occur more safely and efficiently. Since the fire and fuels goals and objectives described for a DFPZ are basically the same as those described in the 2004 ROD, along with the added goal of focusing on firefighter safety, the district intends to continue to add to the DFPZ network previously implemented under HFQLG.

A portion of a planned DFPZ network is located in the Puls Camp area of the Dragon Project. Planned DFPZ locations have been refined from those originally identified in the 1999 HFQLG FEIS based on site-specific review by district fuels specialists. Each network contributes to a larger strategic network that is a part of a long-term fuel-reduction program, where the goal is to reduce the size and severity of wildfire on the landscape. The proposed segment would generally function as a connector between other planned and/or completed segments of DFPZs (Figure 2). The area that falls within the DFPZ network within the Dragon project area consists of approximately 666 acres (Table 5).

Desired fire behavior within the DFPZ portions of the Dragon Project is for fire to remain on the surface with a flame length of less than four feet under 90th percentile weather conditions and increased torching and crowning indices. The crowning index (CI) is a measure of the ability of a stand to sustain a fire that moves through the canopy; this is called an active crown fire. The higher the CI, the less susceptible a stand is to an active crown fire. Reducing canopy fuels is directly correlated to an increased CI and the reduced potential for spread of active crown fire. Achieving the desired fire behavior conditions would

provide fire suppression personnel a safer location from which to take action against a wildfire, as well as reduce the expected fire intensity and severity, if a wildfire were to burn in the project area.

Fire behavior within the eastside pine stands of the Puls Camp area (Map 1) is predicted to have average flame lengths of 39 feet. Currently, the flames lengths and fire type do not meet the desired condition for this area. The torching and crowning indices, and canopy base heights within most of the stands in this area also do not meet the desired conditions.

Table 3: Puls Camp Fire Behavior and Effects Indicators Under 90th Percentile Weather Conditions.

Effects Indicators	Existing Condition		Desired
	Puls Camp - Eastside Pine		
	average	range	
Flame length (feet)	39	8 to 90	<4
Fire type	Passive Crown	Surface to Active Crown	Surface only
Torching Index (TI)	6	1 to 17	>30
Crowning Index (CI)	21	8 to 44	>35
Canopy Base Height (CBH) (feet)	8	5 to 18	15-25

Source: Forest Vegetation Simulator-Fire Fuels Extension (FVS-FFE), Fire and Fuels Report ELRD

Based on the current stand structure and predicted fire behavior, there is a need to reduce fuels using thinning, tree removal, and prescribed fire to reduce the size, intensity, and severity of fires within the project area, which in turn would reduce the detrimental effects of large-scale wildfire. Meeting the desired condition for each stand type would allow for the use of prescribed fire across the landscape to create forest conditions that are more resilient to wildland fires and help restore ecological processes that include opening growing space, providing a flush of soil nutrients, and increasing plant diversity, while maintaining desired forest structure.

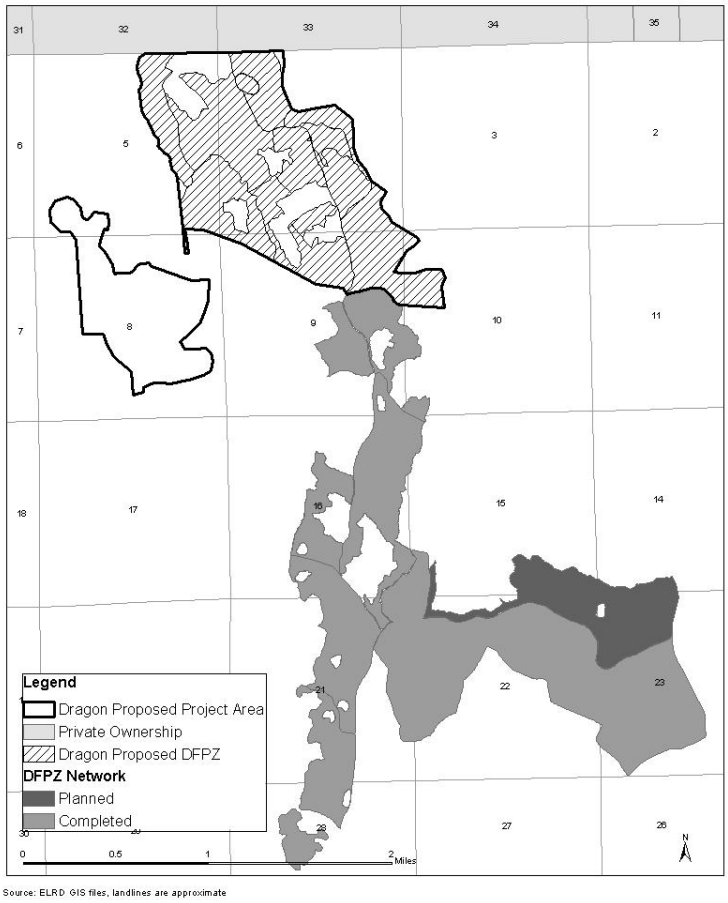


Figure 2: Map of DFPZ network adjacent to Dragon Project Puls Camp and Aspen Flat areas

Vegetation Treatments

Vegetation treatments are needed to trend these ecosystems towards desired conditions within the eastside pine type and the associated meadow, shrub, riparian and aspen communities. Treatment intensity would vary along the topographical gradient resulting in different vegetative composition and density. Each vegetation type is described below.

Non-Forested Communities

Non-forested communities provide natural openings in an area dominated by coniferous forests. Although non-forested communities make up a relatively small fraction of the total area of the Sierra and Cascade mountains, they provide many ecosystem services and functions such as a variety of plant species that greatly enrich biodiversity over the landscape, provide habitat for a variety of non-forest bird and insect species, an herbaceous layer which decreases soil erosion, and higher soil moisture availability due to the lack of trees. In the Dragon Project, these communities consist of meadows and bitterbrush/sagebrush flats. Additionally, non-forested communities contribute to wildfire behavior modification and can be

incorporated into fire and fuels management objectives. Fire was the primary process that historically maintained the spatial extent of these non-forested communities by killing tree seedlings that established along the forest-non-forest ecotones. Currently within the Dragon Project area there is an increase in the distribution and density of trees into these non-forested communities due to a reduction in wildfires as well as the loss of herbaceous vegetation from over-grazing and climatic change (Vale 1981; Miller and Rose 1999; Norman and Taylor 2005).

Meadows

Meadows are found in the lower elevations of the topographic gradient. Meadows can be characterized based on vegetation, elevation, water table, landform, hydrology, and soil characteristics. Meadows in the Dragon Project area consist of both wet and dry meadows. Dry meadows are characterized by herbaceous and shrub vegetation adapted to drier conditions. Soils within the dry meadows are not saturated within the rooting zone for most of the growing season. In contrast, wet meadows are composed predominately of perennial sedges, rushes, and grasses. Soils in wet meadows are saturated in the rooting zone for a majority of the growing season. Meadow types may integrate across the landscape due to changes in hydrologic conditions across small distances. Therefore, dry meadows may have inclusions of wet vegetation and vice versa.

Conifers have encroached within both meadow types. This is causing a reduction in soil moisture availability, water storage, and herbaceous vegetation. The encroaching conifers in these non-forested communities need to be removed to increase the aerial extent of these areas and improve meadow function. Removing conifers from meadows and meadow edges would improve soil moisture and water storage, thereby enhancing herbaceous and shrub communities. Additionally, enhanced meadows would provide better food sources and habitat for many species of insects, mammals, and birds.

Bitterbrush / Sagebrush Flats

Bitterbrush / Sagebrush flats are located on volcanic flats and terraces associated with sandy loam textured soils. This community is dominated by big sage (*Artemisia tridentata)* and bitterbrush *(Purshia tridentata)* that provide high forage and browse production for wildlife and domestic livestock. Additionally when this community is maintained in a non-forest condition, the loss of precipitation due to tree intercept is reduced, resulting in higher soil moisture availability and ground water recharge. Currently the bitterbrush / sagebrush flats are decadent, with infrequent grass and herbaceous species. Additionally, conifer trees are encroaching along the margins of this community contributing to a decline in the spatial extent of this community. These encroaching conifers need to be removed to increase the aerial extent of these areas and improve function

Eastside Pine

Eastside pine stands in the Dragon Project area are highly variable in structure and pattern depending on topographic features that include slope, aspect, and topographic positions. The project areas can be grouped into two areas based on similarities of topographic features. The eastside pine stands in the north end of the project (Puls Camp and Aspen Flat) are similar in slope and topographic position and would be grouped. The eastside pine stands in the Windy Gap Well area are lower in elevation, have mild slopes, and are positioned on toe slopes along non-forested vegetation types and form the second area in the eastside pine vegetation type.

Puls Camp and Aspen Flat Areas

Historically, the eastside pine forest in these areas were mainly composed of large scattered ponderosa and Jeffery pines, with variable tree densities, and lower canopy cover. With increasing elevation stand densities and canopies increased and species composition included white fir on upslope areas. Currently, the overstory pines in these stands are unhealthy and declining and the understory is comprised of densely stocked small diameter white fir. Densities within the eastside pine stands range from approximately 75 to 255 square feet of basal area (BA) per acre throughout the topographic gradient, from meadow edge to upland. The white fir understory is increasing competition for soil and water resources with the overstory pines which decreases tree vigor creating unhealthy forest conditions that are more susceptible to bark beetle infestations. Additionally, the small diameter white fir function as ladder fuels making these stands more susceptible to high severity fires and creating communities less resilient to natural disturbances.

The desired condition for eastside pine stands in these areas is to reduce densities to the lower limit of full site occupancy, below which site resources are not fully utilized for tree growth and risk of bark beetle infestation is greatly reduced, increase the relative composition of fire resistant trees, and create horizontal and vertical heterogeneity. The lower densities would increase stand resiliency by reducing ladder and canopy fuels, and improve tree health, vigor, and growth through reduced competition for limited resources. Vegetation management using variable density thinning and prescribed burning is needed to achieve these objectives.

Variable density thinning would improve ecosystem function by enhancing understory herbaceous and shrub production and improving soil moisture availability. Since snow and precipitation generally increases further upslope and fire frequency declines, it is desirable to maintain higher tree densities with a greater white fir component in the upslope areas.

Windy Gap Well Area

The eastside pine forest in the Windy Gap Well area has a narrow linear shape located on a relatively flat bench between a dry meadow and a brush community. These eastside pine stands can be characterized as ecotones because they are transition areas between the adjacent non-forested communities. Historically, these areas consisted of large scattered trees, variable tree densities, and sparse overstory canopy cover,

with an understory of big sage (*Artemisia tridentata*). These areas were maintained by frequent fires and competition from grasses that prevented widespread establishment of young conifers. However, subsequent grazing and fire suppression practices have facilitated understory tree establishment with increases in tree densities and canopy cover. This area currently has an average of 35 percent canopy cover, with pockets of much higher canopy cover.

The desired condition of these stands is variable spaced large trees with a diverse herbaceous and shrub understory. The understory vegetative response is highest when the overstory canopy cover is 20 percent or less on the forested portions of the stand.

There is a need to thin these areas to achieve attributes of the historical stand structure that include reduced canopy cover and variably spaced large trees to increase disturbance resiliency. Due to the negative relationship between overstory canopy cover and understory vegetation, open-canopy forests dominated by large trees would increase soil moisture availability and increase herbaceous and shrub community cover, richness and diversity, thereby providing suitable habitat for a large number of wildlife species that inhabit eastside pine forests.

Aspen

Aspen are a disturbance dependent, fire-resilient, shade-intolerant species that relies on vegetative reproduction to maintain stands between episodic seeding events. Aspen communities provide many ecological services in western montane forests because they are one of the few deciduous forest types present. Aspen communities contain greater species diversity and abundance of birds, mammals, insects, and understory plants that provide forage and hiding cover for wildlife and livestock. Additionally, aspen communities provide benefits such as increased water availability.

Aspen are declining throughout the west due to changes in fire-regimes and historic grazing from livestock and wildlife. These communities cover approximately one percent of the landscape on the ELRD, and provide a unique forest component in a conifer dominated landscape (ELRD Ecology files). Condition surveys of the aspen communities within the Dragon Project indicate that 44 percent are classified as high/very high risk for loss**,** and 33 percent are classified as moderate risk for loss. All stands have conifers shading or encroaching the aspen in the Dragon Project area.

Once aspen communities are encroached by conifers and are not successfully regenerating, the ecological services such as biodiversity, forage, habitat, and understory plant communities decrease and are at risk of being lost from the landscape. Due to the poor condition of the aspen communities within the Dragon Project area; there is a need to enhance aspen communities by removing conifers and fencing aspen stands. Removal of conifers within aspen communities increases light availability providing the proper growth environment for aspen. Fencing aspen communities protects aspen regeneration from being browsed allowing suckers to grow above the browse line to successfully recruit future aspen cohorts.

Riparian and Watershed Improvements

Riparian areas within the proposed project are found throughout the vegetation types and consist of seasonal drainages, wetlands, and meadows. Riparian vegetation communities differ between intermittent and perennial streams, yet both perform similar ecological services that include provision of high quality habitat, reduction of erosion and sedimentation, and increased stabilization of banks. The ecological diversity of riparian corridors is maintained by natural disturbance regimes that include fire. Within the Dragon Project area, the forest structure within these riparian areas (Riparian Conservation Areas [RCAs], 2004 SNFPA ROD) has followed a similar trend of increased surface and ladder fuels, forest density and canopy cover as the adjacent vegetation types due to fire suppression efforts and grazing.

The thinning and prescribed fire activities proposed for eastside pine forests can also be used to restore the structure in riparian areas to increase understory diversity and cover that would improve riparian function. Reduced surface fuel loading and tree densities would enhance understory vegetative biodiversity, richness, and cover, and therefore improve resiliency of the stand. Increasing understory vegetation along stream banks would increase stream channel stability and improve riparian function. A secondary benefit would be improved soil root structure, which can withstand erosive shear forces during high flow events, thus decreasing downstream sediment deposition.

Several water impoundments are located within the project area, some of which were excavated within seasonal stream channels. Many of these impoundments are currently impeding water flow in their associated meadows and streams by holding water that is subsequently lost to evaporation, and there is a need to remove them. One such impoundment is a stock pond in the Aspen Flat area (T33N, R 8E, Section 8, Map 4). There is a need to improve the hydrologic function of the dry meadow and the associated stream affected by the stock pond at the outlet of the meadow. In the Windy Gap Well area (T32N, R8E, Section 7, Map 5), there is a need to improve the hydrologic function of the wetland and associated stream that is being affected by two non-functional waterfowl enhancement structures and one reservoir on the east edge of Grays Flat.

Improperly placed roads and landings within and adjacent to RCAs have contributed to sedimentation, altered surface/subsurface flow interactions, and channel morphology. There is a need to improve or decommission roads and landings within and adjacent to RCAs to improve riparian functions by reducing potential sources of sediment, improving natural surface and subsurface flow paths, and stabilizing channel morphology.

Transportation Management

The transportation system within the Dragon project area consists of National Forest System (NFS) roads and unauthorized routes. In order to provide access for the proposed treatments, existing roads would be utilized. Upgrades and reconstruction, are needed on some of these roads to provide access and/or to

address adverse effects to the watershed. There is a need to maintain the transportation system for public safety and access.

Alternatives

Alternative 1: Proposed Action

The objectives outlined in the Purpose and Need would be achieved through thinning, prescribed fire (pile burning and underburning) and conifer removal treatments that would be implemented throughout the project area. Treatments would be implemented utilizing commercial timber sales, service contracts, and the work of Forest Service personnel. Proposed actions for various components of the project area are described in the following sections.

Fuels Treatments

Fuels would be treated across the entire project area using a combination of vegetation treatments (thinning and conifer removal) and, prescribed fire, designed to meet desired conditions. Prescribed fire would be conducted after vegetation treatment in all vegetation types. Prescribed fire would not be used in aspen until it is in a healthy ecological condition. If needed, hand thinning of small-diameter trees less than five inches would be done prior to underburning.

Vegetation Treatments

In areas proposed for mechanical treatment, mechanical ground-based equipment would be utilized to harvest trees greater than or equal to three inches in diameter at breast height (dbh) up to 30 inches dbh. Whole-tree yarding would be used when possible. Hand treatments would occur where equipment cannot be used (i.e. rocky or other inoperable areas) or when the economics make mechanical treatments unfeasible. Hand treatments include felling trees up to 30 inches dbh and cutting shrubs, lopping and scattering, and/or piling and later burning. Activity generated landing slash would be machine piled would be burned.

Trees greater than 30 inches and legacy trees[2] would be retained unless felling is required to meet safety and operability requirements. All available snags, 15 inches or larger dbh, would be retained unless required to be felled during project implementation to meet operability or safety needs. If felled, such snags would be left in place as a downed log. An average of five down logs, 12 inches (at large-end), per acre would be retained where available.

Treatment in RCAs would be the same as the surrounding vegetation types. Integrated Design Features (IDFs) and Best Management Practices (BMPs) would be implemented to protect various resources including riparian areas.

The following describes the proposed actions for each vegetation type. See Table 5 for acreage of each vegetation type. See maps 1 thru 3 for locations of each vegetation type.

[2] Legacy trees are those displaying old-growth characteristics. For ponderosa and Jeffrey pine a legacy tree is defined as a tree that has the following characteristics: (1) platy, yellow bark on four panels (on at least ½ to ¾ of the bole), (2) downward or outward sweeping branches (branches not angled upwards) on at least the top 1/3 of the tree, and (3) a rounding or flat top, regardless of age or diameter.

Non-forested Communities

To restore meadow and bitterbrush / sagebrush flat function in these non-forested communities all trees less than 30 inches dbh which do not exhibit legacy tree characteristics would be removed mechanically and/or by hand where the continuous encroached tree line currently occurs, while scattered trees within the non-forested community proper would be hand-thinned. Hand-thinned material would generally be lopped and scattered, and/or piled and later burned. The extent of this treatment into neighboring forested areas would be delineated where the transition between existing upland and meadow vegetation occurs. This transition occurs anywhere up to 200 feet from the current meadow edge.

During prescribed fires in the adjacent upland areas, fire would be allowed to back into the edge of the non-forested communities at a low intensity to maintain the forested-non-forested boundary.

Eastside Pine

The desired condition in these stands is variably spaced, large, healthy, fire-resistant trees. Variable density thinning would be implemented to create residual stand densities that are highly variable throughout the topographic gradient.

Variable density thinning creates non-uniform conditions using three components: clumps, openings and the matrix. Clumps are portions of treatment units where higher than average stocking levels would be maintained. Emphasis would be placed on maintaining existing clumps of healthy-fire resistant trees across all size classes. Some thinning may occur in the clumps to reduce ladder fuels and ensure the clumps will persist through time. Preferences for both large and small healthy fire-resistant trees would contribute to vertical heterogeneity. Openings are areas where lower than average stocking levels would be retained. Openings would be placed in areas that increase the aerial extent of existing openings, disease pockets, or areas with small non-fire-resistant trees. Clumps and openings would range in size from 0.1 to 0.5 acres. Within the matrix, ladder and canopy fuels would be thinned to desired stocking levels (Table 4). Small understory conifer trees would be thinned where they serve as ladder fuels to adjacent overstory trees. Some mid- and upper-story trees would be removed to protect adjacent trees targeted for retention and to break up ladder and canopy fuel continuity. Residual stand densities in the matrix would be highly variable, generally lower in transition zones near non-forested areas and increasing further upslope.

Residual BA within the stand matrix would be determined based on site quality, existing stand attributes, and soil productivity. Thinning treatments would ensure that stand densities do not exceed an upper limit of 60 percent of Stand Density Index (SDI) 365 and be effective for approximately 20 years post treatment to help prevent bark beetle infestations. Trees favored for retention are those free of disease or insect infection.

To maintain within-stand diversity, approximately three to five percent of the upland areas in each treatment unit would be left in non-mechanically treated clumps (leave islands) generally ranging in size

from one-quarter to five acres. These leave islands would be distributed evenly throughout the upland areas, however they would be placed at a minimum 300 to 400 feet from a road edge.

Puls Camp and Aspen Flat Areas

Emphasis in these areas would be on retaining larger, healthier trees, favoring ponderosa pine over white fir. All aspects of variable density thinning would be used. Generally, within the matrix an average BA of 90 to 120 square feet of BA per acre would be retained. As shown in Table 4 below, BA would be lower along the edges of the non-forested communities and within the ecotones. The thinning in these areas would meet the desired fuels conditions for flame length, TI, and CBH. In addition, thinning the DFPZ in the Puls Camp area would meet the desired fuels conditions for CI.

Windy Gap Well Area

Emphasis in this area would on an abundant and diverse understory. Thinning in these stands would meet the desired fuel conditions for flame length, TI and CBH.

There are two forested stands in the Windy Gap Well area (Map 2). In the northern stand, (#72) residual stand densities would still be variable along the gentle topographical gradient. Generally, 60 to 90 square feet of BA per acre would be retained in the matrix, and BA would be lower along the edges of the non-forested communities and within the ecotones (Table 4). All aspects of variable density thinning would be used.

The southern stand, (#519) can be described as an ecotone, and contains less of a topographic gradient from the meadow edge to the forested areas. Therefore the strand structure in this area would not include a matrix, just clumps and openings. In this stand, thinning would also occur to meet a desired target of approximately 20 to 40 percent residual canopy closure in the forested portions of the stand, to increase understory vegetation.

Table 4. Desired basal area/acre along topographic gradient in eastside pine

Location on Topographic Gradient	Desired Basal Area/ac (BA/ac)
Non-forested Community Edge	0-20
Ecotone	20-60
Upland Pine	60-90
Upland Pine with White Fir	90-120

Source: Dragon Project FVS runs.

Aspen

To restore aspen stands conifers less than 30 inches dbh, which do not exhibit legacy characteristics would be removed to provide the proper growing environment. The aspen treatment unit extends outward from the existing aspen clone 150 feet to the east, west, and south, and 100 feet to the north. In areas inaccessible to mechanical equipment hand thinning would be used. Inaccessible areas include those which are too rocky for mechanical equipment to operate on or have no access by road. The harvested material would be lopped and scattered or piled outside the unit and later burned. Prescribed fire would take place within aspen stands after the next cohort of aspen is successfully recruited and only if light surface fuels exist within the stand. Aspen units with excessive browsing from livestock and/or wildlife would be fenced to reduce browse impacts immediately following project implementation or when monitoring indicates that browsing pressure is impeding successful aspen recruitment.

Existing mature aspen trees would be protected during logging and vegetation treatment operations. Any burning of debris piles would generally be done outside the perimeter of aspen rooting zones, because of their susceptibility to heat damage.

Table 5. Acreages by vegetation type and by proposed treatment type in the Dragon Project Area.

Vegetation Type	Treatment	
	Thinning or Conifer Removal	Prescribed Fire
	Acres	acres
Puls Camp		
Non-forested Communities	19	19*
Eastside Pine	640	640
Aspen	7	0
subtotals ->	**666**	**659**
Aspen Flat		
Non-forested Communities	14	14*
Eastside Pine	187	187
Aspen	41	0
subtotals ->	**242**	**201**
Windy Gap Well		
Non-forested Communities	300	300*
Eastside Pine	353	353
Aspen	12	0
subtotals ->	**665**	**653**
White Horse Well		
Non-forested Communities	0	0
Eastside Pine	0	0
Aspen	3	0
subtotals ->	**3**	**0**
Project totals	**1576**	**1513**

*Low intensity fire allowed to back in along edge only. Source: Eagle Lake Ranger District GIS. Acres are approximate

Watershed Improvements

In the Aspen Flat Area (T33N, R8E, Section 8, Map 4), the stock pond just upstream from the intersection of 33N37 and 33N03 would be filled in with the existing fill-material (berm) on site and be re-contoured to match the natural profile of the stream channel and the grade of the surrounding meadow to improve the hydrologic function of the dry meadow above the pond and stream below. In the Windy Gap Well area (T32N, R8E, Section 7, Map 5), three of the four existing structures (two waterfowl enhancement structures and one reservoir) would be recontoured using the same process as above to improve the hydrologic function of the seasonal wetland and associated stream in Grays Valley. If necessary, these

areas would be reseeded with native seeding, and protected with temporary fencing to allow for soil stabilization and protection from browse.

The landing at the intersection of 33N03 and 33N03B in the Aspen Flat area (Map 4) would be ripped after use to prevent water from pooling and evaporation loss, and to allow for better infiltration of water into the associated RCA of the nearby meadow.

In the White Horse Well area, portions of NFS roads 33N04Y and 33N04YA, and unauthorized route UNE560 (Map 6) would be decommissioned to improve riparian function along the meadow edge. NFS road 33N04Y would be decommissioned by ripping the road bed, and NFS road 33N04YA and unauthorized route UNE560 would be decommissioned by placing a barrier across the road. In the Windy Gap Well area, a portion of unauthorized routes UNE309 and UNE310 (Map 5) would be decommissioned where the routes cross a dry meadow to improve riparian function. Unauthorized route UNE309 would also be decommissioned by ripping the road bed, and UNE310 would be decommissioned by ~~placing a barrier across the road~~ *ripping approximately the first 600 feet of the road bed, where the road crosses the meadow*.

See the following transportation management section for specifics and mileages on road improvements and decommissions that are planned to take place to improve riparian functions by reducing potential point sources of sediment, improve natural surface and subsurface flow paths and stabilize channel morphology. All proposed transportation actions in the Dragon Project are designed to improve riparian function, and were analyzed in the Dragon Project Area WA/LA.

Transportation Management

The proposed action includes transportation recommendations to actively manage the forest transportation system within the project area. This would include maintenance, reconstruction, decommissioning, and construction of roads. No temporary roads would be constructed for the Dragon Project. Road related watershed improvement work would also be performed on multiple roads and drainage crossings within the project area. This work would include upgrading culverts, surfacing crossings, constructing low water crossings, and removing unneeded crossings.

Approximately 0.5 mile of NFS maintenance level 2 (ML2) roads would be reclassified as maintenance level 1 (ML1) road once the project is complete (Table 6). ML1 roads are closed to all wheeled motor vehicle traffic, but retained on the NFS to facilitate future management activities. A total of approximately 0.4 mile of existing NFS road would be decommissioned as they are not needed for long-term future management and are currently influencing hydrologic function. Approximately 2.2 miles of NFS road would receive reconstruction maintenance prior to hauling.

Approximately 0.8 mile of unauthorized route would be upgraded to Forest transportation standards and added as NFS roads. These routes were determined to have long-term needs for future management.

Approximately 0.6 mile of these additions would be classified as ML 1 and thus closed to wheeled motor vehicle traffic at the conclusion of their use on this project. Approximately 0.2 mile of these additions would be classified as ML 2 and thus open for use by high-clearance vehicles. Approximately 1 mile of unauthorized route was determined to have no immediate or long-term future management needs and would be decommissioned.

Summary of Transportation Actions

Table 6: Summary of Transportation Actions.

Action	Miles
New Road Construction ML 1 (existing unauthorized route)	0.6
New Road Construction ML 2 (existing unauthorized route)	0.2
Decommission (existing NFS road)	0.4
Decommission (existing unauthorized route)	1.0
Reconstruction Maintenance (existing NFS Road)	2.2
Proposed Reduced Maintenance Level 1 (+)	0.5

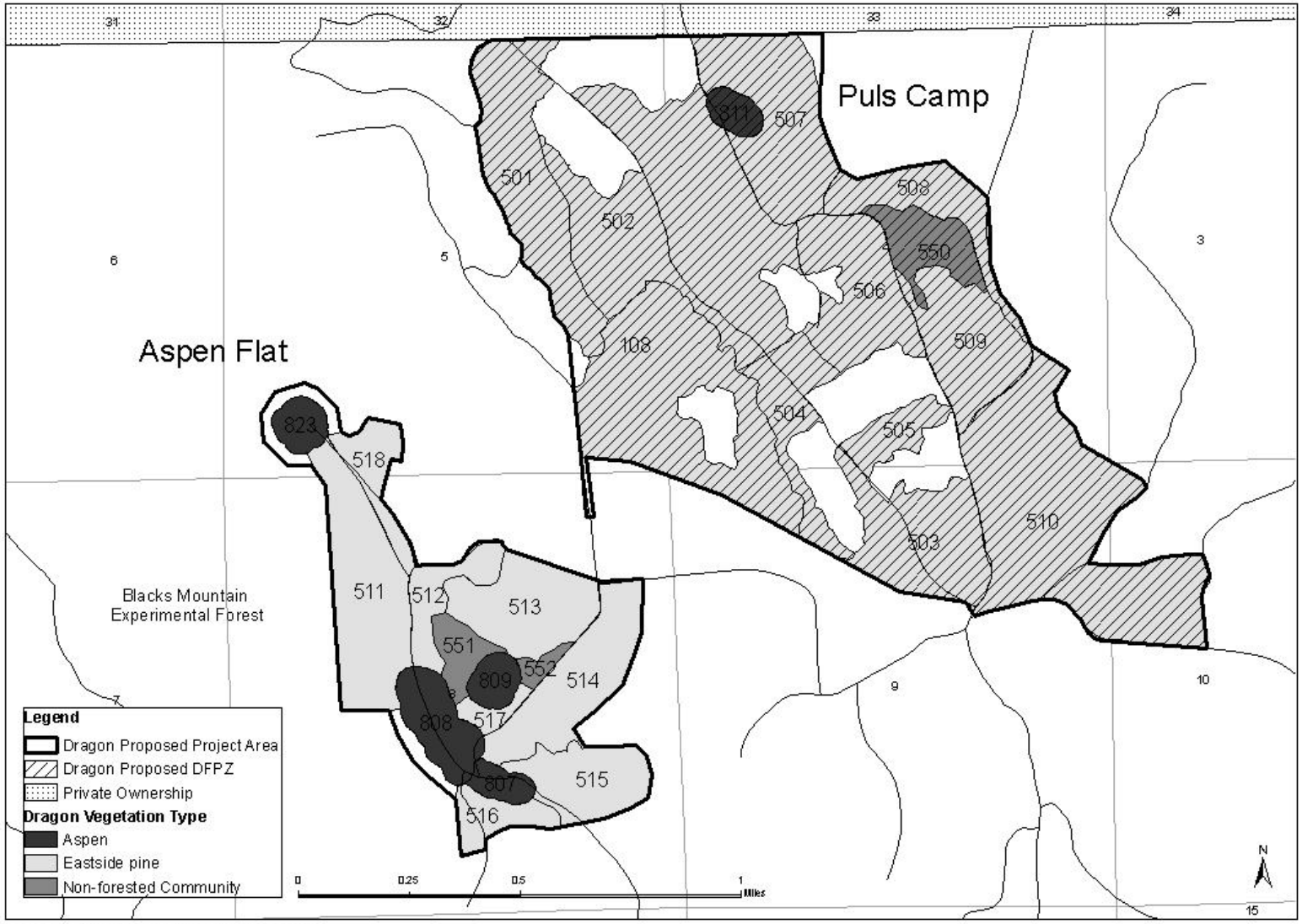
(+) Existing NFS Maintenance Level 2 road.
Source: Lassen National Forest Transportation GIS (Dragon Road Treatment), mileages are approximate.

All NFS roads used for hauling would receive pre, during, and post haul maintenance as per Forest Service Road Maintenance T-Specifications for Timber Sale Contracts as needed. The road maintenance on this project would supplement a forest road maintenance program that is currently under funded. A dust abatement plan would also be included to control wind-caused erosion from road use.

The proposed water source for this project would be White Horse Well located off of NFS road 33N04Y (T33N R8E SE ¼ Sec 33). This is a well pumped water source that conforms to the applicable Best Management Practices (BMP), and would continue to be maintained to current BMP standards.

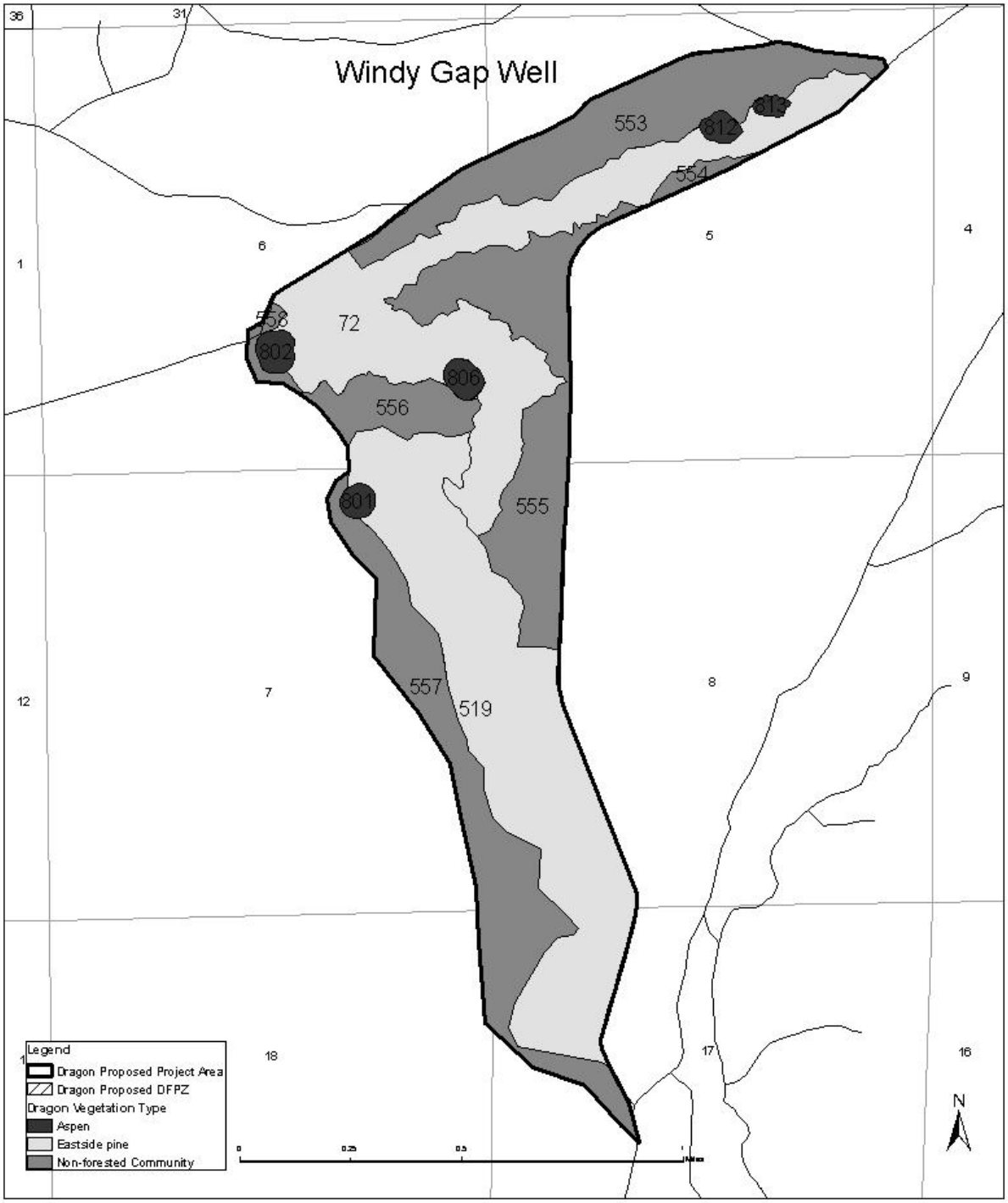
See Maps 4-6 for proposed transportation actions.

Map 1- Dragon Project Proposed Action, Fuels and Vegetation Treatments



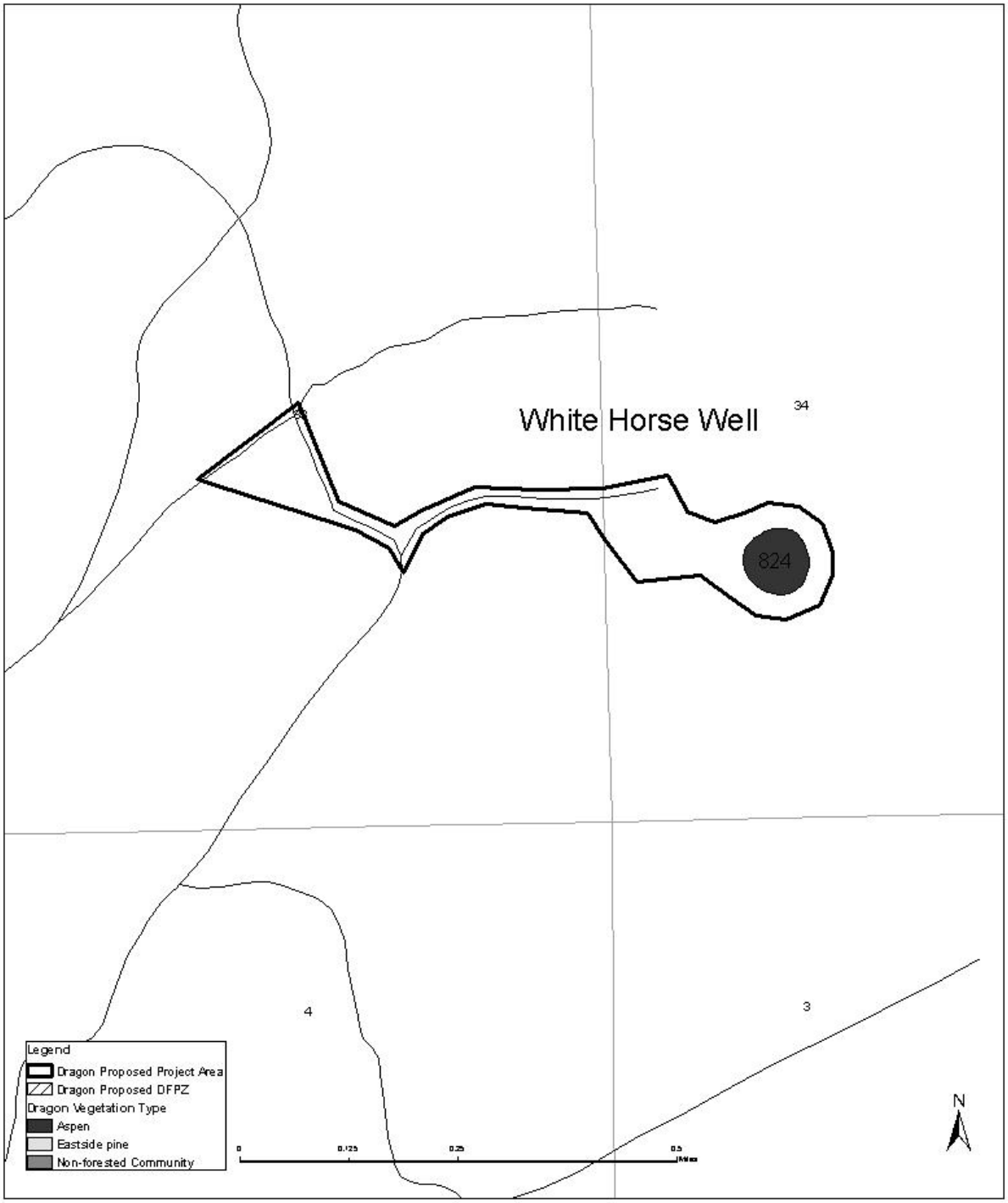
Source: ELRD GIS files, landlines are approximate

Map 2 - Dragon Project Proposed Action, Fuels and Vegetation Treatments



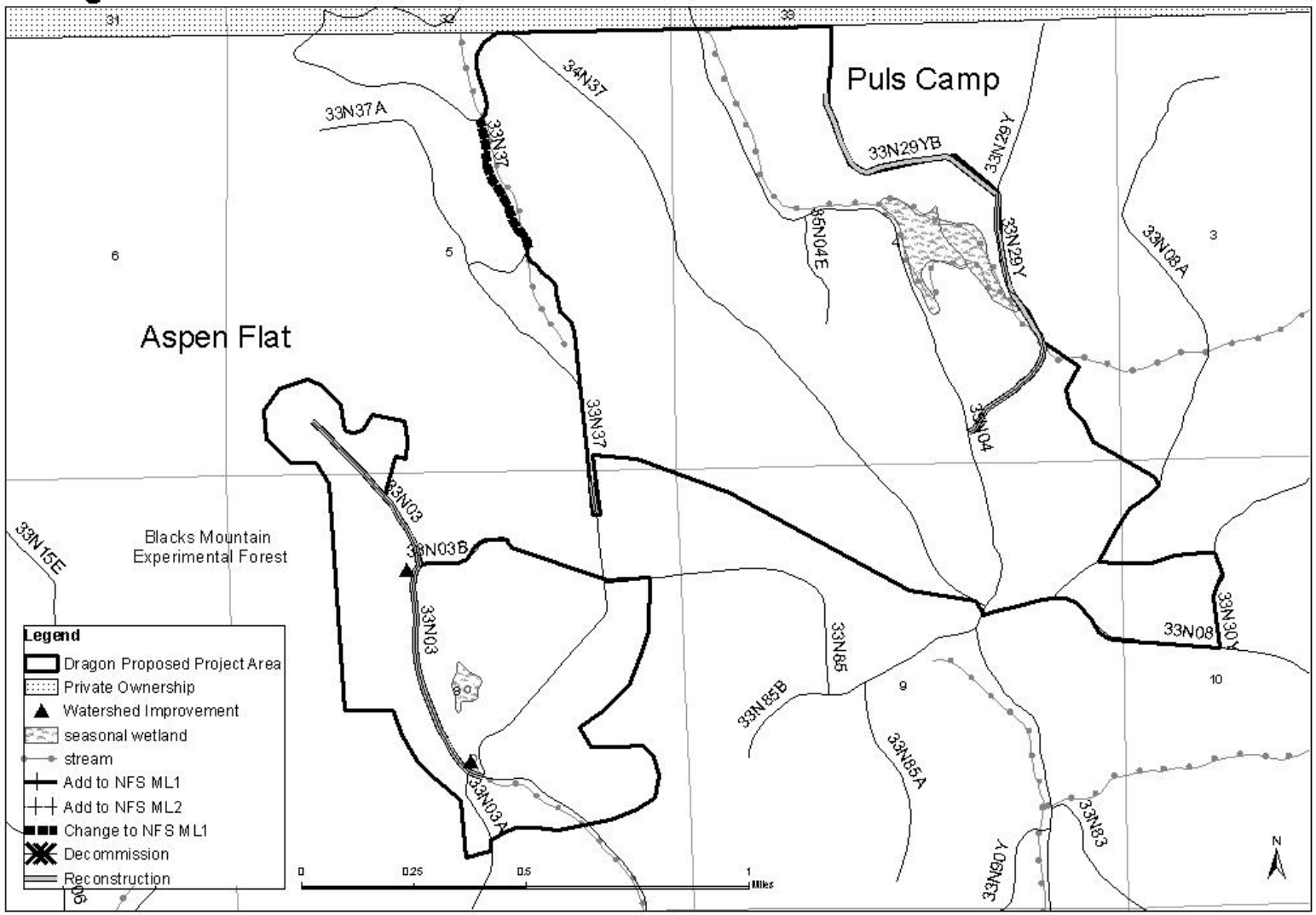
Source: ELRD GIS files, landlines are approximate

Map 3 - Dragon Project Proposed Action, Fuels and Vegetation Treatments



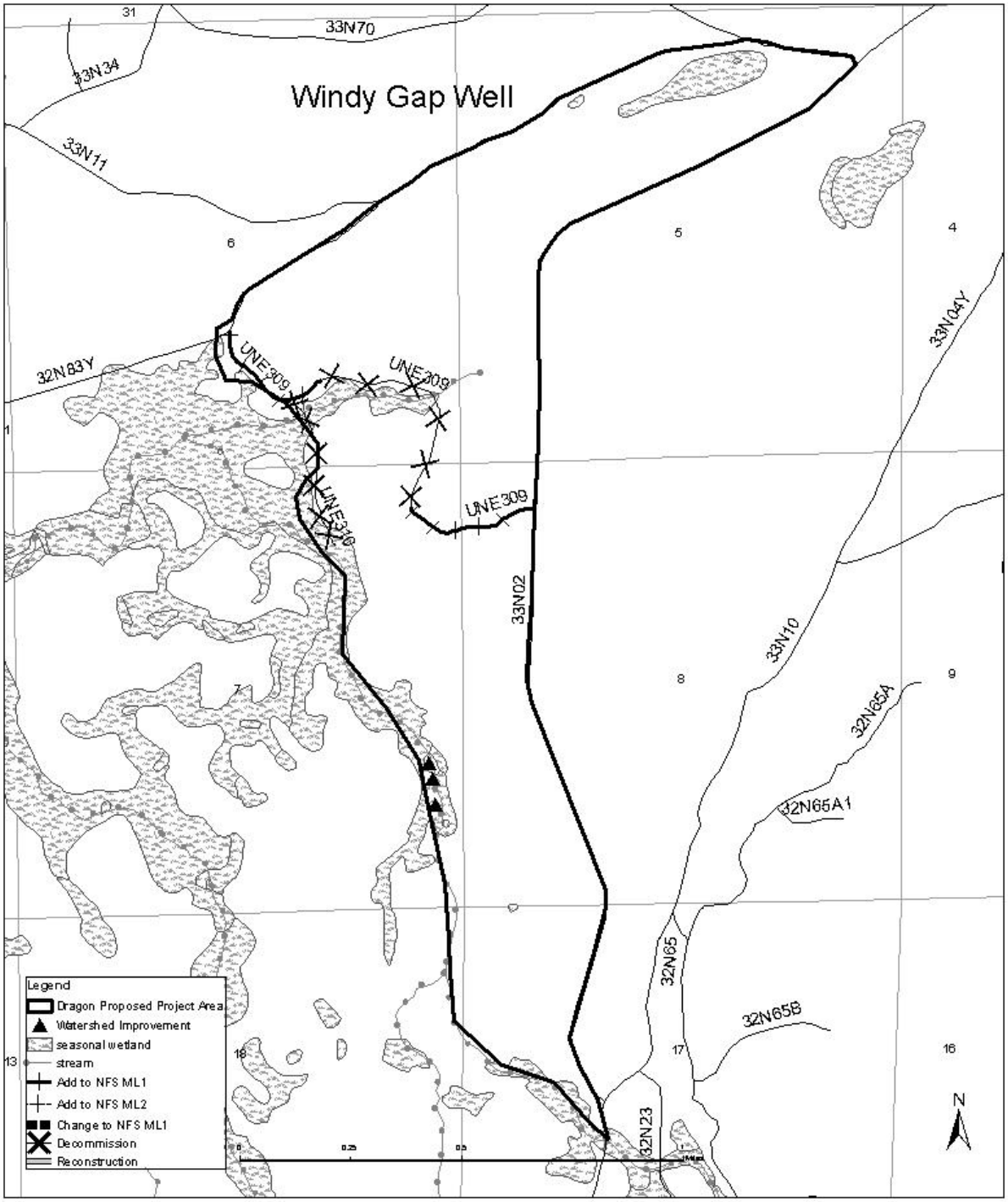
Source: ELRD GIS files, landlines are approximate

Map 4- Dragon Project Proposed Action, Watershed Improvements and Transportation Management



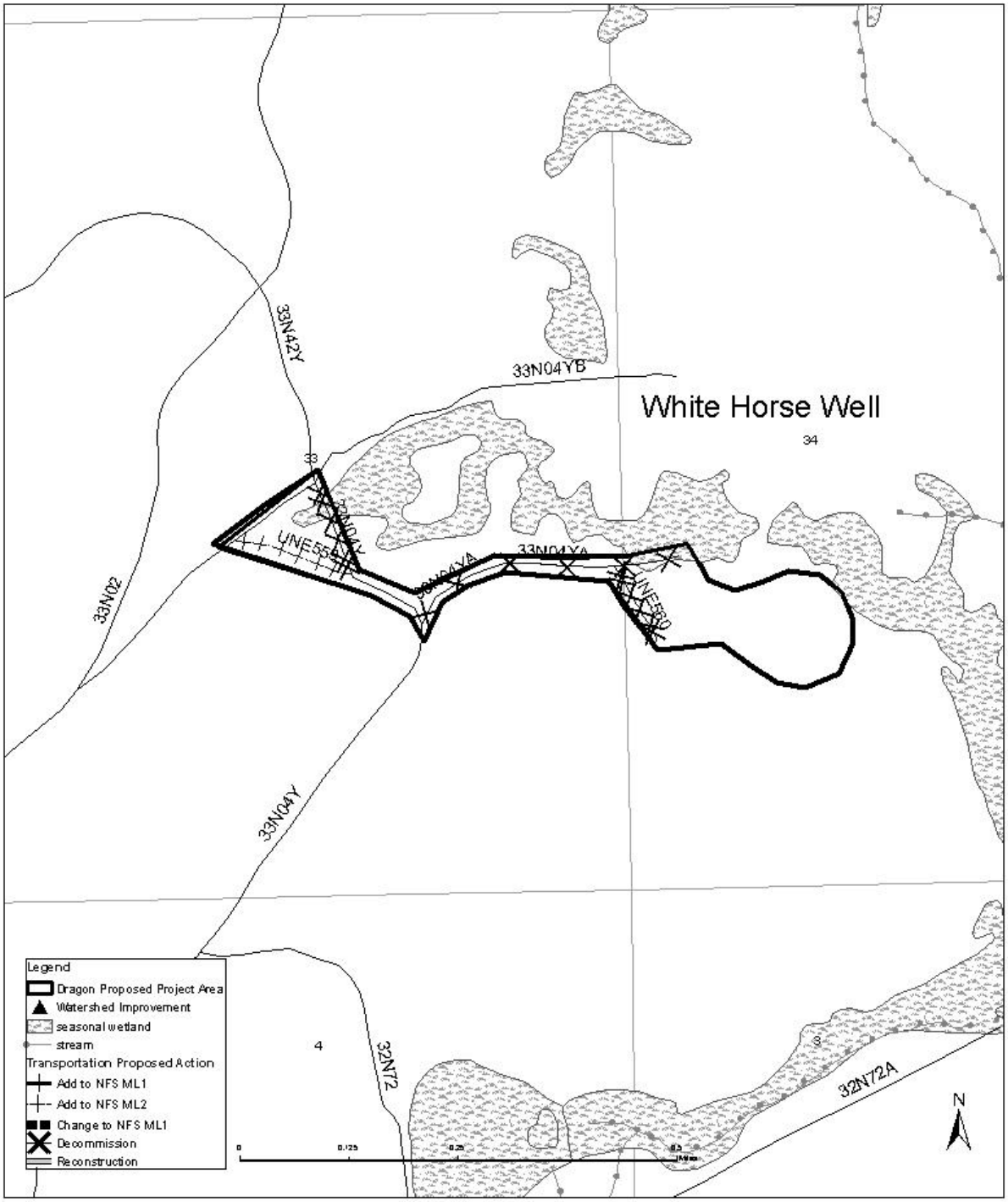
Source: ELRD GIS files, landlines are approximate

Map 5- Dragon Project Proposed Action, Watershed Improvements and Transportation Management



Source: ELRD GIS files, landlines are approximate

Map 6 - Dragon Project Proposed Action, Watershed Improvements and Transportation Management



Source: ELRD GIS files, landlines are approximate

Integrated Design Features

The following are the integrated design features (IDF) that would be incorporated as part of the proposed action to minimize any possible negative effects of this proposal.

Cultural Resources

1. All historic properties eligible or potentially eligible for listing on the National Register of Historic Places (*i.e.*, Class I and Class II properties) within treatment areas would be protected by employing Standard Resource Protection Measures (SRPM) as defined in the *Regional Programmatic Agreement and Interim Protocol*. Cultural site boundaries would be flagged as non-entry zones for project activities (flag and avoid).
2. If cultural resources are encountered during project activities, all work would immediately stop in the vicinity of the find until an assessment of the situation is made.
3. Project treatments may occur within specific cultural sites with the approval and direction of a Cultural Resource specialist.
4. To avoid any subsurface disturbance, no decommissioning of roads via ripping is allowed through sites, ripping is allowed on road segments not within sites. Decommissioning of roads could also be achieved through placement of barriers, as long as they are not ground disturbing and outside site boundaries.

Fire and Fuels

5. Fire lines would be constructed for prescribed fire operations, except where existing roads, skid trails, or natural barriers would serve as control lines. Hand lines would not be constructed within Riparian Conservation Areas (RCAs) and wet meadow areas where graminoid and forb indicator species of a wet site are present (*e.g.*, *Juncus balticus* or *Polygonum bistortoides*).
6. Pile burning and ignition for underburning would not occur within wet or dry meadow areas; or where graminoid and forb indicator species of a wet site are present (*e.g.*, *Juncus balticus* or *Polygonum bistortoides*); however, low intensity fire would be allowed to back into portions of these meadows.
7. Where riparian communities are established, minimize disturbance to riparian vegetation and retain sufficient ground cover by conducting prescribed fire in a manner which limits the intensity of fire.

Invasive Plants

8. All off-road equipment would be weed-free prior to entering the Forest. Staging of equipment would only be allowed in weed-free areas.
9. New small infestations identified prior to or during project implementation would be evaluated and treated according to the species present and project constraints and avoided by project activities. If larger infestations are identified, they would be isolated and avoided by equipment, or equipment used would be washed after leaving the infested area and before entering an uninfested area.
10. Post-project monitoring for implementation and effectiveness of weed treatments and control of new infestations would be conducted as soon as possible and for a period of multiple-years after completion of the project.
11. Follow-up piling and fuels treatment would occur only in weed-free areas.

12. If project implementation calls for mulches or fill, they would be certified weed-free.
13. Seed mixes used for revegetation of disturbed sites would consist of locally adapted native plant materials to the extent practicable.

Range

14. Livestock management would be adjusted to allow for herbaceous vegetation response following proposed treatment. Site-specific changes to grazing management may include but are not limited to deferred grazing, complete rest, temporary fencing, and/or other means for distributing livestock away from treatment areas.
15. Fences, water developments, and cattle guards would be protected. The contractor would be responsible for the repair of damage to structural range improvements, caused by project activities.

Riparian Conservation Areas and Water Quality Protection Measures

RCA widths are allocated along all seasonally flowing streams, both ephemeral and intermittent; wetlands; and wet meadows in accordance to the 2004 SNFPA ROD, as described in Table 7.

Table 7: Riparian Conservation Area widths within the Dragon project area.

RCA Category	RCA Width[1]	Water body in Dragon project area
Perennial Streams	300' on each side of the stream, measured from bank full edge of the stream.	None in project area.
Seasonally flowing streams (intermittent and ephemeral)	150' on each side of the stream, measured from the bank full edge of the stream.	Puls Camp Creek and other unnamed streams.
Special aquatic features	300' from the edge of the feature or riparian vegetation, whichever is greater.	Unnamed seasonal wetlands, wet meadows, and springs.

Source: 2004 SNFPA ROD. Note: 1) The width of RCAs may be modified for site-specific conditions as recommended in the Dragon Project Area Watershed Assessment/Landscape Analysis.

16. A minimum 10-foot "no mechanical equipment" buffer would be designated along seasonal streams.
17. In RCAs of streams and special aquatic features the following IDFs would be implemented in order to meet Riparian Conservation Objectives (RMORCO):
    - Soils must be dry at the 12-inch depth (15 bars of tension) in the Aspen Flat area (*addition: White Horse Well also)* and at the 10-inch depth in the Puls Camp and Windy Gap Well areas before heavy equipment could be operated in these areas.
    - Landings would be located outside of RCAs, meadows, and special aquatic features. Existing landings within RCAs would not be used.
    - Conifers would be harvested with feller-bunchers that have 24-inch or greater track widths.

- Turning of equipment would be minimized.
- Ground-based equipment would be kept off areas with slopes greater than 20 percent within RCAs.
- Skid trails would be kept to a minimum and no waterbars would be installed after treatment. Stream and meadow crossing locations would be agreed to and designated on the ground prior to use.
- Ground-based equipment would be used to remove timber using one-end suspension.
- Skid trails within RCAs would require 90 percent of existing ground cover on bare soil on the trails. Insuring placement of this cover after treatment would require spreading slash over these open areas.
- Conifers necessary for stream bank stability would be retained.

18. Machine piling would not occur in RCAs.
19. In the Aspen Flat area, hand piling of burn piles may occur beyond the inner 30 feet of RCAs. In RCAs with non-fish aquatic species habitat hand piling between the inner 30 and 50 feet of the RCA may occur if piles are no more than 10 feet in diameter and 5 feet high and no more than 10 percent of the area within the inner 50 feet of the RCA is covered in piles.

Silviculture

20. All stumps 14 inches in diameter and greater would be treated in all vegetation types except aspen, with either Sporax® or Cellu-Treat® to prevent the spread of annosus root disease. No Sporax or Cellu-Treat would be applied within 25 feet of known special interest plants, or streamcourses, and special aquatic features, shown on the contract map.

Soil Quality Standards and Best Management Practices

21. Soil quality standards and appropriate Best Management Practices (BMP) that protect forest soils would be implemented for the entire project. BMPs are described in *Water Quality Management for Forest System Lands in California, Best Management Practices* (2011), LNF LRMP (1993), and the 2004 SNFPA ROD.
22. In treatment units outside of RCAs, soil moisture conditions would be evaluated using Forest established visual indicators before equipment operations proceed. Lassen National Forest Wet Weather Operations and Wet Weather Haul Agreements would be followed to protect the soil and transportation resources.
23. Areal extent of detrimental soil disturbance would not exceed 15 percent of the area dedicated to growing vegetation. Soil porosity would be at least 90 percent of undisturbed conditions
24. Following implementation, the project site would be evaluated by a qualified specialist to determine if detrimentally compacted ground exceeds the LRMP standard of 15% areal extent. If restoration is needed to achieve compliance an appropriate subsoiler, ripper or other implement would be used to fracture the soil in place leaving it loose and friable. Landings no longer needed for long-term management would be remediated as described. Where landing construction involved cut and fill, the landing would also be re-contoured to match the existing topography.
25. To the extent possible, existing landings and skid trails would be utilized.
26. Mechanical equipment would not operate on slopes greater than 35 percent.

Threatened, Endangered, and Sensitive (TES) Plant Species

27. Occurrences of *Juncus hemiendytus* var. *abjectus* would be flagged and avoided by all timber harvest activities and locations displayed as control areas on contract maps where they occur adjacent to forested stands. Pile burning and ignition for underburning would not occur within occurrences of *Juncus hemiendytus* var. *abjectus*, although low intensity fire would be allowed to back into these areas.
28. Prescribed fire would not be ignited or forced through low sage plant communities, although low intensity fire would be allowed to back into these areas. Ignitions adjacent to these habitats would not occur within a 25 foot buffer around these habitats.
29. During ground disturbing activities, allow treatment within *Mimulus pygmaeus* occurances only during dry soil conditions. Slash piles would be located outside known *Mimulus pygaeus* occurrences. Pile burning and ignition of prescribed fire would be avoided in these areas.
30. New occurrences of TES plant species and special interest species discovered before or during ground-disturbing activities would be protected through flag and avoid methods (with the exception of *Astragalus inversus*, for which no special protections would be required).

Wildlife

31. Sandhill crane nest sites: a LOP would be observed up to one-half mile of nesting sites from April 1 through August 1, unless surveys confirm that sandhill cranes are not breeding.
32. Northern goshawk habitat: LOPs (February 15 through September 15) would be observed in unsurveyed suitable goshawk habitat.

Alternative 2: No Action

Under the No Action alternative, the current LRMP, as amended, would continue to guide management within the project area. No treatment activities would be implemented to accomplish project objectives. The No Action alternative provides a baseline for comparative analysis of the action alternatives. Although there would be no action to treat vegetation under this project, other activities in the Dragon project area such as road maintenance, fire suppression, fuelwood cutting, grazing, hunting, and OHV riding would continue.

Public Involvement

The following list outlines the public involvement process for the Dragon Project:

- The project has been listed in the Lassen National Forest Schedule of Proposed Actions (SOPA) since July 2012.
- The project proposal was discussed with the Susanville Indian Rancheria on January 11, 2012 and December 3, 2012.
- The project proposal was discussed with the Lassen County Fish and Game Commission on January 19, 2012.
- The project was presented to the Lassen Fire Safe Council in February 2012 and February 2013, and has been incorporated into the *Lassen County Community Wildfire Protection Plan*.
- The project proposal was discussed with the range permittees from the area in July 2012.
- The project proposal was discussed with Pit River Tribe on October 3, 2012 and February 13, 2013.

Scoping

Scoping for this project was initiated on August 7, 2012. Individuals and groups that expressed interest in response to the SOPA were mailed a copy of the scoping document for this project. Six individuals/organizations responded in writing. All suggested changes to elements of the proposed action received from the public were considered. The analysis of the public comments is contained in the document titled "*Dragon Project Public Scoping Issue Analysis and Alternative Development*" (located in the Dragon Project Record, ELRD office).

Issues

The Forest Service separated issues into two groups: significant and non-significant issues. Significant issues are defined as directly or indirectly caused by implementing the proposed action. Non-significant issues are defined as : 1) outside the scope of the proposed action; 2) already decided by law, regulation, Forest Plan, or other higher level decision; 3) irrelevant to the decision to be made; or 4) conjectural and

not supported by scientific or factual evidence. The Code of Federal Regulations (40 CFR Part 1501.7(3)) of The Council on Environmental Quality's (CEQ) NEPA regulations requires us to: "Identify and eliminate from detailed study the issues which are not significant or which have been covered by prior environmental review…" No significant issues were identified from the public scoping comments. Treatment of the one issue raised in scoping with an explanation as to why it was not considered significant is contained in the project record (see *Dragon Project Public Scoping Issue Analysis and Alternative Development* document).

Alternatives Considered but Eliminated from Detailed Study

In addition to the No Action and the action alternative analyzed in detail for this project, a third alternative (a non-commercially funded fuels alternative) was initially analyzed and considered. Alternative 3 was developed based on direction in the Memorandum and Order dated 11/03/2009 from Judge Morrison C. England, United States District Court, during the remedy phase in the complaint of Sierra Forest Legacy vs. Mark Rey. This direction requires that a detailed consideration of a non-commercially funded (fuels reduction) alternative be included for all new fuels reduction projects not already evaluated and approved as of the date of the Memorandum and Order. The requirement to develop this alternative is in effect until the agency remedies the deficiencies of the programmatic 2004 Sierra Nevada Framework or a supplemental EIS is completed, whichever came first[3].

The intent of this alternative was to meet desired fire behavior conditions by reducing surface, ladder, and crown fuels. Specific objectives included reducing predicted flame lengths, probability of crown fire initiation and spread, and predicted mortality within the stand. Desired conditions would be achieved through a combination of thinning and prescribed fire, so that wildland fire burning under 90th percentile weather conditions would produce, on average, a flame length of four feet or less. Surface fuels would be reduced using prescribed fire. Ladder fuels would be reduced by thinning from below to raise the canopy base height to a level that would prevent or greatly reduce the likelihood of a surface fire transitioning into the canopy. Canopy fuels would be reduced by thinning to a level that achieves adequate crown separation to decrease canopy bulk density and reduce crown continuity, to a level, which would reduce the chance of an active crown fire.

As directed Alternative 3, which focused solely on achieving desired fuel conditions, was fully developed. As with Alternative 1, the FVS program was used to model both silvicultural and fuels attributes: fire behavior (fire type, flame length, and torching and crowning indices) and stand characteristics (crown bulk density, canopy base height, trees per acre, basal area, etc.). These data runs can be found in the Dragon Project Record.

[3] A decision in this case was filed on April 15, 2013 for this case in favor of the USDA. With this decision, it is no longer required to analyze this alternative. The analysis of this alternative had been completed by the time the decision was filed. It was decided to include this analysis in the EA, as it was originally considered.

The design of Alternative 3 was similar to Alternative 1 in terms of dealing with surface and ladder fuels. However in order to fully meet the desired fuel conditions for canopy reduction overall more trees need to be removed than for Alternative 1. This is a result of the nature of the existing stand structure of a majority of the stands in the Puls Camp and Aspen Flat area of the project. As previously discussed these stands are comprised of very few overstory trees and a large number of smaller diameter ladder fuels, with a majority being white fir.

Modeling indicated that to meet fuels crowning objectives in the Puls Camp area seven of the eleven stands remove more trees in Alternative 3 then Alternative 1. The remaining four stands remove the same amount of trees to meet all fuels objectives. Puls Camp is part of the DFPZ network, so the crowning objectives are emphasized (Fire and Fuels Report). In Aspen Flat, three of the seven stands remove more with Alternative 3 compared to Alternative 1.

One of the standards and guidelines set forth in the 2004 SNFPA ROD states in eastside pine type "design projects to retain 30 percent of the existing basal area". Alternative 3 would not meet this standard for two stands in two stands in the Puls Camp area. If the prescription required to achieve the fuels objectives for these stands were implemented, BA would be reduced below 30 percent of existing, violating management direction. Implementation of Alternative 3 would reduce densities within stands with an upland pine and white fir component to below the desired silvicultural condition.

Alternative 3 is being addressed within the Silviculture and the Fire and Fuels Report however, based on the discussion above the Decision Maker has decided not to carry Alternative 3 through the full IDT analysis, and was dropped from further consideration. With stands of this nature with a large proportion of small diameter white firs, it is near impossible to come up with a "non-commercial" alternative that meets all fuels objectives, including crown fuels (Fire and Fuels Report).

Alternatives suggested during the scoping process were also considered. Alternatives not considered in detail may include, but are not limited to, those that fail to meet the purpose and need, are technologically infeasible or illegal, or would result in unreasonable environmental harm. Descriptions of alternatives considered from scoping and the reasons for their elimination from detailed study are contained in the document titled *Dragon Project Public Scoping Issue Analysis and Alternative Development,* located in the Dragon Project record.

Decision to be Made

The decision to be made is whether to implement the Proposed Action as described above, an alternative that better responds to the Purpose and Need, or the No Action Alternative.

A decision on DFPZ maintenance would not be made at this time. Treatments of stand structures are designed to be effective for a minimum of 10 years, with a desired target efficacy of approximately 20 years. Therefore, in the effects analysis for this project, effectiveness of the proposed actions has been considered to a time 20 years into the future. Future DFPZ maintenance actions in proposed treatment

areas would be analyzed separately and site-specially, in compliance with the National Environmental Policy Act.

Environmental Consequences

This section describes the environmental impacts of the alternatives in relation to whether there may be significant environmental effects as described in 40 CFR 1508.27. The following documents are summarized in this EA and are available upon request and are hereby incorporated by reference into this assessment:

- Silviculture Report for the Dragon Project; Harrison-Smith, July 29, 2013 (Silviculture Report)
- Dragon Project, Report for Fire and Fuels; Lewis, August 7, 2013 (Fire and Fuels Report)
- Management Indicator Species Report, Dragon Project; Rickman and Vandersall, August 7, 2013 (MIS Report)
- Biological Evaluation for the Dragon Project; Rickman and Vandersall, August 7, 2013 (BE)
- Dragon Project, Range Report; Pasero, August 5, 2013 (Range Report)
- Biological Evaluation and Assessment for R5 Forest Service Sensitive and Federally Listed Plant Species, Dragon Project; Kellison and Sanger, August 7, 2013 (Botany BE/BA)
- Dragon Project, Hydrology Report; Blaschak, August 6, 2013 (Hydrology Report)
- Dragon Soil Resource Report; Peters, August 2013 (Soils Report)
- Cultural Resources Report, Dragon Project; Gudiño, August 5, 2013 (Cultural Report)
- Dragon Project, Transportation Report; Nagel, August 5, 2013 (Transportation Report)
- Dragon Project, Recreation and Visual Resources; Harrison-Smith, August 5, 2013 (Recreation and Visual Resources Report)

Additional documents used for the Dragon project are also available upon request and are hereby incorporated by reference into this assessment, including the following:

- Migratory Landbird Conservation on the Lassen National Forest, Dragon Project Assessment; Rickman, August 7, 2013 (Migratory Landbird Assessment)
- Dragon Project, Noxious Weed Risk Assessment; Kellison and Sanger, August 7, 2013 (Noxious Weed Risk Assessment)
- Ecology Report for Forest Understory Response, Meadow, and Aspen; Jones, August 5, 2013 (Ecology Report)
- Transportation Analysis Process documentation, Dragon Project (TAP), May 2012
- Watershed Assessment, Dragon Project; Harrison-Smith, June 2012 (WA)
- Past, Ongoing, and Reasonably Foreseeable Future Actions Report for Dragon Project (PORFFA), June 2012

Further analysis and conclusions about the potential effects are available in the above reports and other supporting documentation located in the project record. The following sections are discussions of

resources that have relevance to a determination of significance. The cumulative effects boundary for each resource was the Dragon Project area, unless otherwise defined as follows.

Hydrology considered effects within the Puls Camp, Aspen Well, and Gray's Valley sub-watersheds that overlap a portion of the project area.

For Pacific tree frog, the cumulative effects analysis area for wet meadow habitat is the project area plus the portions of the Puls Camp, Aspen Well, and Gray's Valley sub-watersheds that feed the seasonal wet meadows with portions of the wet meadows in the project area.

Effects for the California spotted owl were analyzed using a combination of the project area plus the area within a 2400 acre home range core area (HRCA) and protected activity center (PAC) adjacent to the project area.

Explanation and maps of these cumulative effects analysis areas can be found in the *Past, Ongoing, and Reasonably Foreseeable Future Activities* (PORFFA) report, located in the Dragon project record, hereby incorporated by reference.

Silviculture

A summary of the stand data modeled using the Forest Vegetation Simulator (FVS) program (USDA FS) for the existing condition and the proposed vegetative treatments under Alternatives 1 and 3 and an explanation of the indicators can be found in the project record in the Silviculture Report. Averages of stand attributes are displayed below in Table 8.

Table 8: Summary of average stand attributes in eastside pine stands for Alternatives 1 and 3.

Stand Type	Condition	TPA	BA	SDI	QMD	%CC	CWHR
Puls Camp	Existing (Alt 2)	507	147	298	8.5	53	3P, 3M, 3D, 4P, 4M
	Post-Treatment: Alt 1	80	77	125	13.7	27	3S, 3P, 4S, 4P
	Post-Treatment: Alt 3	63	69	108	14.8	23	3S, 4S, 4P
Aspen Flat	Existing (Alt 2)	230	129	228	11.3	44	3P, 3M, 4P, 4M
	Post-Treatment: Alt 1	68	88	133	17.0	28	4S, 4P
	Post-Treatment: Alt 3	65	88	150	17.0	31	4S, 4P, 4M
Windy Gap Well	Existing (Alt 2)	83	103	159	15.0	35	4P, 4M
	Post-Treatment: Alt 1	34	70	99	19.3	23	4S, 4P
	Post-Treatment: Alt 3	48	92	132	19.1	30	4S, 4M

Source: Dragon Stand Exam data modeled with Forest Vegetation Simulator program, Eagle Lake Ranger District. Note: TPA = trees per acre, BA = square feet of basal area per acre, QMD = quadratic mean diameter in inches, %CC = percent canopy closure, SDI = stand density index, CWHR = California Wildlife Habitat Relationship, a classification of trees ≥5" dbh where size class 3 = 6.0-10.9", size class 4 = 11.0-23.9", and size class 5 = 24"+ QMD and where canopy closure S = sparse or 10-24%, P = open or 25-39%,M = moderate or 40-59%, D = dense or greater than 60%.

Alternative 1

Implementing Alternative 1 would result in residual stand structures of primarily open stands comprised of large trees with relatively lower stand densities. Post-treatment vegetative cover within the project area would remain primarily eastside pine and the percentage of white fir would decrease within the timbered stands.

In Alternative 1, which primarily involves mechanical tree removal, legacy trees and healthy fire-resistant dominant and co-dominant overstory trees would typically be retained. The proposed variable density thinning in Alternative 1 targets smaller diameter trees for removal, though some trees in most size classes would be retained throughout all stands to provide for vertical heterogeneity. As compared to the existing condition, the resulting quadratic mean diameter (QMD) is projected to increase for all stands post-treatment. Diameter distributions by size classes can be seen in the Silviculture Report, with comparisons of pre- and post-treatment distributions. With the proposed action, the existing snag and down log attributes are not expected to change as a result of harvest.

Implementing the proposed actions would improve stand health in all eastside pine stands, particularly by having reduced stand densities for all treatment areas. These would be stocked stands with available growing space and resources such that inter-tree competition does not affect stand growth for a period of generally 10 to 20 years or more.

The non-forested communities would be enhanced as a result of Alternative 1, though there may be scattered trees remaining that are greater than 30 inches dbh or are legacy trees. Local data indicates that by removing conifers from these non-forested systems, meadow-type herbaceous and shrub communities would be enhanced, improving soil moisture and water storage.

Removal of conifers within the aspen communities would increase light availability, providing the proper growth environment for young aspen. Fencing would protect the aspen regeneration from browsing to allow suckers to grow above the browse line to successfully recruit future aspen cohorts. Alternative 1 would enhance aspen regeneration and improve the ecological services and functions provided by functioning aspen communities (Ecology Report).

All stands under Alternative 1 would have varying degrees of canopy reduction. Herbaceous understory vegetation exhibits greater growth, higher productivity, and higher species richness and diversity when competing overstory is reduced (see the Ecology Report). Therefore, throughout the project area, an herbaceous understory response would be expected as there is an incremental increase in herbaceous cover as canopy cover is reduced. Based on this relationship the greatest understory response would be seen within the openings in all stands, and in the meadow and sagebrush communities. Additionally, openings in the canopy created by the variable density thinning would recruit desired shade-intolerant conifer species.

The need to prevent the spread of annosus root disease within the project area would be met by the application of Sporax® or Cellu-Treat® to cut stumps of all live conifer trees equal to or greater than 14

inches stump diameter. When applied properly, the use of borax has been shown to be up to 90 percent effective at preventing new infections of annosus root disease on stump surfaces (Schmitt *et al*. 2000). The USDA Forest Service prepared a final report entitled *Human Health and Ecological Risk Assessment for Borax (Sporax)* in 2006. When properly applied, the risk associated with the use of Sporax to the environment and human health is negligible.

Due to volumes predicted to be removed in sawlog and biomass, the alternative alone would not be considered a cost-effective action. However, the Dragon project could be sold with another district timber sale that has a positive cash flow to create a cost-effective action for the Federal Governement (Economic Analysis, Silviculture Report). The project would have a positive socio-economic impact to the forest products industry, its employees, and local communities.

Cumulatively the thinning prescriptions proposed in Alternative 1 were designed to initiate management efforts to meet the purpose and need for the project by modifying the forest structure to have lower tree density, a higher proportion of fire-resistant tree species, more vertical and horizontal heterogeneity in the arrangement of trees, and reduced/rearranged surface, ladder, and canopy fuels in all stands. This strategy would improve forest health across the landscape by reducing stand densities, reducing fire hazard, and increasing resiliency to inherent disturbances in this area. Utilizing fire as an ecological process to supplement the modified forest structure created by the thinning prescriptions would maintain the forest structure, as well as enhance understory vegetation communities within a natural range variability that resembles desired landscape conditions. In addition, these treatments should enhance the ecological services and functions provided by the understory vegetation by enhancing plant diversity and creating a floristically rich and productive understory that may support healthier populations of primary consumers (nectivores, frugivores, birds, etc.) and increasing hiding cover for fawns (see the Ecology Report). The proposed actions would have a long-term effect of increasing the duration of soil moisture availability to plants during the growing season, further contributing to a healthy, forested ecosystem (see the Ecology Report).

Alternative 2

Existing stand conditions would persist and develop unaltered by active management. By deferring silvicultural treatments, an opportunity to reverse post-settlement trends and to enhance and maintain the legacy components in these fire-suppressed stands would not occur. The horizontal and vertical continuity of surface, ladder, and canopy fuels would remain intact in the absence of fire and other naturally occurring disturbances that would cause mortality within the project area. Accumulation of fuels would continue to occur in the absence of fire. Stands would remain densely stocked, increasing in susceptibility to loss from insects, disease, and stand-replacing fires.

The existing stand structure promotes a low, diffuse light environment where understory conditions may be characterized by partial to complete shade. The herbaceous understory component would continue to decline in the absence of naturally occurring disturbance. Existing aspen would remain at risk of loss

from competition from encroaching conifers, and little regeneration is likely in the absence of suitable regeneration conditions. Ecological benefits provided by aspen communities which include biodiversity, forage, habitat, understory plant communities and conservation of riparian soil would continue to be lost as the aspen component decreases on the landscape. Restoration activities designed to enhance non-forested communities would not occur; there would be no increase in understory diversity and cover or improvement of riparian function. Fire-resistant, shade-intolerant tree species within the project area would continue to decline in comparison to the proportion of species that are less resistant to wildfire, such as white fir. The forest structure within these areas would follow the same trajectory of increased forest density and canopy cover as adjacent stands.

Fire and Fuels

Alternative 1

The thinning and prescribed fire treatments under Alternative 1 would have the effect of reducing the surface, ladder, and canopy fuel loadings. These reductions would result in lower flame lengths, higher canopy base heights, and increased torching and crowning indices. Combined, these changes would result in reduced first order fire effects and a reduced potential for a surface fire to transition into a passive or active crown fire. A more detailed explanation of these indicators is found in the Fire and Fuels Report.

Table 9: Summary of effects under Alternative 1 for reducing fire behavior.

Windy Gap Well					
Effects Indicators	Existing Condition		Post Treatment		Desired Conditions
	Average	Range	Average	Range	
Flame length	8	7 - 8	3	3†	< 4 ft.
Fire Type	Surface	Surface	Surface	Surface	Surface
Canopy Base Height	24	16 to 32	38	37 to 38	15 – 25 ft.
Torching Index	31	13 to 48	137	133 to 141	> 30
Crowning Index	51	43 to 59	69	53 to 85	> 35
Aspen Flat					
Effects Indicators	Existing Condition		Post Treatment		Desired Conditions
	Average	Range	Average	Range	
Flame length (feet)	20	7 to 41	3	3†	< 4 feet
Fire Type	Passive Crown	Surface to Passive Crown	Surface	Surface	Surface
Canopy Base Height	12	4 to 37	28	16 to 50	15 – 25 ft.
Torching Index	14	0 to 63	103	56 to 198	> 30
Crowning Index	29	15 to 44	43	22 to 82	> 35
Puls Camp (DFPZ)					
Effects Indicators	Existing Condition		Post Treatment		Desired Conditions
	Average	Range	Average	Range	
Flame length	40	8 to 92	3	3 to 4	< 4 ft.
Fire Type	Passive Crown	Surface to Active Crown	Surface	Surface	Surface
Canopy Base Height	8	5 to 18	20	16 to 26	15 – 25 ft.
Torching Index	5	1 to 16	71	52 to 89	> 30
Crowning Index	21	8 to 43	38	26 to 56	> 35

Source: Fire behavior outputs from FFE-FVS. Note: Fuel model Timber-Understory #5 (Alternative 2) represent existing conditions and Timber Litter #8 (Alternative 1) represents post treatment conditions††.

†Modeling indicates all stands within these vegetation types would have the same flame length, therefore range values are one value.

††Fuel model Shrub #1 represents post treatment conditions for stand 519 in the Windy Gap Well area.

Flame lengths of around four feet can be directly attacked by hand crews and engines, allowing faster fire line construction and generally resulting in less total acreage burned, as well as safer conditions for firefighters. Table 9 summarizes the predicted flame lengths following treatments as well as the desired flame lengths. The effects of the treatments would be successful in reducing flame lengths to the desired

levels, which would allow firefighters to use direct attack methods on fires occurring within the proposed treatment areas.

Table 9 also compares the torching and crowning indices of the various treatment types with those desired. The torching indices within all of the proposed treatment areas would be sufficient to meet desired levels and reduce the chance of torching and active crown fire, under 90th percentile weather conditions. The crowning indices are analyzed in all the proposed treatment areas with a fuels reduction objective. However, within a DFPZ, more emphasis is placed on achieving the desired CI when designing fuels treatments because the potential for an active crown fire is reduced when the CI is increased. A higher CI also increases the probability that an approaching crown fire would transition to a surface fire, which correlates to increased firefighter safety. Within the Aspen Flat and Puls Camp areas, the crowning indices for more than half of the stands proposed for treatment would be sufficient to meet the desired levels and reduce the potential of an active crown fire initiating or spreading. There are five stands within the DFPZ that fall short of meeting the desired condition, due to balancing silviculture and fuels objectives, even though the indices were increased when compared to the existing condition. After modeling the proposed treatments in FVS, some of the stands basal areas were taken below the desired silviculture conditions, in order to meet the desired CI. One of the standards and guidelines set forth in the 2004 SNFPA ROD states in eastside pine types "design projects to retain 30 percent of the existing basal area" (Silviculture Report). In order for the remaining stands to meet the desired CI, the treatments would have lowered the basal area below 30 percent of the existing condition, violating management direction. However, due to the combination of the increased CBH and TI, the reduced flame lengths, surface and ladder fuel loading, and CBD, and the placement of the stands within the project area, the lower CI within those stands would not compromise the overall effectiveness of the DFPZ to reduce torching and spread of an active crown fire throughout the Puls Camp area.

Cumulatively under Alternative 1, the proposed vegetative treatments would change the stand structures. These differences in structure would contribute to landscape-level diversity by creating areas of lower stand densities, reduced surface and ladder fuel loading, and reduced crown fuels. The diversity in forest structure created by these treatments and their spatial arrangement across the landscape may greatly reduce the growth of large fires. The combined proposed treatments would create a relatively open to moderately open forest structure, compared to the existing condition, where fuel loadings and arrangements would be altered to encourage low-intensity surface fires.

The combined effects of these treatments would increase the ability of fire suppression personnel to both safely and effectively limit the size of wildland fires while allowing for the reintroduction of fire to these areas under more moderate weather conditions. Suppression efficiency would be improved within the treatment areas by creating an environment where wildfires would burn at lower intensities and where firefighting production rates would be increased because less ground fuels and fewer small diameter trees would need to be cleared for fireline construction and backfiring operations. The thinning treatments from Alternative 1 would connect to the adjacent DFPZ treatments that have been completed and others that are planned. This interconnection would increase the effectiveness of the entire DFPZ network due to

increased acreage treated and it would minimize the ability of a fire to flank the treatment areas. The DFPZ network would provide a safer and more efficient environment for fire crews to stop wildland fires that could potentially spread and destroy private property, communities, watersheds, and wildlife.

Alternative 2

Under Alternative 2, the absence of fuels treatments and prescribed fire would allow continued increases in the fuel loading across the project area. Down woody material would continue to accumulate at a rate that is greater than decomposition. Absence of thinning and prescribed fire would allow continued in-growth of ladder fuels. As the canopies of stands become denser, and the surface and ladder fuel loads increase, anticipated fire behavior and effects would become more severe. These factors would cause an increase in the probability of stand replacement in the event of a wildland fire. Across the project landscape, Condition Class would remain in a state (Condition Class 3) that could result in the loss of key ecosystem components in the event of a large wildland fire.

Under 90th percentile weather conditions, predicted flame lengths in a wildland fire would be in excess of four feet over most of the project area. Flame lengths within the Dragon project area are predicted to average 8 feet and range from 7 to 8 feet in the Windy Gap Well area, average 20 feet and range from 7 to 41 feet in the Aspen Flat area, and average 40 feet and range from 8 to 92 feet in the Puls Camp area. The predicted flame lengths would create a situation where direct fireline attack would be prohibited and firefighters would have to employ indirect suppression methods. This would allow fires to become larger, more expensive, and potentially more hazardous for firefighters and the public. Associated smoke from a large, intense wildland fire could create both nuisance and health concerns in nearby communities for considerable durations (days or weeks).

Air Quality

Alternative 1

There would be no difference to Air Quality between actions proposed in Alternative 1. The project area lies within the Lassen County Air Pollution Control District (LCAPCD). In accordance with Title 17 of the California Code of Regulations, a smoke management plan would be required and would be submitted and approved by the LCAPCD prior to any prescribed fire ignitions that are part of Alternative 1. Adherence to the smoke management plan (SMP) for pile and understory burning would decrease the chance of negative impacts to communities and other smoke sensitive areas. It would also help to ensure that emissions from pile or understory burning would not violate the National Ambient Air Quality (NAAQ) emission standards. In addition to these safeguards, a daily Air Quality Conference Call is conducted during the prescribed fire season. These calls are attended by representatives of the Air Quality Management Districts, the California Air Resources Board, Geographical Area Coordination Center meteorologists, and agencies that are conducting prescribed fire operations. These calls help ensure that burning only occurs when atmospheric conditions are conducive to good smoke dispersion and that the cumulative effects of all prescribed burning remain at levels that are within the provisions of the Clean

Air Act. Fugitive dust from operations would be mitigated by standard contract requirements for road watering or other dust abatement techniques (Fire and Fuels Report).

Alternative 2

Alternative 2 would create no short-term impacts from smoke to the local areas because prescribed fire would not be implemented in the project area. However, the risk of a major air quality impact from a large wildland fire burning in the area would be increased under Alternative 2. The amount of smoke created, in the event of a large wildland fire burning in the project area, would be increased for several reasons. There would be more acres burned in a shorter period of time, and the fire could burn under hotter and drier conditions, so the amount of fuel available to be consumed would increase and fuels would burn that would otherwise have been removed under Alternative 1. Increased consumption of the canopy fuels, due to the more intense fire behavior, would also contribute to increased smoke production.

Additionally, smoke impacts to local communities would be more severe in the event of a wildland fire due to the normal summertime inversions. Inversions cause smoke to linger near the surface in low-lying areas and can last for extended periods, especially during summertime conditions. Summertime inversions have negatively impacted the area during years when large wildland fires burned, including 1977, 1987, 1992, 1999, and 2007 (Lassen National Forest fire history records).

Management Indicator Species (MIS), Terrestrial and Aquatic

The MIS whose habitat would be either directly or indirectly affected by the action alternatives of the Dragon Project and that were analyzed in the MIS report were: Pacific tree frog, mountain quail and hairy woodpecker. Due to a lack of direct effects to habitat factors of analysis for the MIS habitats and species analyzed for this project, Alternative 2, the No Action alternative, would serve primarily to continue long-term vegetative trends within the project area, and would not alter the existing trend in the analyzed habitats nor would it lead to a change in the distribution across the Sierra Nevada bioregion for any of the analyzed MIS species.

Summaries of the analyses of potential effects of the action alternative on analyzed MIS species and their habitats are provided below.

Pacific tree frog:

Alternative 1: There would be no change in acres of wet meadow nor changes to CWHR height class or ground cover class on the approximately 69 acres of wet meadow in the Dragon project. For Alternative 1, there are negligible short-term risks to hydrology from treatment of approximately 264 acres of wet meadow riparian conservation areas (RCAs) and up to 67 acres of seasonal wet meadows. There are potential long term benefits to approximately 18 acres of wet meadows from road decommissioning and

man-made structure recontouring. Considering the approximately 61,000 acres of wet meadow on USFS lands and small changes to habitat factors on limited acres, Altnernative 1 would not alter the existing trend in the habitat, nor will it lead to a change in the distribution of Pacific tree frogs across the Sierra Nevada bioregion.

Mountain quail:

Alternative 1: About 469 acres of early seral forest would be altered to a mid seral condition, and about 22 acres would be changed to a grass/shrub type due to aspen restoration units. About 23 acres of size class 4 would be altered to a grass/shrub type due to aspen restoration units. The 469 acre decrease in early seral forest would represent 0.09% of the 530,851 acres of early seral forest habitat on National Forest System lands in the Sierra Nevada, while the 23 acre decrease in mid seral forest due to aspen restoration treatments represents just 0.0008% of the 2,776,022 acres of mid seral coniferous forest habitat on National Forest System lands in the Sierra Nevada. The 120 acres of early seral pine plantations would remain unchanged due to lack of treatment, and size class 4s would increase by over 400 acres due to thinning in size class 3s resulting in larger QMDs.

Due to the minor amount of acreage involved, Alternative 1of the Dragon Project would not alter the existing trend in the habitat, nor would it lead to a change in the distribution of mountain quail across the Sierra Nevada bioregion.

Hairy woodpecker:

Alternative 1: The Dragon Project was designed to retain essentially all snags greater than 15 inches dbh, and also provided project design features in consideration of future snag recruitment. The negligible change that may occur under Alternative 1 in medium- or large-sized snags per acre as a result of proposed thinnings and prescribed fire in the Dragon Project area, would not alter the existing trend in this ecosystem component, nor would it lead to a change in the distribution of hairy woodpecker across the Sierra Nevada bioregion.

Threatened, Endangered, and Sensitive (TES) Wildlife Species, Terrestrial and Aquatic

Due to the project area being outside the range of the species, or due to the lack of suitable habitat or habitat components in the project area, it is was determined the action alternatives would have no effect on the following Federally Listed threatened or endangered species or their critical habitat: gray wolf, northern spotted owl, valley elderberry beetle, Central Valley steelhead DPS, Central Valley chinook salmon ESU, Delta smelt, winter-run chinook salmon ESU, California red-legged frog, Shasta crayfish, conservancy fairy shrimp, vernal pool fairy shrimp, vernal pool tadpole shrimp, and giant garter snake.

Due to the project area being outside the range of the species, or due to the lack of suitable habitat or habitat components in the project area, it was determined that the action alternatives would have no effect on the following Forest Service Sensitive species: Northern bald eagle, California wolverine, American marten, Pacific fisher, Sierra Nevada red fox, Townsend's big-eared bat, great gray owl, willow flycatcher, yellow rail, Shasta hesperian snail, foothill yellow-legged frog, Sierra Nevada yellow-legged frog, Cascade frog, northwestern pond turtle, California floater, Great Basin rams-horn, scalloped juga, topaz juga, montane peaclam, nugget pebblesnail, black juga, kneecap lanx, Goose Lake redband trout, hardhead, Pacific lamprey, and Eagle Lake rainbow trout.

Sensitive species analyzed in detail for the Dragon project were northern goshawk, California spotted owl, sandhill crane, pallid bat, fringed myotis and western bumble bee. Summaries of the analyses of effects of the action alternatives for these species are given below.

Northern goshawk

Alternative 1: Analyses of direct and indirect effects indicated that no goshawk PACs or post-fledging areas would be directly affected by proposed projects. The project-level analysis indicated that the proposed actions would serve to reduce the amount of CWHR 4M forested habitat within the project by about 90 acres. The existing habitat condition within these affected acres is generally poor for nesting habitat due to small average tree sizes and rather open canopies. All affected acres would remain as foraging habitat post-treatment. Also, there would be benefits from the treatments such as protection from widespread loss of habitat due to wildfire, improving the health and vigor of remnant old-growth trees within the treatment areas, promoting the recruitment of a large tree component currently lacking in the Dragon area, the retention of unthinned patches within treatment units that would retain night-roosting habitat (Rickman et al 2005), as well as aspen enhancement projects. Cumulatively, project activities would reverse some long-term vegetative trends within the project area, and the resulting DFPZ and other treatments would confer some protection against widespread habitat loss due to wildfire.

Given the results of these analyses, it was determined that the proposed activities within Alternative 1 of the Dragon project may affect individuals of northern goshawks, but is not likely to result in a trend towards federal listing or loss of species viability.

Alternative 2: Analyses of direct, indirect and cumulative effects indicated that no direct effects to current habitat conditions that would result from this alternative. Indirect and cumulative effects include a continuation of current vegetative trends across the analysis area. No direct reduction in goshawk habitat quality on USFS lands within the project area would occur.

Densification of stands, and surface and ladder fuel loading throughout the project area would continue to increase. Goshawk habitat in and around the Dragon project area would continue to be at risk from wildland fires.

California spotted owl

Alternative 1: Analyses of direct and indirect effects indicate revealed the Dragon project includes one unit of which about 50 acres is within the HRCA for the Blacks Mountain spotted owl territory. However, these 50 acres are not currently suitable habitat. The Dragon project would not affect the PAC or other areas of spotted owl habitat. Some protection of the PAC and HRCA from wildfire would result due to the proposed treatments. No adverse cumulative effects to spotted owls or their habitat were identified.

Given the results of the above analyses, it was determined that the proposed activities within Alternative 1 of the Dragon project may affect individuals of California spotted owls, but was not likely to result in a trend towards federal listing or loss of species viability.

Alternative 2: Because Alternative 1 does not directly affect spotted owl habitat, there would be little difference in direct effects to owl habitat between Alternative 1 and Alternative 2. Neither alternative would directly affect existing canopy closure, CWHR structural class or snag and downed log densities in spotted owl habitat. The no action alternative would have little immediate or short-term impacts to spotted owls or their habitat within the project area, in part due to the lack of existing suitable habitat within the project area.

Cumulative, long-term increases in a white fir component could eventually lead to increased spotted owl habitat in the project area, if the white fir was able to reach maturity. However, increased tree densities and decadence in terms of downed logs and snags would serve to increase the likelihood of a wildfire in this area, which could spread fire into the HRCA and PAC associated with the Blacks Mountain territory. If such a fire was large and burned at high intensities, there would be potential for large-scale loss of owl habitat within this territory. Given that eastside owl habitat tends to be at the upper slopes of eastside mountains, and the mid and lower slopes are dominated by unsuitable eastside pine forests, a high-intensity fire could cause abandonment of the Blacks Mountain site due to loss of habitat if the PAC and HRCA were completely burned by high intensity fire.

Greater sandill crane

Alternative 1: There would be little direct, indirect or cumulative effects to sandhill cranes as a result of Alternative 1 because, 1) no projects would directly affect nesting habitat, 2) the treatments proposed for forested stands in the Windy Gap area may indirectly benefit cranes by enhancing foraging habitat, 3) the potential for disturbance would be reduced by application of LOPs and some road decommissioning projects, and, 4) there would be no negative cumulative effects.

Therefore, it was determined that the proposed activities within Alternative 1 of the Dragon project may affect individuals of sandhill cranes, but was not likely to result in a trend towards federal listing or loss of species viability.

Alternative 2: Because the projects proposed in Alternative 1 would not directly affect crane nesting habitat, there would be little difference in direct or indirect effects to sandhill crane nesting habitat as a result of the No Action alternative compared to the action alternative. This alternative would not thin along forested edges adjacent to the area of nesting habitat at Fred's Grave or adjacent to large sagebrush flats, and thus would not result in enhancement of foraging habitat. Current vegetative trends within forested stand adjacent to foraging and nesting habitat would continue, leading to increased forest density over time, as well as increased extent over time as conifers continued to invade into the sagebrush flats and meadows. Over the long term this would have a negative effect on the open habitats cranes utilize. Although there would be no potential for project-related disturbance from this alternative, there would also be no reduction in existing road densities which would result in reduced potential for road-related disturbance.

Cumulatively, as forage was further reduced in upland areas due to increasing conifer densities, livestock movement and distribution may become more concentrated in open forage areas (Range report, project record), such as meadows and sagebrush flats. Further concentration in these areas could negatively affect sandhill cranes through increased potential of trampling of young or increased utilization of forage in these areas. The treatments in the proposed action may reduce the amount of acres burned in the event of a wildland fire; this increased protection from wildfire would not be realized in the No Action alternative. However, such wildfire events may have little effect on the structure of sandhill crane habitat, which is non-forested and generally in the wetter areas of meadows, which would not be likely to burn during such fires except in extremely dry conditions.

Pallid bat

Alternative 1: Analyses of direct, indirect and cumulative effects indicate that the proposed treatments within Alternative 1 are consistent with conservation measures identified by the 2001 Framework (USDA 2001). The proposed treatments would reduce the vulnerability of large, old trees to mortality from insects, drought and wildfire, and would enhance foraging habitat. There may be some potential for disturbance during project implementation.

Cumulatively, the proposed thinnings would serve to reverse some long-term vegetative trends, such as increase densification of eastside pine forests, which have likely been detrimental to this species, which prefers more open forest conditions. The thinnings should also promote the achievement of a large tree component that is deficient in the Dragon landscape and which are important as maternity roosts for this species. These projects, as well as follow-up prescribed fires, should also serve to reduce potential fire danger and the potential for widespread loss of habitat by thinning stands that have become over-stocked through time by small diameter trees. Most aspen stands on the ELRD are degraded, with few large stems. The proposed aspen treatments should improve potential habitat by thinning conifers from the aspen while retaining large diameter conifer trees, and would also fence aspen stands as needed to prevent over-

utilzation by livestock. In time, these treatments would increase the number of aspen stems large enough in diameter to serve as potential roost trees.

Therefore, it was determined that the proposed activities within Alternative 1 of the Dragon project may affect individuals of pallid bats, but were not likely to result in a trend towards federal listing or loss of species viability.

Alternative 2: Analyses of direct, indirect and cumulative effects indicate that this alternative would continue the current habitat condition for this species. Little immediate change would likely occur in the existing habitat values for this species. Opportunities to enhance foraging habitat through variable thinnings and meadow and treatments would not occur. This alternative would also not be consistent with some conservation measures for the species, such as reducing overstocked stand conditions and implementing vegetation treatments to create open understories that allow for unencumbered flight (USDA 2001, Vol. 3, chapter 3, part 4.4, page 55). This alternative would result in a continuation of long-term vegetative trends that have resulted in loss of large trees, in-growth of young trees, and loss of understory vegetation. Remnant large, old trees across the Dragon project area would remain vulnerable to competition-related mortality factors (Biondi 1996), and large pines have decreased faster than their rate of recruitment within Blacks Mountain Experimental Forest, located immediately west of the Dragon area (Dolph et al 1995).

Existing aspen would remain at risk of further degradation. Ecological services provided by aspen communities which include biodiversity, forage, habitat, understory plant communities and availability of large-diameter aspen stems would continue to be lost as the aspen component decreases on the landscape. Restoration activities designed to restore forest structure in riparian areas and montane meadows to increase understory diversity and cover, and improving riparian function would not occur. The forest structure within these areas would continue to follow the same trajectory (increased forest density and canopy cover) as the adjacent stands, and thus foraging habitat for this species would continue to decline with time. Potential for widespread fire loss would also remain at current levels, with no potential reduction as would be achieved by variable thinnings and pine ecotone thinnings as proposed under Alternative 1. Therefore, this alternative would continue the current vulnerability of large, old trees to mortality from insects, drought and wildfire, resulting in reduced numbers of living and dead trees available for maternity roosts for this species.

Fringed myotis

Alternative 1: The primary direct and indirect effects of Alternative 1 would generally be positive for this species in terms of enhancing foraging habitat and improving the health of large, old trees. However, there may be some potential for disturbance to individuals during project implementations. Cumulatively, the proposed thinnings would serve to reverse some long-term vegetative trends, such as increase densification of eastside pine forests and reductions in understory vegetation, that have likely been detrimental to this species, which prefers more open forest conditions.

Therefore, it was determined that the proposed activities within Alternative 1 of the Dragon project may affect individuals of fringed myotis, but was not likely to result in a trend towards federal listing or loss of species viability.

Alternative 2: Analyses of direct, indirect and cumulative effects indicated that Alternative 2 would cause little immediate change in the existing habitat values for this species. Vegetative trends would continue, including continued densification of forests and reductions in understory vegetation, which would continue to reduce potential foraging values for this species. Remnant large, old trees across the Dragon project area would remain vulnerable to competition-related mortality factors (Biondi 1996), and large pines have decreased faster than their rate of recruitment within Blacks Mountain Experimental Forest, located immediately west of the Dragon area (Dolph et al 1995). This alternative would continue the current vulnerability of large, old trees to mortality from insects and drought. While episodes of drought and bark beetle infestations may result in a pulse of old-growth trees becoming snags, in the long term this would result in a deficit of such trees on the landscape.

Existing aspen would remain at risk of further degradation. Ecological services provided by aspen communities which include biodiversity, forage, habitat, understory plant communities and availability of large-diameter aspen stems would continue to be lost as the aspen component decreases on the landscape. The conifer component within non-forested communities would continue to follow the same trajectory (increased forest density and canopy cover) as the adjacent stands, and thus within-forest foraging habitat for this species would continue to decline with time due to reduced understory vegetation and forage plants for prey species such as moths.

Cumulatively, the potential for widespread fire loss would remain at current levels, with no potential reduction as would be achieved by variable thinnings and other treatments as proposed under Alternative 1. Smaller or patchy fires may improve habitat for this species by leading to a pulse of fire-killed snags and creating a mosaic of forest and non-forested patches. The benefits of such fires in creating an increase in roost snags would diminish through time as the snags toppled. Large, wide-spread high intensity fire may create improved habitat conditions in the short-term, but in the long-term may result in a deficit of roost trees in wide areas of previously forested landscapes as fire-killed trees eventually fall to the ground.

Western bumble bee

Alternative 1: Analyses of direct, indirect and cumulative effects indicated that the proposed treatments of the Dragon project were designed to address some long-term vegetative trends that have likely been detrimental to the habitat of this species. The project would result in long-term habitat improvement by increasing the diversity and abundance of understory vegetation, with some potential short-term negative effects of prescribed fire, especially if implemented in spring.

The proposed treatment would serve to reverse long-term vegetative trends that have resulted from a long history of fire suppression and grazing. Historically, forested stands in the eastside pine region were more

open than today, with a greater amount of understory vegetation. The purpose and need of the Dragon project recognizes these long-term changes on the landscape, and would help to address and reverse some of these changes in the treatment areas. Reducing conifer tree densities and increasing the species diversity and abundance of understory plants, especially in forested stands occupying lower slope positions, would benefit western bumble bees. Within some fenced aspen stands on the ELRD, flower heads of yarrow appear to be more common within the fences than immediately outside of them. While yarrow is not a plant of high value to bumble bees (R.Thorp, pers. comm. 2013) other livestock-induced reductions in flowering plants, especially in and adjacent to wet meadows where livestock congregate, likely occur. The proposed actions would typically not exacerbate this potential effect of on-going livestock grazing, or lead to increased utilization or greater livestock numbers. On the contrary, the variable density thinnings and other treatments that lead to an increase in understory plants may serve to disperse livestock away from wetland areas, and lead to more widespread but overall less intensive utilization (Range report, project record).

Given these analyses, it was determined that the proposed activities within Alternative 1 of the Dragon project may affect individuals of western bumble bee, but was not likely to result in a trend towards federal listing or loss of species viability.

Alternative 2: Direct, indirect and cumulative effects analyses indicated that the No Action alternative would continue long-term vegetative trends, including continued densification of forested stands and reductions in understory vegetation, which would continue to reduce potential foraging values for western bumble bees. The observed recent declines in western bumble bee are thought to be a result of factors that transcend the vegetative trends within the project boundaries of the Dragon project, and include factors such as disease from imported bumble bees, urban and agricultural development, and exposure to pesticides. Thus, long-term vegetative trends within the project area, or within the ELRD as a whole, were likely not a large contributing factor in the observed population declines of western bumble bees.

The No Action alternative, by perpetuating long-term vegetative trends such as increasing forest densities that have largely been negative for the habitat of this species, would not improve habitat conditions within the project area as would the proposed action, and would likely lead to long-term negative trends. Cumulatively, on-going activities such as livestock grazing would occur in the same general patterns as it has in the past. As forests increase in extent and density understory vegetation would decrease in forested stands, and livestock grazing would over time may become more concentrated in meadow and sage/bitterbrush flats (Range report, project record), as would bumble bee habitat.

Range

The area of analysis for effects to the rangeland resource and livestock grazing is the grazing allotment boundaries. The Dragon Project area occurs in three different grazing allotments: Bear Valley, Harvey Valley and Grays Valley. Due to the small acreages of the project within each allotment and the minimal

expected effects within each allotment, effects will be discussed as a whole unless necessary for clarity and will focus primarily on the area within each allotment where activities would occur.

Alternative 1

Alternative 1 would have little to no direct or indirect effect to the management of livestock grazing on any of the allotments. Treatments may result in some re-distribution of livestock away from meadow areas into more open timber areas for a short time period. Adjustments to a rotation schedule may be necessary to help protect aspen sprouts from livestock browsing. However, the potential changes would not be any greater than the usual adjustments made from year to year for annual differences in resource conditions.

Direct and indirect effects to the rangeland resource would be minimal due to the overall size of the treatment areas in any one allotment. Vegetation treatments, both in forested and non-forested communities, would provide diversity in vegetation species, their vigor and productivity, and the associated wildlife species that use these communities. The treatments would increase herbaceous vegetation in the understory and could contribute to additional available forage for use by livestock and wildlife. Non-forested treatments would defer further encroachment of conifer species into meadow and sagebrush / bitterbrush flat areas, allowing herbaceous species to dominate. Watershed improvements would contribute to overall improved meadow and riparian health in those areas.

Cumulatively Alternative 1 would have positive although minimal effects to the rangeland resource due to the overall acreage of the project area. Treatments would have minor impacts to livestock management operations, but these would be short-term and outweighed by the improvement in resource conditions over the long-term.

Individually, the proposed treatments would have few effects to the rangeland resource or livestock management. The combination of treatments proposed in the project area would change the arrangement of vegetative communities such that livestock would possibly scatter better across the landscape resulting in lighter grazing pressure in some areas. Forage plants would be healthier and more abundant for use by both livestock and wildlife.

Combined, the proposed treatments would have a positive effect on the rangeland resource. Thinning treatments followed by prescribed fire would provide varying amounts of overstory as well as understory development. In turn, a mosaic and variation of vegetation communities is created along with the associated plant and animal species they support. Open timber stands provide a variety of forage species for livestock and wildlife and draw grazing pressure away from meadow areas for shade and protection from weather and insects. Treatments in upland areas contribute to overall rangeland health.

Alternative 2

There would be no effects to livestock management or the rangeland resource by implementation of Alternative 2, No Action. Due to the small acreage of the proposed action in relation to the large areas encompassed by the three allotments in which activities would occur under Alternative 1, the implementation of Alternative 2 would have no positive or negative effects to the rangeland resource or livestock management.

Botanical Resources

The following discussion of effects on botanical resources are summaries of the information found in the Biological Evaluation for Forest Service Sensitive Plant Species (BE), the Biological Assessment for Federally Listed Plant Species (BA) and the Dragon Project Noxious Weed Risk Assessment, hereby incorporated by reference.

Affected Environment

There are currently no known Region 5 Sensitive Plant species within the Dragon Project area. There are also no known occurrences of Threatened or Endangered Plant species and no vernal pool habitat has been identified within the project boundary. However, there is one vernal pool outside of the project area which supports an occurrence of the Threatened species *Orcuttia tenuis*. This vernal pool is located approximately three quarters of a mile outside of the Dragon Project boundary. Critical habitat was designated in 2003 for *Orcuttia tenuis* with approximately 627 acres located within the Dragon Project area associated with the White Horse Reservoir vernal pool. ESA defines critical habitat as specific geographic areas that contain features essential for the conservation of a threatened or endangered species that may require special management and protection. The primary constituent elements or PCEs of critical habitat define these features; however, no PCEs are found within the 627 acres of critical habitat found within the Dragon Project boundary.

Botanical Sensitive Species

Alternatives 1 and 2

Direct, Indirect, and Cumulative Effects

Since there are no known occurrences of Forest Service Sensitive Plant species within the proposed project area, there would be no direct, indirect, or cumulative effects to Forest Service Sensitive Plant species from the implementation of either Alternative 1 or 2 of the Dragon Project.

Determination

Alternatives 1 and 2 would have no effect on any Forest Service Sensitive Plant species because there are no known occurrences of these species within the Dragon Project area.

Threatened and Endangered Plant Species

Alternative 1

Direct, Indirect, and Cumulative Effects to Individuals

Since there are no known occurrences of Threatened or Endangered Plant species within the proposed project area, there would be no direct, indirect, or cumulative effects from the implementation of the Dragon Project.

Direct, Indirect, and Cumulative Effects to Critical Habitat

Currently, there are no vernal pools or other suitable habitat for *Orcuttia tenuis* within the project area. A 300 foot zone was used to represent the critical habitat area for vernal pools for analysis purposes because this area is believed to be the extent of potential watershed needed to contribute to the health of vernal pools and needs of vernal pool endemic plant species within the larger critical habitat boundary. The nearest vernal pool is located approximately three quarters of a mile outside of the Dragon Project boundary. Since this vernal pool is located well beyond the 300 foot immediate critical habitat area, the PCEs for this species are not contained within the Dragon Project area. Therefore, there would be no direct, indirect, or cumulative effects to the critical habitat for *Orcuttia tenuis* from the implementation of the Dragon Project.

Alternative 2 – No Action

Direct, Indirect, and Cumulative Effects to Individuals

Since there are no known occurrences of Threatened or Endangered Plant species within the proposed project area, there would be no direct, indirect, or cumulative effects from the No Action Alternative.

Direct, Indirect, and Cumulative Effects to Critical Habitat

Indirect effects from the No Action Alternative could include the potential for high severity wildland fire and noxious weed invasion, but since the vernal pool and immediate critical habitat are located outside of the project area, indirect effects would not be expected. In addition, there would be no direct effects to the critical habitat for *Orcuttia tenuis* from the No Action Alternative, other than those resulting from ongoing activities. Given that the White Horse Reservoir vernal pool and immediate critical habitat are located outside of the project area, direct, indirect, and cumulative effects would not be expected from the implementation of the No Action Alternative.

Determinations

Alternatives 1 and 2 would have no effect on *Orcuttia tenuis* or designated critical habitat because there are no known occurrences of this species within the project boundary and the primary constituent elements for the designated critical habitat are not contained within the Dragon Project area.

Hydrology

Alternative 1

With the implementation of Best Management Practices (BMPs) and Integrated Design Features (IDFs) as listed in the Hydrology Report, Alternative 1 should have no detectable effect on water quality. It is the intent that the IDFs and BMPs identified would maintain water quality and prevent adverse effects to beneficial uses, both locally and downstream. Alternative 1 would treat approximately 18.6, 3.2, 2.7, and 0.3 percent of the Puls Camp, Aspen Well, Grays Valley, and Harvey Valley sub-watersheds, respectively. It is unlikely that Alternative 1 would have a direct effect on stream flow due to the nature of the proposed vegetation and management treatments, the amount of area to be treated, the size and type of streams within the project area, and the semi-arid climate.

There would be no direct, indirect, or cumulative effects on channel morphology from the vegetation treatments under this alternative. Skid trails would be minimized and no waterbars would be installed after treatment (IDF). Crossing locations would be minimized and rehabilitated (BMP). Thinning may remove vegetation within the Riparian Conservation Areas (RCAs); however, conifers necessary for stream bank stability would be retained (IDF). It is unlikely that Alternative 1 would alter stream flow; thus it is unlikely that a channel-altering flooding event would indirectly result from the treatments proposed.

All seasonally flowing streams and wetlands within the project area would have allocated RCA widths in accordance with the Sierra Nevada Forest Plan Amendment (2004) guidelines and IDFs would be implemented to meet Riparian Conservation Objectives (RCOs). The IDFs would include dry soil to a depth of 12 inches in project areas within the jurisdiction of the Lahontan Regional Water Quality Control Board, and dry to a depth of 10 inches in project areas within the Central Valley Regional Water Quality Control Board boundaries. No new landings would be placed in RCAs, and existing landings within RCAs would not be used. Turning of equipment would be minimized. Disturbance to riparian vegetation cover would also be minimized and sufficient ground cover retained through prescribed burning practices which limit the intensity of fire. These treatments would not have a direct, indirect, or cumulative effect that negatively impacts floodplains or wetlands. Alternative 1 includes meadow enhancement treatments which would harvest trees up to 30 inches diameter at breast height (dbh) along meadow edges; therefore, this alternative would have an indirect long-term beneficial effect of improving the quantity and duration of soil moisture along meadow edges.

Alternative 1 would decrease forest stand densities and fuel loads. This would reduce the likelihood of a severe wildfire that could adversely impact hydrologic resources through increased erosion and sedimentation, increased peak flows, and possible channel incision.

Road decommissions are proposed under Alternative 1. Approximately 1.4 miles of both USFS and non-system routes would be decommissioned under this alternative through ripping and/or barricading roads. This would have the beneficial effect of reduction in road density in sub-watersheds, particularly within

RCAs. Roads near streams that are proposed for decommissioning would also have the beneficial effects of reducing road-associated runoff and sediment delivery to streams.

Cumulative effects: The method used for quantifying cumulative watershed effects (CWE) is the Equivalent Roaded Acre Model (ERA), developed for National Forests in Region 5 (Appendix 2 of the Hydrology Report, Dragon Project Record). The Puls Camp (HOR6), Aspen Well (PI20), and Grays Valley (HC28) 7th field sub-watersheds were used as the geographic boundary for cumulative watershed effects analysis. Harvey Valley (PI19) was not included in the CWE analysis, due to the very small percentage (no more than 0.3%) of proposed treatment area in this sub-watershed. All three sub-watersheds are at low risk for CWEs prior to proposed treatments under Alternative 1. A low risk of cumulative watershed effects is defined as an ERA value of less than 50 percent of the threshold of concern (TOC), a moderate risk is an ERA value between 50 and 80 percent, and a high risk ERA value is between 80 and 100 percent. Proposed activities under the action alternative would increase ERA values slightly, but they would remain at low risk for CWEs. All sub-watersheds recover to ERA values representing low risk for cumulative effects at 10 years post-treatments. Since none of the post-project ERA values exceed the 15 percent TOC, detrimental effects to watershed resources are unlikely under Alternative 1. There are no municipal water supplies or 303(d) listed water bodies that would be affected by any of the disturbances in the sub-watersheds.

Alternative 1 would have beneficial effects from meadow enhancements, road decommissions, and removal of water impoundments that would collectively help trend the sub-watersheds toward improved hydrologic functioning through meadow restoration, decreased road-related runoff and sedimentation, improved infiltration, and reduced evaporation.

Alternative 2

Under this alternative, only previously identified ongoing and foreseeable future management activities would take place within the sub-watersheds. Foreseeable future activities are generally small in scale (less than 700 acres per sub-watershed).

This Alternative would lead to a continuing trend toward increased forest stand densities in eastside pine and non-forested areas. In the event of a high-severity wildfire, precipitation on newly burned areas could cause excessive erosion and sedimentation, increases in peak flow and possible channel incision. Severe wildfire can also remove riparian wetland vegetation leading to decreased functions of these areas.

Cumulative effects: Without the proposed action, ERA percentage values would remain near their current values. Ongoing actions would affect these values somewhat; however, recovery from past actions would have a greater effect than the impact of the ongoing actions and ERA percentage values would continue to decrease over time.

Some indirect cumulative effects of this alternative are a consequence of high forest stand densities and increased fuel loads. Higher stand densities could lead to decreases in stream flow and increased fuel

loads could result in a severe wildfire. Severe wildfires increase erosion and sedimentation, raise peak flows of burn areas, and can lead to channel incision. Other indirect cumulative effects include those of continued grazing, and roads that persist on the landscape.

There would be no beneficial cumulative effects from meadow enhancements, water impoundment removal, or road decommissions that would help improve hydrologic functions through restoration, better infiltration, and decreased runoff and sedimentation from roads.

Soils

Soils in the Dragon project are typical for the area, are generally in good condition, and present no unusual management problems for implementing the proposed action. The soils have been affected by past timber harvest as evidenced primarily by the old landings, roads and skid trails still visible today. The integrated design features included in proposed action assure that Forest standards for long term soil productivity are met.

The Dragon project action alternatives would be expected to have the following direct, indirect and cumulative effects.

Alternative 1

Soil cover in the form of litter, duff, woody debris, rocks and low growing plants is well-distributed throughout the Dragon project area and keeps the risk of erosion low. The proposed action includes activities that would reduce soil cover in some areas, most notably where skidding or underburning occurs. These cover impacts would generally be short-term as soil cover is replenished by needlecast and low-growing plants. The project IDFs would ensure that adequate cover and other erosion prevention measures are in place.

Legacy compaction (loss of soil porosity) was found to occur in excess of the LRMP standard in two units within the Dragon project. This legacy compaction is a result of logging practices no longer implemented on National Forest System land. The Dragon project is designed in a way that would minimize the degree and extent of additional compaction. The mechanical treatments avoid the most highly compactable soils, the project utilizes existing skid trails and landings, the operating period is limited to periods when the soils are not wet, and compaction would be monitored and remediated using appropriate tillage as needed to ensure that the project area is within the LRMP standard after project implementation. Ten years of soil monitoring on the national forests of the HFQLG pilot project, which include the Lassen, have shown that post-project compaction, as measured in number of thinning units meeting standards, increases only slightly when projects are implemented following present-day forest management practices.

No major soil displacement activities such as windrowing have occurred in the past in the Dragon Project area, so soil organic matter hasn't been adversely affected except in small areas, associated with skidding. The planned activities would only impact soil organic matter in a minor way, mainly where equipment turning displaces soil short distances. Similarly, litter and duff would be displaced locally but would continue to meet the LRMP standard of 50% coverage overall. Large woody material is generally well-stocked except in the Windy Gap area. The proposed action will leave at least 5 logs per acre where they exist.

Alternative 2 – No action

No direct adverse effects on soils would be expected with Alternative 2, but indirect and cumulative effects could result from continued accumulation of fuels and the increasing risk of high intensity wildfire. High intensity wildfires adversely impact soil resources through combustion of ground cover which leaves areas of bare soil and increases the risk of soil loss by erosion. Combustion of the litter and duff layer, which is the forest's nutrient reservoir, leads to reduced long-term productivity. High intensity wildfires can also adversely impact the soil's hydrologic function by creating a hydrophobic layer, and by reducing soil organic matter and stable aggregates, all of which can lead to lower water infiltration rates, increased erosion risk, and reduced soil water storage.

Cultural Resources

Alternative 1

The entire Area of Potential Effects (APE) for the Dragon Project has been inventoried for cultural resources. All documented survey coverage for the area is adequate for the purpose of identifying historic properties that could be affected by the undertaking. Fourteen historic properties have been identified within the project area. Standard Resource Protection Measures (SRPM) would be employed as integrated design features and applied to all cultural resources within the project area for all the alternatives. Application of SRPMs would eliminate any adverse effects to cultural resources. This undertaking would be consistent with stipulations in the *First Amended Regional Programmatic Agreement among the U.S.D.A. Forest Service, Pacific Southwest Region, California State Historic Preservation Officer, and Advisory Council on Historic Preservation Regarding the Process for Compliance with Section 106 of the National Historic Preservation Act for Undertakings on the National Forests of the Pacific Southwest Region*.

Alternative 2

There would be no direct or indirect effects, and therefore no cumulative effects to cultural resources as a result of Alternative 2, since no project activities would be implemented.

Transportation

Alternative 1

In the short term there would be a direct effect of increased traffic due to the movement of equipment, materials, and personnel into and out of the project area. Increased traffic can impact the safety of the public and Forest Service employees using the roads in the area. Traffic management measures would minimize these impacts. With the use of standard contract provisions for traffic control, effects would be negligible.

For the short term during the sale contract, depending on the length and timing of the project, there would be potential of erosion from the construction of new NFS roads. There would be standard provisions in the contracts to require erosion control measures in case seasonal closures are needed. No temporary roads are proposed in this alternative.

Cumulatively, active management of the transportation system would improve public access and firefighter safety, as well as minimizing adverse environmental effects and reducing future maintenance costs.

Alternative 2

Under this alternative, to treatments would be performed and the existing road system within the project area would remain as is. There would be no direct or cumulative effects. Unauthorized routes within the analysis area would remain on the landscape. No progress would be made towards the established Objective Maintenance Levels of NFS roads. A forest road maintenance program that is currently under funded would not receive supplemental maintenance on NFS roads. Roads would continue to deteriorate through use by high-clearance vehicles, off-highway vehicle (OHV) riders, mountain bicycles, etc. without concurrent maintenance and upkeep. Some of these roads could possibly deteriorate to the point where they would no longer be accessible to high-clearance vehicles, including fire suppression equipment. This would limit ingress/egress for firefighting ground resources and would therefore reduce firefighter safety.

Recreation and Visual Resources

Alternative 1

With the implementation of the standard safety procedures, there would be minimal effects (direct, indirect, or cumulative) to recreation or public safety under Alternative 1. Actions proposed would result in minimal effects (direct, indirect, or cumulative) to the visual resources, with the exception of the positive effect from the creation of a more open forest.

Alternative 2

As no action would occur, there would be no effects (direct, indirect, or cumulative) to recreation or public safety. There would be no effects (direct, indirect, or cumulative) to the visual resources, with the exception of the potential for large-scale wildfire. With no reduction in the risk of wildfire to this forest area, effects to the scenery would take place if a large-scale wildfire (beyond expected disturbance levels in this ecological unit) were to occur. Depending on the scale, wildfire could change the vegetative composition of the forest resulting in scenic degradation for 3 to 10 years and a different type of scenic expression thereafter.