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Silviculture Report

Westside Fire Recovery Project

Klamath National Forest
Siskiyou County, CA

Photo by Todd Drake, 2014

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Executive Summary

Introduction

The purpose of this report is to assess the fire impacts to the vegetation on the landscape and determine what effects actions will have on increasing the likelihood and speed by which burned forested areas are regenerated as well as the consequences of not taking any action to accelerate the establishment of conifers on the landscape. Discussion of various scientific literature is incorporated to support the evaluation of effects from the stands to be treated with either salvage harvest, site preparation and planting, or some combination of each.

Methodology

Site visits to the project area by foresters and a silviculturist were conducted between October 2014 and December 2014. Remotely sensed data on vegetation burn severity were field-validated and potential treatment areas were identified. Stand data were collected using ocular estimates and plot data collection, as needed.

Observations included the following:

- Pre-fire stand condition of vegetation (growth, species composition);
- Post-fire stand condition of vegetation;
- Availability of natural seed sources on site and within natural seed distribution distance;
- Availability of suitable snags for retention;
- Availability and suitability of hardwoods for retention;
- Plantability (reasonable ability to plant conifers in an area), an estimate of physical effort needed to conduct artificial regeneration;
- Regeneration Potential, an estimate of the potential for artificial regeneration; and
- Site Class, Aspect, and Elevation estimates as they relate to artificial regeneration attributes and regeneration potential.

Stand data were compiled from existing plots in the project area and used to simulate future stand conditions based on proposed treatments. The Forest Vegetation Simulator (FVS) was used to estimate time needed to establish conifer-dominated stands. Northern spotted owl dispersal habitat charcteristics were used as a threshold for considering a stand to be on a trajectory towards late-successional characteristics (diameter at breast height of 11.0 inches, canopy cover 40%, percentage of conifer composition). In addition to using professional judgment and visual cues during site visits, the 1944 Wieslander Vegetation mapping was used to assess historic species composition and conifer dominance throughout the project area (Kelly et al. 2005). Proposed units for planting were substantiated using this background information.

Analysis Indicators

- Acres treated (site prepared and planted) to promote conifer regeneration;
- Percent of landscape treated to restore a mature stand of conifers within 60 years with and without future fire disturbance; and
- Vegetation type regenerated in the short-term, and in the long-term.

Spatial and Temporal Context

Spatial bounding is limited to units within the project area considered for regeneration treatments (including salvage units, existing plantations, and select natural stands not included in salvage) and hazard tree removal along roads (areas where regeneration is likely to be affected by the project). The spatial area surrounding roads on which hazards trees may be removed averages an estimated 24 acres per road mile.

Both short-term and long-term effects will be considered in this analysis. Short-term temporal bounding is the time period in which treatments occur from harvest activity, site preparation, and planting; this is about one to five years because effects on regeneration will begin to be visible during this time period. Long-term temporal bounding is for an estimated 40-100 years from project implementation and is based on the maximum time for reduction of suface woody fuels following fire (Peterson, Dodson and Harrod 2014) and computer-generated modeling that showed stand conditions approaching the desired late-successional characteristics.

Affected Environment

Before the fires of 2014, vegetation types within the project area generally ranged from an oak/brush/grass type to well-stocked mixed conifers. Age classes ranged from 20 year-old plantations to late-successional forest. Using the existing vegetation layer provided from the CALVEG dataset, the size classes described in Table S-1 were distributed throughout the project area. California Wildlife Habitat Relationships (CWHR) type is derived primarily from CALVEG type and relative cover of conifer and hardwood trees for various mixed conditions. It represents an estimate of the variation in stand conditions that existed before the fires. Table S-1 displays the percentage of the project area that was classified by a specific size class prior to the fires as well as the percentage of each size class included within salvage units. Salvage treatments are only proposed for areas of moderate to high severity vegetation mortality (i.e. greater than 50 percent of trees fire-killed on a unit level, based on Rapid Assessment of Vegetation Condition after Wildfire (RAVG)). Using the field-verified RAVG data, treatments are proposed on 23%[1] of the area within the 185,000-acre burn that resulted in greater than 50% mortality (64,000 acres burned with more than 50% mortality).

Table S-1. Percentage of size classes within project area and within salvage units. (Note: Percentage does not equal 100% since some data was not classified in the dataset and was omitted from the table.)[2]

CWHR Code	CWHR Size Class	DBH	Percentage of diameter class within Project Area	Percentage that burned with	Percentage that burned with

[1] Percentage differs from published DEIS due to reduction in proposed treatment acres after analysis was completed. Actual treatment acres are shown in Table S-2.

[2] Percentages may change slightly in the Final Silviculture Report to reflect reductions in treatment acres at the time of publication.

				greater than 50% mortality within the Project Area	greater than 50% mortality within treatment units
1	Seedling tree	<1.0"	1%	<1	<1
2	Sapling tree	1.0" - 5.9"	6%	2	1
3	Pole tree	6.0" - 10.9"	16%	4	1
4	Small tree	11.0" - 23.9"	41%	11	3
5	Medium/large tree	≥24.0"	25%	6	2
6	Multi-layered tree	A distinct layer of size class 5 trees over a distinct layer of size class 4 and/or 3 trees, and total tree canopy of the layers ≥60% (layers must have ≥10.0% canopy cover and distinctive height separation).	0%	N/A	N/A
0	Not Determined / Not Applicable		<1%	<1%	<1%

The oak/brush/grass type is typically found on low-elevation sites on shallow, rocky soils located on southerly and westerly aspects which exhibit harsher conditions than on northerly and easterly aspects. As elevation increases, conifer species become more prevalent, primarily as a function of favorable environmental conditions for conifer survival and growth. Deeper, more developed soils than those at low elevations supported mixed conifer stands of Douglas-fir, ponderosa pine, incense cedar, and sugar pine. Higher elevation sites within the project area lend themselves to favorable conditions for red fir and white fir survival and growth, with white fir becoming a substantial component of the mixed conifer type. Hardwood species, including Pacific madrone, California black oak, canyon live oak, Oregon white oak, tanoak, and bigleaf maple are generally a minor component of mixed conifer stand composition.

The project is focused on areas that burned with moderate and high vegetation severity. High severity areas are characterized by total or near-total conifer crown consumption. Individual trees in this condition were either killed or damaged beyond their ability to survive. Within areas of moderate burn intensity, some crown consumption has occurred as a result of the fire but these areas are characterized by total or near-total crown scorch. The vast majority of crown-scorched trees have been killed by the fire or damaged beyond their ability to survive. Within areas of light vegetative burn severity, the impacts on conifers were often severe, especially to the smaller size and lower crown classes. Within the fire-burned area, approximately 70% of all the existing plantations survived the exreme fire conditions of the 2014 Fires.

Understory vegetation has been totally consumed or top-killed throughout much of the project area; the degree of mortality is primarily a function of fire intensity. On areas burned at moderate to high intensity levels, mortality is essentially complete. On areas burned at low-intensity levels,

if the fire was hot enough to consume the organic layer then understory vegetation, including conifer seedlings and saplings, were also killed.

Light-seeded, prolific, early successional weed and grass species, having survived the fire in unburned pockets and perimeter areas, will rapidly reinvade burned areas. Well-established perennial root or rhizome species will likely re-sprout from existing root systems. Brush species, such as manzanita, snowbrush, deerbrush and whitethorn, are well-adapted ecologically to the fire-impacted ecosystems. Assuming fire intensity and duration at less than lethal levels, these species are capable of root collar sprouting. Brush seed, which may retain viability for 40-150 years in the duff layer, will germinate in potentially large numbers for 2-3 years after fire-scarification. Fire top-killed hardwood tree species, such as black oak, tanoak, madrone, and live oak are also capable of root-collar sprouting. These species are able to take immediate advantage of a well-established root system, giving them the inherent capability to grow rapidly for early site dominance.

There is an estimated 150,000 to 300,000 hundred cubic feet (ccf) (75 to 150 million board feet) of burned timber that may be removed. The removal of these dead trees will help ensure effective and timely restoration of burned treatment stands.

Several factors influence the rate of deterioration of fire-killed trees: tree species, species characteristics (such as bark thickness or depth of sapwood), tree diameter, rate of growth, age, local site conditions, severity of the fire, and time of year the burn took place (Lowell et al, 1992). Bark provides a protective covering for the cambial layer in a tree. Trees with thinner bark are more susceptible to fire damage and tend to deteriorate more rapidly than those with thicker bark. Sapwood in all species is susceptible to decay. It is the first merchantable part of fire-killed or damaged trees to be degraded by insects, and stain and decay fungi. Large diameter trees generally decay slower than small diameter trees, and older trees generally decay slower than young trees. Less sapwood volume and decreased growth rates within the sapwood are partially the reason. When the effects of diameter and age are combined, a larger diameter tree will deteriorate more slowly than a smaller diameter tree if the difference is a result of age and not rate of growth. A faster rate of growth may offset this advantage of a large diameter tree (Lowell et al, 1992).

Insects (primarily beetles), stain and decay fungi, and weather all act as deterioration agents in fire-killed timber. Insect activity usually precedes fungal activity and provides a mechanism for introducing fungi that accelerate sapwood deterioration. Fungal decay, once introduced, will deteriorate the sapwood ahead of any insect damage. Decay causes reductions in strength properties of wood, rendering the wood useless from a structural standpoint, and thus decreasing useable log volume. In addition to the deterioration caused by stain, decay, and insects, weather checking also contributes to loss. Weather checking is cracks that form vertically in the wood as the tree dries out. With time, the cracks go deeper into the log, and the portion of the log that is checking is unusable for manufacturing boards.

Fire killed trees retain market value for approximately two years after the fire; smaller trees and smaller logs (less than 14 inches in diameter) lose value much more quickly than larger trees and

logs (Lowell, Willits, and Krahmer 1992). The site is well roaded, making commercial removal of merchantable trees feasible. Without using the receipts from the sale and removal of dead trees, site recovery may be cost prohibitive. Planting without fuels reduction and site preparation would likely result in the loss of conifer plantations before they mature, given the median 8-to38-year fire return interval of the Klamath Province (Skinner, Taylor, and Agee 2006).

Environmental Consequences

Alternative 1

Direct and Indirect Effects

Under the alternative 1, the entire burned area will be left to recover naturally. Severely burned trees that survived the 2014 fire will continue to die for several years due to injuries to crowns and cambium tissue from the fire, drought stress and post insect attack of weakened trees. Natural regeneration of coniferous forest may occur in severly burned patches, but it will be highly variable. Larger burn patches will regenerate more slowly because of distances from seed sources.

Successful natural regeneration in one-two decades, though highly variable, has been documented following stand-replacing fires in the Klamath Province within white fir, Douglas-fir, and Douglas-fir tanoak stand types (Shatford, Hibbs and Puettman 2007; Joint Fire Science Program Final Report, Project 05-2-1-40 2009). Pine and mixed-conifer associations were not sampled in the Shatford et al. study. More typically, vegetation is likely to go through an extensive time-period of hardwood- and brush-dominated site occupancy (Zhang, Webster, Powers and Mills 2008). Reforestation will slowly occur naturally but may take many decades to replace brushfields (Zhang et al. 2008). In larger patches where the majority of the trees were killed by the fire, re-establishment of forest cover would rely on natural regeneration and may take decades or longer. For the larger, contiguous areas of high-severity burn, distance from seed sources may further delay natural regeneration. In some cases of high-severity burn, there are no living conifer trees available to provide potential seed for potential natural regeneration for several miles.

Overstory and understory vegetation which was killed but not consumed by the fire will remain, an over time contribute to higher fuel loadings (Peterson et al. 2014). Given the high residual fuel loading, probable length of time required for site dominance by conifers and the fire history, it is likely the area will re-burn before fire-resilient trees can become established.

Suitable lands for conifer regeneration will be re-occupied, generally by brush and hardwood species. Without salvage, site preparation and planting, severely burned stands will likely be replaced by shrubs and brush (Skinner, Taylor and Agee 2006); regeneration of conifers and restoration of forested wildlife habitat may take decades.

Lands unsuitable for conifer growth will re-vegetate through natural successional processes. Grasses, forbs, brush, and hardwoods will continue to dominate these sites for many years. Without reforestation efforts, these areas will re-vegetate primarily as areas of grass, shrubs and some hardwoods, resulting in a loss of the conifer forest habitat that previously existed, for an indefinite period of time. Conifers will generally consist of scattered individual or small groups of ponderosa pine, sugar pine, knobcone pine, Douglas-fir, incense cedar, and white fir.

Although natural regeneration of conifer species has occurred elsewhere, following more typical wildfire site conditions, the project area has a higher percentage of acres burned at high intensities than more typical historic patterns, resulting in prolonged regeneration periods and variable stocking patterns on unplanted sites (Shatford et al. 2007). Assuming large, stand-replacing fires will continue to occur, long-lasting early-seral plant communities will increase within the project area primarily because more area is burned at higher intensities than historic patterns predict (Skinner et al. 2006). Although post-fire observations may indicate surprisingly prolific regeneration, even on severely burned sites, natural regeneration establishment in local wildfires in the past led to desired stocking levels typically only being met around the edges of the fire where a good seed source is still intact (Bonnett, Schoettle, and Shepperd 2005). The remaining standing dead trees would be a hazard to new plantations, forest visitors, and forest workers as dead trees fall or create increased fuel on the ground.

The likelihood and time required for conifer regeneration is affected by bark beetle infestations. Alternative 1 has a sizeable risk of bark beetle population increases, primarily because all stressed trees remain. This results in the maximum potential habitat source for beetles, and the maximum potential loss of living trees as the insect population moves into lightly burned areas and adjacent green stands. Lesser levels of mortality are anticipated in stands outside the fire-affected area than in the project area but some increase in beetle infestation is expected among live trees. Experience from previous wildfires indicates that an outbreak can be intense for the one to two years post-fire.

Cumulative Effects

Adding the effects of alternative 1 to those of current and reasonable foreseeable future actions listed in appendix C of the DEIS will provide no measurable cumulative effects to the extent and time required for conifer regeneration.

Alternative 2

Direct and Indirect Effects

Salvage Harvest and Reforestation

Salvage harvest, most of which will have subsequent site preparation and planting, will occur on an estimated 6,800 acres (four percent of the National Forest System land within the project area). Proposed acres of salvage and planting are in areas that primarily burned with high severity effects on vegetation. High severity burn areas have very few seed-cone capable trees remaining to provide natural seedling capability. Without salvage and planting, these areas will likely not regenerate satisfactorily for many decades. The techniques used for salvage harvest, site preparation and planting, and the number of acres proposed for each technique, are displayed in chapter 2. For the purposes of this analysis, trees within salvage units that have a greater than 70% probability of mortality from fire damage are considered fire-killed and may be harvested; trees that have greater than 30% probability of surviving are considered green and will be retained unless they pose an eminent threat to safety or must be removed for safe and efficient logging operations. Salvage harvest units boundaries may include Riparian Reserves and patches of green trees that burned with lower severity but these areas will not be harvested. Acres salvage harvested and site prepared will be planted with a variety of coniferous species to ensure diversity, and will be released from competing vegetation within a year or so of being planted.

Salvage harvest, followed by site preparation, planting, and release gives the highest likelihood of successful conifer regeneration. Twenty-three percent of the landscape that burned at moderate to high severity will be treated to achieve mature conifer stands.

With implementation of salvage harvest, some temporary roads will be utilized to access units. Given the relatively short individual segments and typical fourteen foot width of temporary roads, measurable effects to fragmentation are not anticipated. Across the entire project area, thirty-eight acres of temporary roads are anticipated to be used, or 0.02% of the landscape. Grasses and forbs are likely to re-occupy temporary roads within 3-5 years after use. Shrubs, hardwoods and conifer seedlings can become established within 2-10 years following road use depending on the vegetation that existed prior to the fire in addition to other unknowns such as future fire events or weather occurrences.

If fuels are treated effectively, and the area is planted, the amount of time needed to restore the site to a sustainable coniferous forest may be reduced. Removing large trees by salvage is not sufficient fuel treatment. Research has shown that plantations established in areas with high slash loadings burned severely, while those where residual slash had been adequately treated burned with much less intensity or not at all (Thompson, Spies and Ganio 2007; Weatherspoon and Skinner 1995). Therefore, effective fuel treatment is an essential component of sustainable reforestation in the Klamath Province (Peterson et al. 2014). Research has shown that the quickest way to reestablish a coniferous forest after stand replacement fire is by active reforestation (Rose and Haase 2005). Aggressive reduction of residual fuels will be necessary to prevent future fire events from becoming stand replacing fires that destroy planted seedlings. Research has shown fuel treatments increase the likelihood of the planted trees surviving future fires. (Weatherspoon and Skinner 1995, Omi and Kalabokidis 1991). Heavy residual fuels need to be reduced substantially to help assure sustainability of plantations. Follow-up reforestation surveys will be completed to assure that the reforestation objectives are achieved.

Since most of the fire-burned areas will be allowed to regenerate naturally (only four percent will be salvage harvested and another four percent will be site prepared and planted outside salvage units), many acres of lands suitable for conifer growth will continue to be understocked or non-stocked by conifers, possibly for decades. These suitable lands will generally be re-occupied by brush and hardwood species. Substantial snag stocking will remain on these reforested lands. Low-impact site preparation methods, which create fewer suitable planting spots, combined with losses inflicted by falling snags, and limited access, results in generally poor chances for conifer re-establishment on these sites.

Lands unsuitable for conifer growth will also re-vegetate through natural successional processes. Grasses, forbs, brush, and hardwoods will continue to dominate vegetation on these sites.

Natural Stand Areas Reforestation and Conifer Plantation Reforestation outside Salvage Units

In addition to salvage harvest acres site prepared and planted, selected natural stands and conifer plantations that became non-stocked or understocked as a result of the 2014 Fires will be site prepared and planted with implementation of alternative 2. Natural stand and conifer plantation site preparation and planting, will occur on an estimated 7,900 acres (four percent of National Forest System lands in the project area). Proposed acres of site preparation and planting are

primarily in high severity burn areas that have very few seed-cone capable trees remaining to provide natural seedling capability. Thus, without site preparation and planting, these areas will likely not regenerate conifers satisfactorily for many decades. Techniques and acres assigned to each technique are displayed in chapter 2.

Roadside Hazard Tree Removal

Hazard tree removal is not a silvicultural treatment to promote conifer regeneration. Hazard tree felling, and where appropriate, removal, is proposed to address public and administrative safety concerns due to the risk of trees falling onto roads. Where hazard tree removal overlaps with proposed salvage harvest units, the effects are the same as salvage effects. Hazard tree removal where it does not overlap with proposed salvage harvest units will decrease fuel loading and, therefore, potential fuels hazard; this will indirectly promote conifer regeneration. Where seed sources are adjacent to roadside hazard removal areas, it is likely that natural regeneration will occur.

Cumulative Effects

The projects added to the effects of the past actions (the affected environment) and the direct and indirect effects of the project are portions of the Elk Thin Project (underburning), the Happy Camp Fire Portection Project, Phase 2 (roadside buffer) and the Thom-Seider Vegetation Management and Fuel Reduction Project (various treatments). When combined with the direct and indirect effects of the proposed salvage, site preparation, and planting treatments, the end result would be an increase in acres treated for hazardous fuels reduction, an increase in acres of roadside treatments and an increase in acres of planted conifer stands set on a trajectory towards establishing resilience to fire, insects and disease and towards achieving northern spotted owl dispersal, foraging and nesting/roosting habitat characteristics. The objectives of the proposed project are in concert with those proposed by these overlapping projects which may no longer be implemented within the project area due to changes in conditions. However, given the desired condition of resilience and fuels reduction, the proposed treatments will benefically increase the magnitude of the effects of these fuels reduction activities.

Alternative 3

Direct and Indirect Effects

Effects of alternative 3 will be the same as for alternative 2 for areas in which salvage harvest is implemented (5,800 acres, three percent of the National Forest System lands within the project area). Twenty-one percent of the landscape that burned at moderate to high severity will be treated to achieve mature conifer stands. Effects of site preparation and planting outside of salvage units are the same as for alternative 2. Effects of areas that are not salvage harvested will be the same as those in alternative 1.

Cumulative Effects

Cumulative effects for alternative 3 are the same as for alternative 2 for areas in which salvage harvest is implemented. Effects of site preparation and planting outside of salvage units are the

same as for alternative 2. Effects of areas that are not salvage harvested are the same as those in alternative 1.

Alternative 4

Direct and Indirect Effects

Effects of alternative 4 will be the same as for alternative 2 for areas in which salvage harvest is implemented (5,900 acres, three percent of the National Forest System lands within the project area). Twenty-two percent of the landscape that burned at moderate to high severity will be treated to achieve mature conifer stands. Effects of site preparation and planting outside of salvage units are the same as for alternative 2. Effects of areas that are not salvage harvested will be the same as those in alternative 1.

Cumulative Effects

Cumulative effects for alternative 4 are the same as for alternative 2 for areas in which salvage harvest is implemented. Effects of site preparation and planting outside of salvage units are the same as for alternative 2. Effects of areas that are not salvage harvested are the same as those in alternative 1.

Alternative 5

Direct and Indirect Effects

Effects of alternative 5 will be the same as for alternative 2 for areas in which salvage harvest is implemented (1,900 acres, one percent of the National Forest System lands within the project area). Effects of site preparation and planting outside of salvage units are the same as for alternative 2 except site preparation and planting will occur on only 3,860 acres of matrix lands (two percent of the National Forest System lands within the project area). Nine percent of the landscape that burned at moderate to high severity will be treated to achieve mature conifer stands. Effects of areas that are not salvage harvested will be the same as those in alternative 1.

Cumulative Effects

Cumulative effects for alternative 5 are the same as for alternative 2 for areas in which salvage harvest is implemented except on fewer acres. Effects of site preparation and planting outside of salvage units are the same as for alternative 2 except on fewer acres. Effects of areas that are not salvage harvested are the same as those in alternative 1.

Comparison of Effects

Alternatives 1 and 5 will, after several decades or more, result in reestablishment of a coniferous forest (Zhang et al. 2008; Shatford et al. 2007); however, that forest may not be sustainable in terms of fuels and fire history because residual fuels will not have been treated. Given the fire return interval of the Klamath Province and the fuels present on the site, a stand replacement re-burn is likely simply because it takes so long for a coniferous forest to reestablish itself without fuels reduction and active reforestation; re-burns where fuels are heavy and tend to be stand

replacement events (Skinner et al. 2006; Weatherspoon and Skinner 1995). The result will likely be a loss of forest cover in this area and a conversion to brush/hardwoods.

Analysis indicators for each alternative are compared in Table S-2.

Table S-2: Comparison of analysis indicators for each alternative

Treatments		Alternative 1	Alternative 2	Alternative 3	Alternative 4	Alternative 5
Acres treated (site prepared and planted) to promote conifer regeneration		0	14,700	13,700	13,800	5,700
Percent of moderate to high severity burned landscape restored to a mature stand within 60 years[3]		0	23%	21%	22%	9%
Type of vegetation likely to regenerate in short – term and long-term	Short-term	Grass, forbs, brush	Brush, hardwoods, young conifers	Brush, hardwoods, young conifers	Brush, hardwoods, young conifers	Brush, hardwoods, some young conifers within matrix lands
	Long-term	Brush, hardwoods, isolated patches of conifers	Mature, mixed conifer stands	Mature, mixed conifer stands	Mature, mixed conifer stands	Brush, hardwoods, mature mixed conifer within matrix lands;isolate d conifers in late successional reserves

Compliance with law, regulation, policy, and the Forest Plan

All alternatives are in compliance with law, regulation, policy and the Forest Plan in relation to vegetation as displayed in the Forest Plan consistency checklist. Silvicultural prescriptions under action alternatives comply with the Forest Plan. Salvage, site preparation and planting are all

[3] Percentages differ from those published in the DEIS due to reductions in treatment acres after initial analysis. The treatment acres are correct, but percentages were recalculated in this document to reflect the changes made to treatment acres.

methods for establishing desired conifer stocking with some level of fire resilience once seedlings are established.

Alternative 1 and alternative 5 will, in time, result in reestablishment of a coniferous forest (Zhang et al. 2008; Shatford et al. 2007), but that forest may not be sustainable in terms of fuels and fire history because residual fuels will not have been treated or will only be treated in part. It may also take decades to reach that stage (Zhang et al. 2008). Given the fire return interval of the Klamath Province and the fuels present on the site, a stand replacement reburn is likely, because it takes so long for a coniferous forest to reestablish itself. Without fuels reduction and active reforestation in these conditions, reburns where fuels are heavy tend to be stand replacement events (Skinner et al. 2006; Weatherspoon and Skinner 1995). The result would likely be a loss of forest cover in this area and a conversion to brush/hardwoods.

Silviculture Report

Introduction

During the summer and fall of 2014, a total of 215,371 acres burned on the west-side of the Klamath National Forest, including the July Complex (Whites Fire, Log Fire and the Man Fire), the Happy Camp Complex (Happy Camp Fire and other fires northwest of Happy Camp) and the Beaver Fire. The Beaver Fire, Happy Camp Fire, and Whites Fire burned a total of 185,000 acres. Approximately 49,50052,000 acres burned at a severity with greater than 75% loss of basal area and an additional 26,00012,000 acres burned with 2550-75% loss of basal area. Areas proposed for treatment include only areas of moderate to high severity vegetation mortality (i.e. greater than 50 percent of trees fire-killed on a unit level, based on field-verified Rapid Assessment of Vegetation Condition after Wildfire (RAVG)).

Figure 1. Roadside hazard trees along 45N65 Road within Happy Camp Fire.

The purpose of this report is to assess the fire impacts to the vegetation on the landscape and determine what effects actions will have on increasing the likelihood and speed by which burned forested areas are regenerated as well as the consequences of not taking any action to accelerate the establishment of conifers on the landscape. Discussion of various scientific literature is incorporated to support the evaluation of effects from the stands to be treated with either salvage harvest, site preparation and planting, or some combination of each.

Natural stand Re-establishment or Recovery

Not all burned areas within the project area are proposed for post-fire treatment. The untreated areas, which include stands that are largely intact post-fire, would recover via natural processes. Also, deforested areas outside of the areas proposed for salvage harvest and fuels treatment, which include a variety of stocking densities and size classes that suffered moderate to heavy mortality, would be left to recover naturally over time. Some moderately burned areas still have a functional forest cover and have adequate seed sources to provide for natural regeneration, butstocking is less than desired to meet management objectives. Small forest gaps created by the fire would re-establish over time without active intervention relying on natural regeneration without site preparation. Dead and dying trees would be left in those areas to provide snags for

wildlife. With no current fuels treatments, these areas will also be prone to future high intensity, stand-replacing fires. "Natural recovery" describes the intent to accept conditions that result from natural processes which may take many years to obtain. Vegetation expected to re-establish in larger openings include grass and brush and in some places hardwoods. Natural conifer regeneration may occur in smaller openings if viable seed trees are in the vicinity. There are no targets or performance measures applied to these areas, but they will be monitored for the establishment of conifer species. Figure 2, taken after the 2013 Salmon Complex Fire on the North Fork Salmon River, shows a plantation that survived with a mixed severity burn adjacent to a high severity stand in the wilderness that had no fuels treatments implemented.

Figure 2. Example of mixed severity burn in plantations adjacent to Wilderness (no fuels treatment) boundary after the Salmon Complex Fire in 2013. T. Coughlin 2013

Methodology

Site visits to the project area by foresters and a silviculturist were conducted between October 2014 and December 2014. Remotely sensed data on vegetation burn severity were field-validated and potential treatment areas were identified. Stand data were collected using ocular estimates and plot data collection, as needed.

Observations included the following:

- Pre-fire stand condition of vegetation (growth, species composition);
- Post-fire stand condition of vegetation;
- Availability of natural seed sources on site and within natural seed distribution distance;
- Availability of suitable snags for retention;
- Availability and suitability of hardwoods for retention;
- Plantability (reasonable ability to plant conifers in an area), an estimate of physical effort needed to conduct artificial regeneration;
- Regeneration Potential, an estimate of the potential for artificial regeneration; and
- Site Class, Aspect, and Elevation estimates as they relate to artificial regeneration attributes and regeneration potential.

Stand data were compiled from existing plots in the project area and used to simulate future stand conditions based on proposed treatments. The Forest Vegetation Simulator (FVS) was used to estimate time needed to establish conifer-dominated stands. Northern spotted owl dispersal habitat charcteristics were used as a threshold for considering a stand to be on a trajectory towards late-successional characteristics (diameter at breast height of 11.0 inches, canopy cover 40%, percentage of conifer composition). In addition to using professional judgment and visual cues during site visits, Wieslander Vegetation mapping was used to assess historic species composition and conifer dominance throughout the project area (Kelly et al. 2005). Proposed units for planting were substantiated using this background information.

Analysis Indicators

- Acres treated (site prepared and planted) to promote conifer regeneration;
- Percent of landscape treated to restore a mature stand of conifers within 60 years with and without future fire disturbance; and
- Vegetation type regenerated in the short-term, and in the long-term.

Spatial and Temporal Context

Spatial bounding is limited to units within the project area considered for regeneration treatments (including salvage units, existing plantations, and select natural stands not included in salvage) and hazard tree removal along roads (areas where regeneration is likely to be affected by the project). The spatial area surrounding roads on which hazards trees may be removed averages an estimated 24 acres per road mile.

Both short-term and long-term effects will be considered in this analysis. Short-term temporal bounding is the time period in which treatments occur from harvest activity, site preparation, and planting; this is about one to five years because effects on regeneration will begin to be visible during this time period. Long-term temporal bounding is for an estimated 40-100 years from project implementation and is based on the maximum time for reduction of suface woody fuels following fire (Peterson, Dodson and Harrod 2014) and computer-generated modeling that showed stand conditions approaching the desired late-successional characteristics.

Affected Environment

Before the fires of 2014, vegetation types within the project area generally ranged from an oak/brush/grass type to well-stocked mixed conifers. Age classes ranged from 20 year-old plantations to late-successional forest. Using the existing vegetation layer provided from the CALVEG dataset, the size classes described in Table 1 were distributed throughout the project area. California Wildlife Habitat Relationships (CWHR) type is derived primarily from CALVEG type and relative cover of conifer and hardwood trees for various mixed conditions. It represents an estimate of the variation in stand conditions that existed before the fires. Table 1 displays the percentage of the project area that was classified by a specific size class prior to the fires as well as the percentage of each size class included within salvage units. Salvage treatments are only proposed for areas of moderate to high severity vegetation mortality (i.e. greater than 50 percent of trees fire-killed on a unit level, based on Rapid Assessment of Vegetation Condition after Wildfire (RAVG)). Using the field-verified RAVG data, treatments are proposed on 23% of the area within the 185,000-acre burn that resulted in greater than 50% mortality (64,000 acres burned with more than 50% mortality).

Table 1. Percentage of size classes within project area and within salvage units. (Note: Percentage does not equal 100% since some data was not classified in the dataset and was omitted from the table.)

CWHR Code	CWHR Size Class	DBH	Percentage of diameter class within Project Area	Percentage that burned with greater than 50% mortality within the Project Area	Percentage that burned with greater than 50% mortality within treatment units
1	Seedling tree	<1.0"	1%	<1	<1
2	Sapling tree	1.0" - 5.9"	6%	2	1
3	Pole tree	6.0" - 10.9"	16%	4	1
4	Small tree	11.0" - 23.9"	41%	11	3
5	Medium/large tree	≥24.0"	25%	6	2

6	Multi-layered tree	A distinct layer of size class 5 trees over a distinct layer of size class 4 and/or 3 trees, and total tree canopy of the layers ≥60% (layers must have ≥10.0% canopy cover and distinctive height separation).	0%	N/A	N/A
0	Not Determined / Not Applicable		<1%	<1%	<1%

The oak/brush/grass type is typically found on low-elevation sites on shallow, rocky soils located on southerly and westerly aspects which exhibit harsher conditions than on northerly and easterly aspects. As elevation increases, conifer species become more prevalent, primarily as a function of favorable environmental conditions for conifer survival and growth. Deeper, more developed soils than those at low elevations supported mixed conifer stands of Douglas-fir, ponderosa pine, incense cedar, and sugar pine. Higher elevation sites within the project area lend themselves to favorable conditions for red fir and white fir survival and growth, with white fir becoming a substantial component of the mixed conifer type. Hardwood species, including Pacific madrone, California black oak, canyon live oak, Oregon white oak, tanoak, and bigleaf maple are generally a minor component of mixed conifer stand composition.

The project is focused on areas that burned with moderate and high vegetation severity. High severity areas are characterized by total or near-total conifer crown consumption. Individual trees in this condition were either killed or damaged beyond their ability to survive. Within areas of moderate burn intensity, some crown consumption has occurred as a result of the fire but these areas are characterized by total or near-total crown scorch. The vast majority of crown-scorched trees have been killed by the fire or damaged beyond their ability to survive. Within areas of light vegetative burn severity, the impacts on conifers were often severe, especially to the smaller size and lower crown classes. Within the fire-burned area, approximately 70% of all the xisting plantations survived the exreme fire conditions of the 2014 fires.

Understory vegetation has been totally consumed or top-killed throughout much of the project area; the degree of mortality is primarily a function of fire intensity. On areas burned at moderate to high intensity levels, mortality is essentially complete. On areas burned at low-intensity levels, if the fire was hot enough to consume the organic layer then understory vegetation, including conifer seedlings and saplings, were also killed.

Light-seeded, prolific, early successional weed and grass species, having survived the fire in unburned pockets and perimeter areas, will rapidly reinvade burned areas. Well-established perennial root or rhizome species will likely re-sprout from existing root systems. Brush species, such as manzanita, snowbrush, deerbrush and whitethorn, are well-adapted ecologically to the fire-impacted ecosystems. Assuming fire intensity and duration at less than lethal levels, these species are capable of root collar sprouting. Brush seed, which may retain viability for 40-150 years in the duff layer, will germinate in potentially large numbers for 2-3 years after fire-scarification. Fire top-killed hardwood tree species, such as black oak, tanoak, madrone, and live oak are also capable of root-collar sprouting. These species are able to take immediate advantage

of a well-established root system, giving them the inherent capability to grow rapidly for early site dominance.

There is an estimated 150,000 to 300,000 hundred cubic feet (ccf) (75 to 150 million board feet) of burned timber that may be removed. The removal of these dead trees will help ensure effective and timely restoration of burned treatment stands. Fire killed trees retain market value for approximately two years after the fire; smaller trees and smaller logs (less than 14 inches in diameter) lose value much more quickly than larger trees and logs (Lowell, Willits, and Krahmer 1992). The site is well roaded, making commercial removal of merchantable trees feasible. Without using the receipts from the sale and removal of dead trees, site recovery may be cost prohibitive. Planting without fuels reduction and site preparation would likely result in the loss of conifer plantations before they mature, given the median 8- to 38-year fire return interval of the Klamath Province (Skinner, Taylor, and Agee 2006).

Several factors influence the rate of deterioration of fire-killed trees: tree species, species characteristics (such as bark thickness or depth of sapwood), tree diameter, rate of growth, age, local site conditions, severity of the fire, and time of year the burn took place (Lowell et al, 1992). Bark provides a protective covering for the cambial layer in a tree. Trees with thinner bark are more susceptible to fire damage and tend to deteriorate more rapidly than those with thicker bark. Sapwood in all species is susceptible to decay. It is the first merchantable part of fire-killed or damaged trees to be degraded by insects, and stain and decay fungi. Large diameter trees generally decay slower than small diameter trees, and older trees generally decay slower than young trees. Less sapwood volume and decreased growth rates within the sapwood are partially the reason. When the effects of diameter and age are combined, a larger diameter tree will deteriorate more slowly than a smaller diameter tree if the difference is a result of age and not rate of growth. A faster rate of growth may offset this advantage of a large diameter tree (Lowell et al, 1992).

Insects (primarily beetles), stain and decay fungi, and weather all act as deterioration agents in fire-killed timber. Insect activity usually precedes fungal activity and provides a mechanism for introducing fungi that accelerate sapwood deterioration. Fungal decay, once introduced, will deteriorate the sapwood ahead of any insect damage. Decay causes reductions in strength properties of wood, rendering the wood useless from a structural standpoint, and thus decreasing useable log volume. In addition to the deterioration caused by stain, decay, and insects, weather checking also contributes to loss. Weather checking is cracks that form vertically in the wood as the tree dries out. With time, the cracks go deeper into the log, and the portion of the log that is checking is unusable for manufacturing boards.

Beyond the important safety concerns associated with fallen snags, deterioration of the fire-killed and damaged trees reduces the quality, the merchantable volume, and value of the lumber. The reduction in value impacts the revenue the federal government receives from stumpage and it also impacts the ability to cost effectively remove the dead trees. There are numerous examples of recent fires where the timber went unsold and unharvested because delay caused deterioration, rendering the trees worthless in the marketplace. Ultimately, the cost of removal far exceeds the

value of the trees, and the government is faced with the dilemma of an increasing fuel load and no funds available to mitigate the impact.

Consequences Common to All Alternatives

Lands within the Inventoried Roadless Areas (IRA) will revegetate through natural successional processes. Because of the intensity of the burn, partially a result of a moderate intensity burn from 1987 that did not receive follow up fuels treatment or maintenance in some areas, few potential seed-sources remain over large areas within the IRAs. Thus, conifer stand re-development will require a long period of time.

The effects of wildfire on the vegetation are the same for all alternatives. The existing diversity of vegetation within the project area is primarily a result of prior fire history.

Additional trees will be killed by insects within and adjacent to the fire area. The perimeter of intensely burned stands and interior islands of partially scorched trees are most susceptible to attack by bark beetles. Other factors affecting susceptibility include site quality, tree size, weather and other pathogens. The extent of this additional damage is not estimated.

Consequences Common to Alternative 1

Alternative 1 has the greatest risk of bark beetle population increases, primarily because all stressed trees remain. This results in the maximum potential habitat source, and the maximum potential loss of living trees as the insect population moves into lightly burned areas and adjacent green stands. Only minor mortality is anticipated in stands outside the fire affected area. Previous experience indicates that an outbreak could be intense for the next one or two years.

After fire mortality has ceased, some stands would be understocked or non-stocked for long-term timber production.

Consequences Common to All Action Alternatives

Low-intensity burned stands with scattered dead trees would have sufficient surviving trees, and are anticipated to maintain minimum stocking levels after salvage harvest. No planting would be planned in small understocked areas within these stands, although some natural regeneration is anticipated. This mixture of stand types and openings would favor highly diverse species composition and stand structure over time.

Areas harvested using ground-based systems would increase soil disturbance, which has a short-term, minor effect on relative species dominance. During the period immediately following harvest, invading species which thrive on disturbed soil would occupy a greater portion of the growing space. These populations are generally transitory and decrease with development of new conifer stands.

Potential cumulative effects of alternatives are changes in species distribution and stand structure development due to reforestation activities. These vary, being primarily a function of the acreage reforested and managed for either future wildlife habitat or commodity outputs.

Artificial regeneration (planting) would be the principal method of reforestation in all action alternatives. It is anticipated that natural regeneration would supplement planted trees in areas where surviving overstory conifers are present and site conditions are favorable.

There is an anticipated delay, from the occurrence of the Westside Project fires to the time of planting, of an estimated two to four years. This delay would allow for the re-vegetation of grasses, forbs, brush, and hardwoods on suitable lands, thus giving them substantial competitive advantage over species planted later. These competitors must be adequately treated during site preparation and release treatments if conifer reforestation efforts are to succeed.

Although post-fire observations may indicate surprisingly prolific regeneration, even on severely burned sites, natural regeneration establishment in local wildfires in the past led to desired stocking levels typically only being met around the edges of the fire where a good seed source is still intact (Bonnett, Schoettle, & Shepperd, 2005).

A variety of conditions exist in this area due to the range in fire severity. In low severity areas, a small number of trees were killed, but in areas of moderate to high severity tree mortality is extensive. In low severity areas, the fire was primarily a surface fire, removing mostly duff, needles and surface fuels. The majority of trees in these areas survived. The forest canopy cover is still intact. There could be some understory vegetation and natural conifer regeneration in any newly created openings. Whereas, in the high severity deforested areas not being salvaged or reforested, primarily due to their small size, land management allocation or accessibility via existing roads, where the fire left conditions of deforestation, stands are basically snag patches that will be left to regenerate naturally over decades or centuries.

Environmental Consequences

Alternative 1

Direct and Indirect Effects

After fire mortality has ceased, large areas severely-affected by the 2014 fires will be understocked or non-stocked for long-term wildlife habitat development and conifer regeneration for many decades. Suitable lands for conifer regeneration will be re-occupied, generally by brush and hardwood species. Without salvage, site preparation and planting, severely burned stands will likely be replaced by shrub-land (Skinner, Taylor and Agee, 2006); regeneration of conifers and restoration of forested wildlife habitat will take decades, or even longer. Reforestation will slowly occur naturally but may take many decades to replace brushfields (Zhang, Webster, Powers and Mills, 2008). Successful natural regeneration in 1-2 decades, though highly variable, has been documented in the Klamath Province (Shatford, Hibbs and Puettman, 2007). If replanted stands experience a longer fire return interval, then they are more likely to reach maturity than naturally regenerated stands which may never reach maturity due to heavy fuel loadings and the historic fire regime. Within the fire-burned area, approximately 70% of all the existing plantations survived the exreme fire conditions of the 2014 Fires.

The entire burned area will be left to recover naturally. Re-establishment of forest cover will rely on natural regeneration and may take decades or longer. For the larger, contiguous areas of high-severity burn, re-vegetation will take a long period of time due, in part, to the distance from seed sources. In some cases of high-severity burn, there are no living conifer trees available to provide potential seed for potential natural regeneration for several miles.

Lands unsuitable for conifer growth will re-vegetate through natural successional processes. Grasses, forbs, brush, and hardwoods will continue to dominate these sites for many years. Without reforestation efforts, these areas will re-vegetate primarily as areas of grass, shrubs and some hardwoods, resulting in a loss of the conifer forest habitat that previously existed, for an indefinite period of time. Conifers will generally consist of scattered individual or small groups of ponderosa pine, sugar pine, knobcone pine, Douglas-fir, incense cedar, and white fir.

Associated fuels reduction treatments, will not occur with implementation of this alternative. Successful natural regeneration in one to two decades, though highly variable, has been documented in the Klamath Province (Shatford et al., 2007). Without reforestation efforts, these areas will re-vegetate primarily as areas of grass, shrubs and some hardwoods, resulting in a loss of the conifer forest habitat that previously existed, for an indefinite period of time. Conifers will generally consist of scattered individual or small groups of ponderosa pine, sugar pine, knobcone pine, Douglas-fir, incense cedar, and white fir.

Overstory and understory vegetation which was killed but not consumed by the fire will remain in stands as fuels hazard. Given the high residual fuel loading, probable length of time required for site dominance by conifers and the fire history, it is likely the area will re-burn before fire-resilient trees can become established. Vegetation is likely to go through an extensive time-period of hardwood- and brush-dominated site occupancy (Zhang et al., 2008).

Although natural regeneration of conifer species has occurred elsewhere, following more typical wildfire site conditions, the project area has a higher percentage of acres burned at high intensities than more typical historic patterns, resulting in prolonged regeneration periods and variable stocking patterns on unplanted sites (Shatford et al., 2007). Assuming large, stand-replacing fires will continue to occur, long-lasting early-seral plant communities will increase within the project area primarily because more area is burned at higher intensities than historic patterns predict, (Skinner et al., 2006). Although post-fire observations may indicate surprisingly prolific regeneration, even on severely burned sites, natural regeneration establishment in local wildfires in the past led to desired stocking levels typically only being met around the edges of the fire where a good seed source is still intact (Bonnett, Schoettle, and Shepperd, 2005). The remaining standing dead trees would be a hazard to new plantations, forest visitors, and forest workers as dead trees fall or create increased fuel on the ground.

The likelihood and time required for conifer regeneration is affected by bark beetle infestations. Alternative 1 has a sizeable risk of bark beetle population increases, primarily because all stressed trees remain. This results in the maximum potential habitat source for beetles, and the maximum potential loss of living trees as the insect population moves into lightly burned areas and adjacent green stands. Lesser levels of mortality are anticipated in stands outside the fire-affected area than in the project area but some increase in beetle infestation is expected among live trees. Experience from previous wildfires indicates that an outbreak can be intense for the one to two years post-fire.

Cumulative Effects

Adding the effects of alternative 1 to those of current and reasonable foreseeable future actions listed in appendix C of the DEIS will provide no measurable cumulative effects to the extent and time required for conifer regeneration.

Alternative 2

Direct and Indirect Effects

Salvage Harvest and Reforestation

Salvage harvest units, most of which will have subsequent site preparation and planting, will occur on an estimated 6,800 acres (four percent of the National Forest System land within the project area). Proposed acres of salvage and planting are in areas that primarily burned with high severity effects on vegetation. High severity burn areas have very few seed-cone capable trees remaining to provide natural seedling capability. Without salvage and planting, these areas will likely not regenerate satisfactorily for many decades. The techniques used for salvage harvest, site preparation and planting, and the number of acres proposed for each technique, are displayed in chapter 2 of the EIS. For the purposes of this analysis, trees within salvage units that have a greater than 70% probability of mortality from fire damage are considered fire-killed and may be harvested; trees that have greater than 30% probability of surviving are considered green and will be retained unless they pose an eminent threat to safety or must be removed for safe and efficient logging operations. Salvage harvest units boundaries may include Riparian Reserves and patches of green trees that burned with lower severity but these areas will not be harvested. Acres salvage harvested and site prepared will be planted with a variety of coniferous species to ensure diversity, and will be released from competing vegetation within a year or so of being planted. Salvage harvest, followed by site preparation, planting, and release gives the highest likelihood of successful conifer regeneration. Twenty-three percent of the landscape that burned at moderate to high severity will be treated (including salvage harvest and site preparation and planting outside harvest units) to achieve mature conifer stands.

With implementation of salvage harvest, some temporary roads will be utilized to access units. Given the relatively short individual segments and typical fourteen foot width of temporary roads, measurable effects to fragmentation are not anticipated. Across the entire project area, thirty-eight acres of temporary roads are anticipated to be used, or 0.02% of the landscape. Grasses and forbs are likely to re-occupy temporary roads within 3-5 years after use. Shrubs, hardwoods and conifer seedlings can become established within 2-10 years following road use depending on the vegetation that existed prior to the fire in addition to other unknowns such as future fire events or weather occurrences.

If fuels are treated effectively, and the area is planted, the amount of time needed to restore the site to a sustainable coniferous forest may be reduced. Removing large trees by salvage is not sufficient fuel treatment. Research has shown that plantations established in areas with high slash loadings burned severely, while those where residual slash had been adequately treated burned with much less intensity or not at all (Thompson, Spies and Ganio 2007; Weatherspoon and Skinner 1995). Therefore, effective fuel treatment is an essential component of sustainable reforestation in the Klamath Province (Peterson et al. 2014). Research has shown that the quickest way to reestablish a coniferous forest after stand replacement fire is by active

reforestation (Rose and Haase 2005). Aggressive reduction of residual fuels will be necessary to prevent future fire events from becoming stand replacing fires that destroy planted seedlings. Research has shown fuel treatments increase the likelihood of the planted trees surviving future fires. (Weatherspoon and Skinner 1995, Omi and Kalabokidis 1991). Heavy residual fuels need to be reduced substantially to help assure sustainability of plantations. Follow-up reforestation surveys will be completed to assure that the reforestation objectives are achieved.

Since most of the fire-burned areas will be allowed to regenerate naturally (only four percent will be salvage harvested and another four percent will be site prepared and planted outside salvage units), many acres of lands suitable for conifer growth will continue to be understocked or non-stocked by conifers, possibly for decades. These suitable lands will generally be re-occupied by brush and hardwood species. Substantial snag stocking will remain on these reforested lands. Low-impact site preparation methods, which create fewer suitable planting spots, combined with losses inflicted by falling snags, and limited access, results in generally poor chances for conifer re-establishment on these sites.

Lands unsuitable for conifer growth will also re-vegetate through natural successional processes. Grasses, forbs, brush, and hardwoods will continue to dominate vegetation on these sites.

Natural Stand Areas Reforestation and Conifer Plantation Reforestation outside Salvage Units

In addition to salvage harvest acres site prepared and planted, select natural stands and conifer plantations that became non-stocked or understocked as a result of the 2014 Fires will be site prepared and planted with implementation of alternative 2. Natural stand and conifer plantation site preparation and planting, will occur on an estimated 7,900 acres (four percent of National Forest System lands in the project area). Proposed acres of site preparation and planting are primarily in high severity burn areas that have very few seed-cone capable trees remaining to provide natural seedling capability. Thus, without salvage and planting, these areas will likely not regenerate conifers satisfactorily for many decades. Techniques and acres assigned to each technique are displayed in chapter 2 of the EIS.

Roadside Hazard Tree Removal

Hazard tree removal is not a silvicultural treatment to promote conifer regeneration. Hazard tree felling, and where appropriate, removal, is proposed to address public and administrative safety concerns due to the risk of trees falling onto roads. Where hazard tree removal overlaps with proposed salvage harvest units, the effects are the same as salvage effects. Hazard tree removal where it does not overlap with proposed salvage harvest units will decrease fuel loading and, therefore, potential fuels hazard; this will indirectly promote conifer regeneration. Where seed sources are adjacent to roadside hazard removal areas, it is likely that natural regeneration will occur.

Cumulative Effects

The projects added to the effects of the past actions (the affected environment) and the direct and indirect effects of the project are portions of the Elk Thin Project (underburning), the Happy Camp Fire Portection Project, Phase 2 (roadside buffer) and the Thom-Seider Vegetation

Management and Fuel Reduction Project (various treatments). When combined with the direct and indirect effects of the proposed salvage, site preparation, and planting treatments, the end result would be an increase in acres treated for hazardous fuels reduction, an increase in acres of roadside treatments and an increase in acres of planted conifer stands set on a trajectory towards establishing resilience to fire, insects and disease. The objectives of the proposed project are in concert with those proposed by these overlapping projects which may no longer be implemented within the project area due to changes in conditions. However, given the desired condition of resilience and fuels reduction, the proposed treatments will will beneficially increase the magnitude of the effects of these fuels reduction activities.

Alternative 3

Direct and Indirect Effects

Effects of alternative 3 will be the same as for alternative 2 for areas in which salvage harvest is implemented (5,800 acres, three percent of the National Forest System lands within the project area). Twenty-one percent of the landscape that burned at moderate to high severity will be treated to achieve mature conifer stands. Effects of site preparation and planting outside of salvage units are the same as for alternative 2. Effects of areas that are not salvage harvested will be the same as those in alternative 1.

Cumulative Effects

Cumulative effects for alternative 3 are the same as for alternative 2 for areas in which salvage harvest is implemented. Effects of site preparation and planting outside of salvage units are the same as for alternative 2. Effects of areas that are not salvage harvested are the same as those in alternative 1.

Alternative 4

Direct and Indirect Effects

Effects of alternative 4 will be the same as for alternative 2 for areas in which salvage harvest is implemented (5,900 acres , three percent of the National Forest System lands within the project area). Twenty-two percent of the landscape that burned at moderate to high severity will be treated to achieve mature conifer stands. Effects of site preparation and planting outside of salvage units are the same as for alternative 2. Effects of areas that are not salvage harvested will be the same as those in alternative 1.

Cumulative Effects

Cumulative effects for alternative 4 are the same as for alternative 2 for areas in which salvage harvest is implemented. Effects of site preparation and planting outside of salvage units are the same as for alternative 2. Effects of areas that are not salvage harvested are the same as those in alternative 1.

Alternative 5

Direct and Indirect Effects

Effects of alternative 5 will be the same as for alternative 2 for areas in which salvage harvest is implemented (1,900 acres, one percent of the National Forest System lands within the project

area). Effects of site preparation and planting outside of salvage units are the same as for alternative 2 except site preparation and planting will occur on only 3,860 acres of matrix lands (two percent of the National Forest System lands within the project area). Nine percent of the landscape that burned at moderate to high severity will be treated to achieve mature conifer stands. Effects of areas that are not salvage harvested will be the same as those in alternative 1.

Cumulative Effects

Cumulative effects for alternative 5 are the same as for alternative 2 for areas in which salvage harvest is implemented except on fewer acres. Effects of site preparation and planting outside of salvage units are the same as for alternative 2 except on fewer acres. Effects of areas that are not salvage harvested are the same as those in alternative 1.

Comparison of Effects

Alternative 1 will, in time, result in reestablishment of a coniferous forest (Zhang et al., 2008; Shatford et al., 2007); however, that forest may not be sustainable in terms of fuels and fire history because residual fuels will not have been treated. It may also take decades to reach that stage (Zhang et al., 2008). Given the fire return interval of the Klamath Province and the fuels present on the site, a stand replacement re-burn is likely simply because it takes so long for a coniferous forest to reestablish itself without fuels reduction and active reforestation; re-burns where fuels are heavy and tend to be stand replacement events (Skinner et al., 2006; Weatherspoon and Skinner, 1995). The result will likely be a loss of forest cover in this area and a conversion to brush/hardwoods.

A comparison of the analysis indicators is shown in the table below.

Table 2 - Comparison of analysis indicators for each alternative

Treatments	Alternative 1	Alternative 2	Alternative 3	Alternative 4	Alternative 5
Acres treated (site prepared and planted) to promote conifer regeneration	0	14,700	13,700	13,800	5,700
Percent of moderate to high severity burned landscape restored to a mature stand within 60 years	0	23%	21%	22%	9%

Type of vegetation likely to regenerate in short – term and long-term	Short-term	Grass, forbs, brush	Brush, hardwoods, young conifers	Brush, hardwoods, young conifers	Brush, hardwoods, young conifers	Brush, hardwoods, some young conifers within matrix lands
	Long-term	Brush, hardwoods, isolated patches of conifers	Mature, mixed conifer stands	Mature, mixed conifer stands	Mature, mixed conifer stands	Brush, hardwoods, mature mixed conifer within matrix lands; isolated conifers in late successional reserves

Compliance with Law, Regulation, and Policy

All alternatives are in compliance with law, regulation, policy and the Forest Plan in relation to vegetation as displayed in the Forest Plan consistency checklist. Silvicultural prescriptions under action alternatives comply with the Forest Plan. Salvage, site preparation and planting are all methods for establishing desired conifer stocking with some level of fire resilience once seedlings are established.

Alternative 1 and alternative 5 will, in time, result in reestablishment of a coniferous forest (Zhang et al. 2008; Shatford et al. 2007), but that forest may not be sustainable in terms of fuels and fire history because residual fuels will not have been treated or will only be treated in part. It may also take decades to reach that stage (Zhang et al. 2008). Given the fire return interval of the Klamath Province and the fuels present on the site, a stand replacement reburn is likely, because it takes so long for a coniferous forest to reestablish itself. Without fuels reduction and active reforestation in these conditions, reburns where fuels are heavy tend to be stand replacement events (Skinner et al. 2006; Weatherspoon and Skinner 1995). The result would likely be a loss of forest cover in this area and a conversion to brush/hardwoods.

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Appendix A– Salvage Units Reforestation Prescriptions

SALVAGE REFORESTATION SUMMARY[4] Alternative 2 - Westside Fire Recovery Project, Klamath National Forest Beaver Fire February 2015										
UNIT	**ACRES**	**ELEV/ ASPECT**	**DUNN S.C.**	**SLOPE**	**SITE PREP/FUELS TREATMENT**	**PLANTING/ CULTURAL PRESCRIPTION**	**RELEASE**	**ANIMAL PROTECT**	**SOILS**	**REMARKS**
1108-S	12.0	4,400' S	III	25-50%	Fall Residual Sub(<10); Handpile/Windrow<10; Cover Ign Pts;Fall Burn Piles	1-0 Cont- PP 100%; 250TPA; Hoe	1st &3rd Yr, Manual Grub; RFE	No	Fair Plant; Low Regen Potential	
1109-G	44.7	3,600' E	II	10-30%	Fall Residual Sub; Machine Pile;Fall Burn Piles	1-0 Cont- PP 75% DF 25%; 250TPA; Hoe	1st &3rd Yr, Manual Grub; RFE	Yes, DF	Good Plant; Mod Regen Potential	
1110-S	59.4	4,000' NE-E	II	25-50%	Fall Residual Sub(<10); Handpile/Windrow<10; Cover Ign Pts;Fall Burn Piles	1-0 Cont- PP 50% DF 50%; 250TPA; Hoe	1st &3rd Yr, Manual Grub; RFE	Yes, DF	Good Plant; Mod Regen Potential	
1128-G	8.9	2,600' S	III	15-35%	Fall Residual Sub; Machine Pile;Fall Burn Piles	1-0 Cont- PP 100%; 250TPA; Hoe	1st &3rd Yr, Manual Grub; RFE	No	Good Plant; Low-Mod Regen Potential	
1128-S	15.8	2,400' SE	III	30-55%	Fall Residual Sub(<10); Handpile/Windrow<10; Cover Ign Pts;Fall Burn Piles	1-0 Cont- PP 100%; 250TPA; Hoe	1st &3rd Yr, Manual Grub; RFE	No	Good Plant; Low-Mod Regen Potential	
1129-G	61.3	4,500' SE	III	15-40%	Fall Residual Sub; Machine Pile;Fall Burn Piles	1-0 Cont- PP 75% DF 25%; 250TPA; Hoe	1st &3rd Yr, Manual Grub; RFE	Yes, DF	Good Plant; Low-Mod Regen Potential	
1129-S	50.0	4,500' SE	III	30-50%	Fall Residual Sub(<10); Handpile/Windrow<10; Cover Ign Pts;Fall Burn Piles	1-0 Cont- PP 75% DF 25%; 250TPA; Hoe	1st &3rd Yr, Manual Grub; RFE	Yes, DF	Good Plant; Low-Mod Regen Potential	

[4] The total treatment acres as shown in Table 2 are not identical to those in this Alternative 2 Reforestation Summary. This summary includes all the original proposed salvage units for Alternative 2. Some units and acres may change in the Final Silviculture Report, however, no additional units are anticipated.

Appendix A– Salvage Units Reforestation Prescriptions

SALVAGE REFORESTATION SUMMARY[4] Alternative 2 - Westside Fire Recovery Project, Klamath National Forest Beaver Fire February 2015										
UNIT	**ACRES**	**ELEV/ ASPECT**	**DUNN S.C.**	**SLOPE**	**SITE PREP/FUELS TREATMENT**	**PLANTING/ CULTURAL PRESCRIPTION**	**RELEASE**	**ANIMAL PROTECT**	**SOILS**	**REMARKS**
1135-S	70.3	3,600' E	III	35-60%	Fall Residual Sub(<10); Handpile/Windrow<10; Cover Ign Pts;Fall Burn Piles	1-0 Cont- PP 50% DF 50%; 250TPA; Hoe	1st &3rd Yr, Manual Grub; RFE	Yes, DF	Good Plant; Mod-High Regen Potential	
1136-G	87.4	4,200' E-SE	III	10-30%	Fall Residual Sub; Machine Pile;Fall Burn Piles	1-0 Cont- PP 75% DF 25%; 250TPA; Hoe	1st &3rd Yr, Manual Grub; RFE	Yes, DF	Good Plant; Mod Regen Potential	
1140-G	142.1	3,900' S-E	III	15-35%	Fall Residual Sub; Machine Pile;Fall Burn Piles	1-0 Cont- PP 100%; 250TPA; Hoe	1st &3rd Yr, Manual Grub; RFE	No	Good Plant; Low-Mod Regen Potential	Very dissected ground
1142-G	83.9	3,600' X-E	II	10-30%	Fall Residual Sub; Machine Pile;Fall Burn Piles	1-0 Cont- PP 25% DF 75; 250TPA; Hoe	1st &3rd Yr, Manual Grub; RFE	Yes, DF	Good Plant; Mod-High Regen Potential	
1151-G	97.5	3,100' E	III	10-35%	Fall Residual Sub; Machine Pile;Fall Burn Piles	1-0 Cont- PP 50% DF 50%; 250TPA; Hoe	1st &3rd Yr, Manual Grub; RFE	Yes, DF	Good Plant; Mod-High Regen Potential	
1155-G	92.7	3,500' S	IV	15-40% Benchy	Fall Residual Sub; Machine Pile;Fall Burn Piles	1-0 Cont- PP 100%; 250TPA; Hoe	1st &3rd Yr, Manual Grub; RFE	No	Good Plant; Low-Mod Regen Potential	
1217-G	13.7	4,200' SE	II	15-45%	Fall Residual Sub; Machine Pile;Fall Burn Piles	1-0 Cont- PP 75% DF 25%; 250TPA; Hoe	1st &3rd Yr, Manual Grub; RFE	Yes, DF	Good Plant; Mod Regen Potential	

SALVAGE REFORESTATION SUMMARY Alternative 2 - Westside Fire Recovery Project, Klamath National Forest Happy Complex Fire February 2015										
UNIT	**ACRES**	**ELEV/ ASPECT**	**DUNN S.C.**	**SLOPE**	**SITE PREP/FUELS TREATMENT**	**PLANTING/ CULTURAL PRESCRIPTION**	**RELEASE**	**ANIMAL PROTECT**	**SOILS**	**REMARKS**
3-H	11.7	5,600' X-W	III	35-65%	Fall Residual Sub(<10); Handpile/Windrow<10;	1-0 Cont- PP 50%/DF 25%/WF 25%	1st &3rd Yr, Manual Grub;	Yes – WF	Fair Plant; Low Regen	Originally labelled as Unit '003-1'

Appendix A– Salvage Units Reforestation Prescriptions

SALVAGE REFORESTATION SUMMARY Alternative 2 - Westside Fire Recovery Project, Klamath National Forest Happy Complex Fire February 2015										
UNIT	**ACRES**	**ELEV/ ASPECT**	**DUNN S.C.**	**SLOPE**	**SITE PREP/FUELS TREATMENT**	**PLANTING/ CULTURAL PRESCRIPTION**	**RELEASE**	**ANIMAL PROTECT**	**SOILS**	**REMARKS**
					Cover Ign Pts;Fall Burn Piles	300TPA; Hoe	RFE		Potential	
3-H	70.0	4,400‘ W	III	45-75%	Fall Residual Sub(<10); Handpile/Windrow<10; Cover Ign Pts;Fall Burn Piles	1-0 Cont- PP 50%/DF 50%; 300TPA; Hoe	1st &3rd Yr, Manual Grub; RFE	No	Fair Plant; Low-Mod Regen Potential	Originally labelled as Unit ’003-2’
3-S	27.6	4,800’ W	III	35-65%	Fall Residual Sub(<10); Handpile/Windrow<10; Cover Ign Pts;Fall Burn Piles	1-0 Cont- PP 50%/DF 25%/WF 25% 300TPA; Hoe	1st &3rd Yr, Manual Grub; RFE	Yes – WF	Fair Plant; Low Regen Potential	Originally labelled as Unit ’003’
5-G	3.4	4,800‘ W	III	25-45%	Fall Residual Sub; Machine Pile;Fall Burn Piles	1-0 Cont- PP 50%/DF 50%; 300TPA; Hoe	1st &3rd Yr, Manual Grub; RFE	No	Fair Plant; Low Regen Potential	Originally labelled as Unit ‘005-4’
5-G	3.9	4,700‘ X	III	25-30%	Fall Residual Sub; Machine Pile;Fall Burn Piles	1-0 Cont- PP 50%/DF 50%; 300TPA; Hoe	1st &3rd Yr, Manual Grub; RFE	No	Fair-Good Plant; Low-Mod Regen Potential	Originally labelled as Unit ‘005-1’
5-H	75.3	2,600‘ E-NE	II	25-70%	Fall Residual Sub(<10); Handpile/Windrow<10; Cover Ign Pts;Fall Burn Piles	1-0 Cont- DF 100%; 300TPA; Hoe	1st &3rd Yr, Manual Grub; RFE	No	Good Plant; Mod-High Regen Potential	Originally labelled as Unit ’005-12’
5-H	60.9	4,100‘ W-E-NE	III	10-65%	Fall Residual Sub(<10); Handpile/Windrow<10; Cover Ign Pts;Fall Burn Piles	A)1-0 Cont- PP 75%/DF 25%; 300TPA; Hoe (50% of unit) B)1-0 Cont- PP 25%/DF 75%; 300TPA; Hoe (50% of unit)	1st &3rd Yr, Manual Grub; RFE	No	Fair Plant; Low-Mod Regen Potential	Originally labelled as Unit ’005-9’ Ridge splits unit - Planting Rx: A- West of ridge B- East of ridge
5-H	81.9	3,000‘ W	III	50-75%	Fall Residual Sub(<10); Handpile/Windrow<10; Cover Ign Pts;Fall Burn Piles	1-0 Cont- PP 100%; 300TPA; Hoe	1st &3rd Yr, Manual Grub; RFE	No	Fair Plant; Low-Mod Regen Potential	Originally labelled as Unit ‘005-5’ Old Scarp
5-H	49.6	3,000‘ W-E-N	III	35-75%	Fall Residual Sub(<10); Handpile/Windrow<10; Cover Ign Pts;Fall Burn Piles	A)1-0 Cont- DF 100%; 300TPA; Hoe (50% of unit) B)1-0 Cont- PP 50%/DF 50%; 300TPA; Hoe (50% of unit)	1st &3rd Yr, Manual Grub; RFE	No	Fair-Good Plant; Low-Mod Regen Potential	Originally labelled as Unit ‘005-7’ East Walker Creek split; Planting Rx: A- West of Creek East of Creek
5-H	32.7	4,800‘ N-W	III	25-70%	Fall Residual Sub(<10); Handpile/Windrow<10; Cover Ign Pts;Fall Burn Piles	1-0 Cont- PP 50%/DF 50%; 300TPA; Hoe	1st &3rd Yr, Manual Grub; RFE	No	Fair-Good Plant; Low-Mod Regen Potential	Originally labelled as Unit ‘005-3’

Appendix A– Salvage Units Reforestation Prescriptions

SALVAGE REFORESTATION SUMMARY Alternative 2 - Westside Fire Recovery Project, Klamath National Forest Happy Complex Fire February 2015										
UNIT	**ACRES**	**ELEV/ ASPECT**	**DUNN S.C.**	**SLOPE**	**SITE PREP/FUELS TREATMENT**	**PLANTING/ CULTURAL PRESCRIPTION**	**RELEASE**	**ANIMAL PROTECT**	**SOILS**	**REMARKS**
5-H	18.2	3,600‘ E	II	40-80%	Fall Residual Sub(<10); Handpile/Windrow<10; Cover Ign Pts;Fall Burn Piles	1-0 Cont- SP 10%/DF 90%; 300TPA; Hoe	1st &3rd Yr, Manual Grub; RFE	No	Good Plant; High Regen Potential	B- Originally labelled as Unit ‘005-8’
5-H	142.2	3,200’ N	II	25-75%	Fall Residual Sub(<10); Handpile/Windrow<10; Cover Ign Pts;Fall Burn Piles	1-0 Cont- DF 100%; 300TPA; Hoe	1st &3rd Yr, Manual Grub; RFE	No	Good Plant; High Regen Potential	Originally labelled as Unit ‘005-11’
5-S	13.4	3,100‘ W-NW-E	III	40-65%	Fall Residual Sub(<10); Handpile/Windrow<10; Cover Ign Pts;Fall Burn Piles	A)1-0 Cont- PP 75%/DF 25%; 300TPA; Hoe (50% of unit) B)1-0 Cont- DF 100% 300TPA; Hoe (50% of unit)	1st &3rd Yr, Manual Grub; RFE	No	Fair-Good Plant; Low-Mod Regen Potential	Originally labelled as Unit ’005’ Planting Rx: A- West B- East
5-S	16.2	3,500‘ W	III	40-70%	Fall Residual Sub(<10); Handpile/Windrow<10; Cover Ign Pts;Fall Burn Piles	1-0 Cont- PP 75%/DF 25%; 300TPA; Hoe	1st &3rd Yr, Manual Grub; RFE	No	Fair Plant; Low-Mod Regen Potential	Originally labelled as Unit ’005-10’
13-H	59.2	3,600‘ N-W	II	45-75%	Fall Residual Sub(<10); Handpile/Windrow<10; Cover Ign Pts;Fall Burn Piles	A)1-0 Cont- PP 50%/DF 50%; 300TPA; Hoe (50% of unit) B)1-0 Cont- PP 25%/DF 75% 300TPA; Hoe (50% of unit)	1st &3rd Yr, Manual Grub; RFE	No	Good Plant; Mod-High Regen Potential	Slinkard Peak Planting Rx: A- West B- East
20-G	16.7	2,600‘ X	II	15-30%	Fall Residual Sub; Machine Pile;Fall Burn Piles	1-0 Cont- DF 100%; 300TPA; Hoe	1st &3rd Yr, Manual Grub; RFE	No	Good Plant; Mod-High Regen Potential	Originally labelled as Unit ‘20’
21-S	13.8	2,600‘ E	II	20-50%	Fall Residual Sub; Machine Pile;Fall Burn Piles	1-0 Cont- DF 100%; 300TPA; Hoe	1st &3rd Yr, Manual Grub; RFE	No	Good Plant; Fair-Mod Regen Potential	Originally labelled as Unit ‘21’
21-S	3.4	3,200’ E	II	40-65%	Fall Residual Sub(<10); Handpile/Windrow<10; Cover Ign Pts;Fall Burn Piles	1-0 Cont- DF 100%; 300TPA; Hoe	1st &3rd Yr, Manual Grub; RFE	No	Fair-Good Plant; Mod-High Regen Potential	Originally labelled as Unit ’21-1’
22-H	48.7	2,500‘ E	II	20-75%	Fall Residual Sub(<10); Handpile/Windrow<10; Cover Ign Pts;Fall Burn Piles	1-0 Cont- DF 100%; 300TPA; Hoe	1st &3rd Yr, Manual Grub; RFE	No	Good Plant; Mod-High Regen Potential	Originally labelled as Unit ’22-1’ Louie Creek

Appendix A– Salvage Units Reforestation Prescriptions

SALVAGE REFORESTATION SUMMARY Alternative 2 - Westside Fire Recovery Project, Klamath National Forest Happy Complex Fire February 2015										
UNIT	**ACRES**	**ELEV/ ASPECT**	**DUNN S.C.**	**SLOPE**	**SITE PREP/FUELS TREATMENT**	**PLANTING/ CULTURAL PRESCRIPTION**	**RELEASE**	**ANIMAL PROTECT**	**SOILS**	**REMARKS**
22-S	61.9	2,400‘ N	II	30-70%	Fall Residual Sub(<10); Handpile/Windrow<10; Cover Ign Pts;Fall Burn Piles	1-0 Cont- DF 100%; 300TPA; Hoe	1st &3rd Yr, Manual Grub; RFE	No	Good Plant; Mod-High Regen Potential	Originally labelled as Unit ‘022’
22-S	62.2	3,600’ NE	III	35-70%	Fall Residual Sub(<10); Handpile/Windrow<10; Cover Ign Pts;Fall Burn Piles	1-0 Cont- DF 100%; 300TPA; Hoe	1st &3rd Yr, Manual Grub; RFE	No	Fair-Good Plant; Mod Regen Potential	Originally labelled as Unit ‘22’
23-S	804.9	3,500‘ N-E	II	35-75%	Fall Residual Sub(<10); Handpile/Windrow<10; Cover Ign Pts;Fall Burn Piles	1-0 Cont- SP 10%/DF 90%; 300TPA; Hoe	1st &3rd Yr, Manual Grub; RFE	No	Good Plant; Mod Regen Potential	Originally labelled as Unit ‘23-1’
31-H	20.6	2,400‘ N-NW	II	40-70%	Fall Residual Sub(<10); Handpile/Windrow<10; Cover Ign Pts;Fall Burn Piles	1-0 Cont- DF 100%; 300TPA; Hoe	1st &3rd Yr, Manual Grub; RFE	No	Good Plant; Mod-High Regen Potential	Originally labelled as Unit ‘031’ Adjacent to Private
32-H	295.3	2,800’ E	II	20-70%	Fall Residual Sub(<10); Handpile/Windrow<10; Cover Ign Pts;Fall Burn Piles	1-0 Cont- DF 90%/SP 10%; 300TPA; Hoe	1st &3rd Yr, Manual Grub; RFE	No	Good Plant; Mod-High Regen Potential	Originally labelled as Unit ‘032’
32-S	17.4	2,000‘ NE	II	25-60%	Fall Residual Sub(<10); Handpile/Windrow<10; Cover Ign Pts;Fall Burn Piles	1-0 Cont- DF 90%/SP 10%; 300TPA; Hoe	1st &3rd Yr, Manual Grub; RFE	No	Good Plant; Mod-High Regen Potential	Originally labelled as Unit ‘032-1’ Adjacent to Private Kuntz Creek
33-G	8.0	1,800‘ NE	II	15-25%	Fall Residual Sub; Machine Pile;Fall Burn Piles	1-0 Cont- DF 90%/SP 10%; 300TPA; Hoe	1st &3rd Yr, Manual Grub; RFE	No	Good Plant; High Regen Potential	Originally labelled as Unit ‘033’ Adjacent to Private
33-G	1.7	1,800‘ NE	II	15-25%	Fall Residual Sub; Machine Pile;Fall Burn Piles	1-0 Cont- DF 90%/SP 10%; 300TPA; Hoe	1st &3rd Yr, Manual Grub; RFE	No	Good Plant; High Regen Potential	Originally labelled as Unit ‘033-2’ Adjacent to Private
33-H	39.6	1,800‘ E-NE	II	15-55%	Fall Residual Sub(<10); Handpile/Windrow<10; Cover Ign Pts;Fall Burn Piles	1-0 Cont- DF 90%/SP 10%; 300TPA; Hoe	1st &3rd Yr, Manual Grub; RFE	No	Good Plant; High Regen Potential	Originally labelled as Unit ‘033-1’ Adjacent to Private
34-H	37.2	2,400’ E-NE	II	35-65%	Fall Residual Sub(<10); Handpile/Windrow<10; Cover Ign Pts;Fall Burn Piles	1-0 Cont- DF 90%/SP 10%; 300TPA; Hoe	1st &3rd Yr, Manual Grub; RFE	No	Good Plant; High Regen Potential	Originally labelled as Unit ‘034’ Mill Creek
35-H	15.7	2,200‘ N	II	25-55%	Fall Residual Sub(<10); Handpile/Windrow<10; Cover Ign Pts;Fall Burn Piles	1-0 Cont- DF 90%/SP 10%; 300TPA; Hoe	1st &3rd Yr, Manual Grub; RFE	No	Good Plant; High Regen Potential	Originally labelled as Unit ‘035’ Macks Creek Adjacent to Private

Appendix A– Salvage Units Reforestation Prescriptions

SALVAGE REFORESTATION SUMMARY Alternative 2 - Westside Fire Recovery Project, Klamath National Forest Happy Complex Fire February 2015										
UNIT	**ACRES**	**ELEV/ ASPECT**	**DUNN S.C.**	**SLOPE**	**SITE PREP/FUELS TREATMENT**	**PLANTING/ CULTURAL PRESCRIPTION**	**RELEASE**	**ANIMAL PROTECT**	**SOILS**	**REMARKS**
36-H	58.1	2,200‘ NW	II	25-55%	Fall Residual Sub(<10); Handpile/Windrow<10; Cover Ign Pts;Fall Burn Piles	1-0 Cont- DF 75%/PP 25%; 300TPA; Hoe	1st &3rd Yr, Manual Grub; RFE	No	Good Plant; Mod-High Regen Potential	Originally labelled as Unit ‘036’ Adjacent to Private
39-H	28.1	2,300’ N	II	20-55%	Fall Residual Sub(<10); Handpile/Windrow<10; Cover Ign Pts;Fall Burn Piles	1-0 Cont- DF 90%/SP 10%; 300TPA; Hoe	1st &3rd Yr, Manual Grub; RFE	No	Fair-Good Plant; Mod-High Regen Potential	Originally labelled as Unit ‘039’ Adjacent to Private
40-H	34.2	2,800’ E	II	40-60%	Fall Residual Sub(<10); Handpile/Windrow<10; Cover Ign Pts;Fall Burn Piles	1-0 Cont- DF 90%/SP 10%; 300TPA; Hoe	1st &3rd Yr, Manual Grub; RFE	No	Good Plant; Mod-High Regen Potential	Originally labelled as Unit ‘040’
50-S	26.0	5,100’ SW	III	25-65%	Fall Residual Sub(<10); Handpile/Windrow<10; Cover Ign Pts;Fall Burn Piles	1-0 Cont- PP 100%; 300TPA; Hoe	1st &3rd Yr, Manual Grub; RFE	No	Fair Plant; Low Regen Potential	Originally labelled as Unit ’50-1’
50-H	85.8	5,100’ S	III	40-70%	Fall Residual Sub(<10); Handpile/Windrow<10; Cover Ign Pts;Fall Burn Piles	1-0 Cont- PP 100%; 300TPA; Hoe	1st &3rd Yr, Manual Grub; RFE	No	Fair Plant; Low Regen Potential	Originally labelled as Unit ’50’
51-H	190.7	4,000’ N-W	III	40-75%	Fall Residual Sub(<10); Handpile/Windrow<10; Cover Ign Pts;Fall Burn Piles	1-0 Cont- PP 25%/DF 75% 300TPA; Hoe	1st &3rd Yr, Manual Grub; RFE	No	Fair-Good Plant; Low-Mod Regen Potential	Originally labelled as Unit ’51-1’
51-S	88.2	4,700’ N-W	III	40-75%	Fall Residual Sub(<10); Handpile/Windrow<10; Cover Ign Pts;Fall Burn Piles	1-0 Cont- PP 25%/DF 75% 300TPA; Hoe	1st &3rd Yr, Manual Grub; RFE	No	Fair-Good Plant; Low-Mod Regen Potential	Originally labelled as Unit ’51’
52-S	64.2	4,700’ NW	III	35-65%	Fall Residual Sub(<10); Handpile/Windrow<10; Cover Ign Pts;Fall Burn Piles	1-0 Cont- PP 75%/DF 25% 300TPA; Hoe	1st &3rd Yr, Manual Grub; RFE	No	Fair Plant; Low-Mod Regen Potential	Originally labelled as Unit ’52’
52-S	59.5	5,000’ NW	III	35-75%	Fall Residual Sub(<10); Handpile/Windrow<10; Cover Ign Pts;Fall Burn Piles	1-0 Cont- PP 75%/DF 25% 300TPA; Hoe	1st &3rd Yr, Manual Grub; RFE	No	Fair Plant; Low-Mod Regen Potential	Originally labelled as Unit ’52-1’
53-H	61.5	3,800‘ W	III	40-75%	Fall Residual Sub(<10); Handpile/Windrow<10; Cover Ign Pts;Fall Burn Piles	1-0 Cont- PP 100%; 300TPA; Hoe	1st &3rd Yr, Manual Grub; RFE	No	Fair Plant; Low Regen Potential	Originally labelled as Unit ’53-1’

Appendix A– Salvage Units Reforestation Prescriptions

SALVAGE REFORESTATION SUMMARY Alternative 2 - Westside Fire Recovery Project, Klamath National Forest Happy Complex Fire February 2015										
UNIT	**ACRES**	**ELEV/ ASPECT**	**DUNN S.C.**	**SLOPE**	**SITE PREP/FUELS TREATMENT**	**PLANTING/ CULTURAL PRESCRIPTION**	**RELEASE**	**ANIMAL PROTECT**	**SOILS**	**REMARKS**
53-S	56.9	4,400‘ W	III	40-75%	Fall Residual Sub(<10); Handpile/Windrow<10; Cover Ign Pts;Fall Burn Piles	1-0 Cont- PP 100%; 300TPA; Hoe	1st &3rd Yr, Manual Grub; RFE	No	Fair Plant; Low Regen Potential	
54-S	82.6	4,400‘ N	III	30-60%	Fall Residual Sub(<10); Handpile/Windrow<10; Cover Ign Pts;Fall Burn Piles	1-0 Cont- PP 25%/DF 75% 300TPA; Hoe	1st &3rd Yr, Manual Grub; RFE	No	Good Plant; Mod-High Regen Potential	
55-G	10.6	3,300’ E-X-W	III	15-35%	Fall Residual Sub; Machine Pile;Fall Burn Piles	1-0 Cont- PP 50%/DF 50%; 300TPA; Hoe	1st &3rd Yr, Manual Grub; RFE	No	Good Plant; Mod-High Regen Potential	Originally labelled as Unit ’55-3’
55-G	45.2	4,800‘ X	III	20-40%	Fall Residual Sub; Machine Pile;Fall Burn Piles	1-0 Cont- PP 50%/DF 50%; 300TPA; Hoe	1st &3rd Yr, Manual Grub; RFE	No	Good Plant; Mod-High Regen Potential	Originally labelled as Unit ’55-4’
55-S	180.5	4,400‘ E	III	45-75%	Fall Residual Sub(<10); Handpile/Windrow<10; Cover Ign Pts;Fall Burn Piles	1-0 Cont- PP 50%/DF 50%; 300TPA; Hoe	1st &3rd Yr, Manual Grub; RFE	No	Good Plant; Mod-High Regen Potential	Originally labelled as Unit ’55’
55-S	11.3	3,200’ E	III	45-75%	Fall Residual Sub(<10); Handpile/Windrow<10; Cover Ign Pts;Fall Burn Piles	1-0 Cont- PP 50%/DF 50%; 300TPA; Hoe	1st &3rd Yr, Manual Grub; RFE	No	Good Plant; Mod-High Regen Potential	Originally labelled as Unit ’55-1’
55-S	16.6	3,300’ E	III	45-75%	Fall Residual Sub(<10); Handpile/Windrow<10; Cover Ign Pts;Fall Burn Piles	1-0 Cont- PP 50%/DF 50%; 300TPA; Hoe	1st &3rd Yr, Manual Grub; RFE	No	Good Plant; Mod Regen Potential	Originally labelled as Unit ’55-2’
55-S	10.9	3,300’ E	III	45-75%	Fall Residual Sub(<10); Handpile/Windrow<10; Cover Ign Pts;Fall Burn Piles	1-0 Cont- PP 50%/DF 50%; 300TPA; Hoe	1st &3rd Yr, Manual Grub; RFE	No	Good Plant; Mod Regen Potential	Originally labelled as Unit ’55-2-1’
55-S	10.6	4,400‘ N	III	40-65%	Fall Residual Sub(<10); Handpile/Windrow<10; Cover Ign Pts;Fall Burn Piles	1-0 Cont- PP 50%/DF 50%; 300TPA; Hoe	1st &3rd Yr, Manual Grub; RFE	No	Fair Plant; Mod Regen Potential	Originally labelled as Unit ’55-3’
55-S	16.9	3,200’ E	III	45-75%	Fall Residual Sub(<10); Handpile/Windrow<10; Cover Ign Pts;Fall Burn Piles	1-0 Cont- PP 50%/DF 50%; 300TPA; Hoe	1st &3rd Yr, Manual Grub; RFE	No	Good Plant; Mod-High Regen Potential	Originally labelled as Unit ’55-1-1’
56-H	145.0	2,800’ N-NW	II	20-70%	Fall Residual Sub(<10); Handpile/Windrow<10;	1-0 Cont- PP 25%/DF 75% 300TPA; Hoe	1st &3rd Yr, Manual Grub;	No	Good Plant; Mod Regen	Originally labelled as Unit ’56’

Appendix A– Salvage Units Reforestation Prescriptions

SALVAGE REFORESTATION SUMMARY Alternative 2 - Westside Fire Recovery Project, Klamath National Forest Happy Complex Fire February 2015										
UNIT	**ACRES**	**ELEV/ ASPECT**	**DUNN S.C.**	**SLOPE**	**SITE PREP/FUELS TREATMENT**	**PLANTING/ CULTURAL PRESCRIPTION**	**RELEASE**	**ANIMAL PROTECT**	**SOILS**	**REMARKS**
					Cover Ign Pts;Fall Burn Piles		RFE		Potential	
56-S	126.3	3,800‘ N-NW-W	II	20-60%	Fall Residual Sub(<10); Handpile/Windrow<10; Cover Ign Pts;Fall Burn Piles	1-0 Cont- PP 75%/DF 25% 300TPA; Hoe	1st &3rd Yr, Manual Grub; RFE	No	Good Plant; Low-Mod Regen Potential	
57-H	126.2	2,600’ E	II	50-75%	Fall Residual Sub(<10); Handpile/Windrow<10; Cover Ign Pts;Fall Burn Piles	1-0 Cont- PP 25%/DF 75% 300TPA; Hoe	1st &3rd Yr, Manual Grub; RFE	No	Good Plant; Mod Regen Potential	
57-S	88.3	3,500’ E	II	50-75%	Fall Residual Sub(<10); Handpile/Windrow<10; Cover Ign Pts;Fall Burn Piles	1-0 Cont- PP 25%/DF 75% 300TPA; Hoe	1st &3rd Yr, Manual Grub; RFE	No	Good Plant; Mod Regen Potential	
58-H	197.5	3,600’ X	II	25%	Fall Residual Sub; Machine Pile;Fall Burn Piles	1-0 Cont- PP 25%/DF 75% 300TPA; Hoe	1st &3rd Yr, Manual Grub; RFE	No	Good Plant; Mod Regen Potential	Originally labelled as Unit ’058-3’
58-H	306.3	2,800’ E-N	II	35-65%	Fall Residual Sub(<10); Handpile/Windrow<10; Cover Ign Pts;Fall Burn Piles	1-0 Cont- PP 25%/DF 75% 300TPA; Hoe	1st &3rd Yr, Manual Grub; RFE	No	Good Plant; Mod Regen Potential	Originally labelled as Unit ’58-1’
58-S	197.0	3,500‘ W	II	25-65%	Fall Residual Sub(<10); Handpile/Windrow<10; Cover Ign Pts;Fall Burn Piles	1-0 Cont- PP 100%; 300TPA; Hoe	1st &3rd Yr, Manual Grub; RFE	No	Good Plant; Low-Mod Regen Potential	Originally labelled as Unit ’058’
58-S	70.1	3,500‘ W	II	25-65%	Fall Residual Sub(<10); Handpile/Windrow<10; Cover Ign Pts;Fall Burn Piles	1-0 Cont- PP 100%; 300TPA; Hoe	1st &3rd Yr, Manual Grub; RFE	No	Good Plant; Low-Mod Regen Potential	Originally labelled as Unit ’58’
58-H	30.8	3,200’ N-W-SW	II	15-65%	Fall Residual Sub(<10); Handpile/Windrow<10; Cover Ign Pts;Fall Burn Piles	1-0 Cont- PP 100%; 300TPA; Hoe (50% of unit)B) 1-0 Cont- PP 25%/DF 75% 300TPA; Hoe (50% of unit)	1st &3rd Yr, Manual Grub; RFE	No	Good Plant; Low-Mod Regen Potential	Originally labelled as Unit ’058-6’ Unit splits on main ridge west of Caroline Creek – Planting/Cultural Prescription A) refers to West side, B) refers to East side
59-H	21.0	2,600’ NE	II	45-60%	Fall Residual Sub(<10); Handpile/Windrow<10; Cover Ign Pts;Fall Burn Piles	1-0 Cont- PP 25%/DF 75% 300TPA; Hoe	1st &3rd Yr, Manual Grub; RFE	No	Fair Plant; Mod Regen Potential	
59-S	44.3	3,200’ E	II	60-75%	Fall Residual Sub(<10); Handpile/Windrow<10;	A) 1-0 Cont- PP 25%/DF 75% 300TPA;	1st &3rd Yr, Manual Grub;	No	Fair Plant; Mod Regen	

SALVAGE REFORESTATION SUMMARY Alternative 2 - Westside Fire Recovery Project, Klamath National Forest Happy Complex Fire February 2015										
UNIT	**ACRES**	**ELEV/ ASPECT**	**DUNN S.C.**	**SLOPE**	**SITE PREP/FUELS TREATMENT**	**PLANTING/ CULTURAL PRESCRIPTION**	**RELEASE**	**ANIMAL PROTECT**	**SOILS**	**REMARKS**
					Cover Ign Pts;Fall Burn Piles	Hoe	RFE		Potential	
60-H	326.5	3,500' E-NE-N	I-II	25-70%	Fall Residual Sub(<10); Handpile/Windrow<10; Cover Ign Pts;Fall Burn Piles	1-0 Cont- PP 25%/DF 75% 300TPA; Hoe	1st &3rd Yr, Manual Grub; RFE	No	Good Plant; Mod-High Regen Potential	
61-H	315.8	2,800' NW-W	I-II	25-70%	Fall Residual Sub(<10); Handpile/Windrow<10; Cover Ign Pts;Fall Burn Piles	1-0 Cont- PP 50%/DF 50%; 300TPA; Hoe	1st &3rd Yr, Manual Grub; RFE	No	Fair-Good Plant; Low-Mod Regen Potential	Originally labelled as Unit '61' YUM?
62-G	37.2	1,800' E-X	II	15-40%	Fall Residual Sub; Machine Pile;Fall Burn Piles	1-0 Cont- PP 25%/DF 75% 300TPA; Hoe	1st &3rd Yr, Manual Grub; RFE	No	Good Plant; Mod-High Regen Potential	Originally labelled as Unit '62' Adjacent to Grider Creek Campround
62-H	161.7	2,400' E	II	35-70%	Fall Residual Sub(<10); Handpile/Windrow<10; Cover Ign Pts;Fall Burn Piles	1-0 Cont- PP 50%/DF 50%; 300TPA; Hoe	1st &3rd Yr, Manual Grub; RFE	No	Fair-Good Plant; Low-Mod Regen Potential	Originally labelled as Unit '62-1' YUM?
62-S	19.0	2,400' E	II	35-70%	Fall Residual Sub(<10); Handpile/Windrow<10; Cover Ign Pts;Fall Burn Piles	1-0 Cont- PP 50%/DF 50%; 300TPA; Hoe	1st &3rd Yr, Manual Grub; RFE	No	Fair-Good Plant; Low-Mod Regen Potential	Originally labelled as Unit '62-2' YUM?
64-S	19.2	3,200' E	I	40-70%	Fall Residual Sub(<10); Handpile/Windrow<10; Cover Ign Pts;Fall Burn Piles	1-0 Cont- PP 50%/DF 50%; 300TPA; Hoe	1st &3rd Yr, Manual Grub; RFE	No	Fair-Good Plant; Mod Regen Potential	
65-G	56.6	3,900' E	I	15-40%	Fall Residual Sub; Machine Pile;Fall Burn Piles	1-0 Cont- PP 50%/DF 50%; 300TPA; Hoe	1st &3rd Yr, Manual Grub; RFE	No	Fair-Good Plant; Mod Regen Potential	
200-H	19.3	2,400' N	I	15-60%	Fall Residual Sub(<10); Handpile/Windrow<10; Cover Ign Pts;Fall Burn Piles	1-0 Cont- DF 90%; SP 10%; 300TPA; Hoe	1st &3rd Yr, Manual Grub; RFE	No	Good Plant; High Regen Potential	
200-H	7.6	2,400' NE	I	15-60%	Fall Residual Sub(<10); Handpile/Windrow<10; Cover Ign Pts;Fall Burn Piles	1-0 Cont- DF 90%; SP 10%; 300TPA; Hoe	1st &3rd Yr, Manual Grub; RFE	No	Good Plant; High Regen Potential	
202-S	17.6	2,500' SE	IA	60% Benchy	Fall Residual Sub(<10); Handpile/Windrow<10; Cover Ign Pts;Fall Burn Piles	1-0 Cont- DF 60%; PP/SP 40%; 300TPA; Hoe	1st &3rd Yr, Manual Grub; RFE	No	Good Plant; Mod Regen Potential	Originally labelled as Unit '202' Heavy biomass unit (hardwoods).

Appendix A– Salvage Units Reforestation Prescriptions

SALVAGE REFORESTATION SUMMARY Alternative 2 - Westside Fire Recovery Project, Klamath National Forest Happy Complex Fire February 2015										
UNIT	**ACRES**	**ELEV/ ASPECT**	**DUNN S.C.**	**SLOPE**	**SITE PREP/FUELS TREATMENT**	**PLANTING/ CULTURAL PRESCRIPTION**	**RELEASE**	**ANIMAL PROTECT**	**SOILS**	**REMARKS**
203-S	49.8	3,000’ N	I	75%	Fall Residual Sub(<10); Handpile/Windrow<10; Cover Ign Pts;Fall Burn Piles	1-0 Cont- DF 80%; SP 20%; 300TPA; Hoe	1st &3rd Yr, Manual Grub; RFE	No	Good Plant; High Regen Potential	Originally labelled as Unit ‘203’
204-S	19.4	2,400’ W	I	50-70%	Fall Residual Sub(<10); Handpile/Windrow<10; Cover Ign Pts;Fall Burn Piles	1-0 Cont- PP 50%; DF 50%; 300TPA; Hoe	1st &3rd Yr, Manual Grub; RFE	No	Good Plant; Low Regen Potential	
206-S	53.7	3,000’ E-SW	II	75%	Fall Residual Sub(<10); Handpile/Windrow<10; Cover Ign Pts;Fall Burn Piles	A)1-0 Cont- DF 80%/ SP 20%; 300TPA; Hoe (50% of unit) B)1-0 Cont- DF 50%/ SP 50%; 300TPA; Hoe (50% of unit)	1st &3rd Yr, Manual Grub; RFE	No	Good Plant; Fair-Mod Regen Potential	Originally labelled as Unit ‘206 A&B’ Planting Rx: A- East Aspect B- SW Aspect
207-S	13.1	3,500’ SE	III	60% Benchy	Fall Residual Sub(<10); Handpile/Windrow<10; Cover Ign Pts;Fall Burn Piles	1-0 Cont- DF 60%; PP/SP 40%; 300TPA; Hoe	1st &3rd Yr, Manual Grub; RFE	No	Fair Plant; Low Regen Potential	Originally labelled as Unit ‘207’ Volume low for skyline. Heavy hardwoods. Site shows signs of previous fire (approx. 30 yrs ago) with pockets of fire salvage.
208-S	69.1	3,000‘ S-SE	III	40-65%	Fall Residual Sub(<10); Handpile/Windrow<10; Cover Ign Pts;Fall Burn Piles	1-0 Cont- PP 100%; 300TPA; Hoe	1st &3rd Yr, Manual Grub; RFE	No	Fair-Good Plant; Low Regen Potential	
209-S	23.3	3,800‘ S	II	50-70%	Fall Residual Sub(<10); Handpile/Windrow<10; Cover Ign Pts;Fall Burn Piles	1-0 Cont- PP 100%; 300TPA; Hoe	1st &3rd Yr, Manual Grub; RFE	No	Fair-Good Plant; Low Regen Potential	
211-S	46.7	4,700‘ E	II	40-65%	Fall Residual Sub(<10); Handpile/Windrow<10; Cover Ign Pts;Fall Burn Piles	1-0 Cont- DF 75%; PP 25%; 300TPA; Hoe	1st &3rd Yr, Manual Grub; RFE	No	Fair-Good Plant; Mod Regen Potential	
212-S	10.3	3,500‘ N	I	45-65%	Fall Residual Sub(<10); Handpile/Windrow<10; Cover Ign Pts;Fall Burn Piles	1-0 Cont- DF 90%; SP 10%; 300TPA; Hoe	1st &3rd Yr, Manual Grub; RFE	No	Good Plant; High Regen Potential	
212-H	70.4	4,400‘ W	II	35-65%	Fall Residual Sub(<10); Handpile/Windrow<10; Cover Ign Pts;Fall Burn Piles	1-0 Cont- PP 100%; 300TPA; Hoe	1st &3rd Yr, Manual Grub; RFE	No	Fair-Good Plant; Low-Mod Regen Potential	
213-G	32.1	2,400‘ X-S-W	I	10-35%	Fall Residual Sub; Machine Pile;Fall Burn Piles	1-0 Cont- PP 50%; DF 50%; 300TPA; Hoe	1st &3rd Yr, Manual Grub; RFE	No	Good Plant; Mod Regen Potential	

Appendix A– Salvage Units Reforestation Prescriptions

SALVAGE REFORESTATION SUMMARY Alternative 2 - Westside Fire Recovery Project, Klamath National Forest Happy Complex Fire February 2015										
UNIT	**ACRES**	**ELEV/ ASPECT**	**DUNN S.C.**	**SLOPE**	**SITE PREP/FUELS TREATMENT**	**PLANTING/ CULTURAL PRESCRIPTION**	**RELEASE**	**ANIMAL PROTECT**	**SOILS**	**REMARKS**
214-H	11.4	2,400‘ S	II	30-65%	Fall Residual Sub(<10); Handpile/Windrow<10; Cover Ign Pts;Fall Burn Piles	1-0 Cont- PP 100%; 300TPA; Hoe	1st &3rd Yr, Manual Grub; RFE	No	Fair Plant; Low Regen Potential	
215-S	14.0	3,000’ NW	II	35% Adverse	Fall Residual Sub(<10); Handpile/Windrow<10; Cover Ign Pts;Fall Burn Piles	1-0 Cont- DF 60%; PP/SP 40%; 300TPA; Hoe	1st &3rd Yr, Manual Grub; RFE	No	Good Plant; Low Regen Potential	Originally labelled as Unit ‘215’
216-H	32.8	3,000’ W	I	60%	Fall Residual Sub(<10); Handpile/Windrow<10; Cover Ign Pts;Fall Burn Piles	1-0 Cont- DF 90%; SP 10%; 300TPA; Hoe	1st &3rd Yr, Manual Grub; RFE	No	Good Plant; Mod-High Regen Potential	Originally labelled as Unit ‘216A’ Nice!
216-H	15.6	3,500’ SW	I	60%	Fall Residual Sub(<10); Handpile/Windrow<10; Cover Ign Pts;Fall Burn Piles	1-0 Cont- DF 70%; SP 15%; PP 15% 300TPA; Hoe	1st &3rd Yr, Manual Grub; RFE	No	Good Plant; Mod Regen Potential	Originally labelled as Unit ‘216B’ Black oak stand-culture; plenty of green islands.
217-S	12.6	3,000’ N	I	80%	Fall Residual Sub(<10); Handpile/Windrow<10; Cover Ign Pts;Fall Burn Piles	1-0 Cont- DF 100%; 300TPA; Hoe	1st &3rd Yr, Manual Grub; RFE	No	Good Plant; Mod Regen Potential	Originally labelled as Unit ‘217’ HTR will capture most volume.
218-S	10.3	2,600‘ N	I	40-60%	Fall Residual Sub(<10); Handpile/Windrow<10; Cover Ign Pts;Fall Burn Piles	1-0 Cont- DF 90%; SP 10%; 300TPA; Hoe	1st &3rd Yr, Manual Grub; RFE	No	Good Plant; High Regen Potential	
219-S	11.8	2,800‘ W	I	35-60%	Fall Residual Sub(<10); Handpile/Windrow<10; Cover Ign Pts;Fall Burn Piles	1-0 Cont- DF 25%; PP 75%; 300TPA; Hoe	1st &3rd Yr, Manual Grub; RFE	No	Fair-Good Plant; Mod Regen Potential	
220-H	48.7	2,900‘ E	I	15-60%	Fall Residual Sub(<10); Handpile/Windrow<10; Cover Ign Pts;Fall Burn Piles	1-0 Cont- DF 90%; SP 10%; 300TPA; Hoe	1st &3rd Yr, Manual Grub; RFE	No	Good Plant; High Regen Potential	
221-S	11.9	3,000’ S	I	70%	Fall Residual Sub(<10); Handpile/Windrow<10; Cover Ign Pts;Fall Burn Piles	1-0 Cont- DF 80%; PP/SP 20%; 300TPA; Hoe	1st &3rd Yr, Manual Grub; RFE	No	Good Plant; Mod Regen Potential	
222-S	12.6	3,000’ S	I	70%	Fall Residual Sub(<10); Handpile/Windrow<10; Cover Ign Pts;Fall Burn Piles	1-0 Cont- DF 80%; PP/SP 20%; 300TPA; Hoe	1st &3rd Yr, Manual Grub; RFE	No	Good Plant; Mod Regen Potential	Originally labelled as Unit ‘222’
223-S	19.6	2,800‘ E-N	I	35-70%	Fall Residual Sub(<10); Handpile/Windrow<10;	1-0 Cont- DF 90%; SP 10%; 300TPA; Hoe	1st &3rd Yr, Manual Grub;	No	Good Plant; High Regen	

SALVAGE REFORESTATION SUMMARY Alternative 2 - Westside Fire Recovery Project, Klamath National Forest Happy Complex Fire February 2015										
UNIT	**ACRES**	**ELEV/ ASPECT**	**DUNN S.C.**	**SLOPE**	**SITE PREP/FUELS TREATMENT**	**PLANTING/ CULTURAL PRESCRIPTION**	**RELEASE**	**ANIMAL PROTECT**	**SOILS**	**REMARKS**
					Cover Ign Pts;Fall Burn Piles		RFE		Potential	
224-S	75.3	5,500' NE	II	70% Benchy	Fall Residual Sub(<10); Handpile/Windrow<10; Cover Ign Pts;Fall Burn Piles	1-0 Cont- WF33%; RF 33%; DF 33%; 300TPA; Hoe	1st &3rd Yr, Manual Grub; RFE	Yes - WF RF	Good Plant; Mod Regen Potential	Originally labelled as Unit '224' PCT along NW unit boundary
225-G	18.0	6,000' E	I	45% Benchy	Fall Residual Sub; Machine Pile;Fall Burn Piles	1-0 Cont- RF/WF 80%; DF 20%; 300TPA; Hoe	1st &3rd Yr, Manual Grub; RFE	Yes - WF RF	Fair Plant; Fair-Mod Regen Potential	Originally labelled as Unit '225A' some areas might support tractor logging
225-S	21.7	5,500' NE	III	50% Benchy	Fall Residual Sub(<10); Handpile/Windrow<10; Cover Ign Pts;Fall Burn Piles	1-0 Cont- RF 33%/SP 33%/IC 33%; 300TPA; Hoe	1st &3rd Yr, Manual Grub; RFE	Yes - RF	Fair Plant; Poor-Mod Regen Potential	Originally labelled as Unit '225B'
226-S	120.6	5,000' NE	III	45% Benchy	Fall Residual Sub(<10); Handpile/Windrow<10; Cover Ign Pts;Fall Burn Piles	1-0 Cont- RF 33%/SP 33%/IC 33%; 300TPA; Hoe	1st &3rd Yr, Manual Grub; RFE	Yes - RF	Fair Plant; Fair-Mod Regen Potential	Originally labelled as Unit '226A'
227-S	31.9	4,500' NW	I	50%	Fall Residual Sub(<10); Handpile/Windrow<10; Cover Ign Pts;Fall Burn Piles	1-0 Cont- DF 90%; SP 10%; 300TPA; Hoe	1st &3rd Yr, Manual Grub; RFE	No	Good Plant; Mod Regen Potential	Originally labelled as Unit '227A'
227-S	27.1	4,500' W-NW	II	55%	Fall Residual Sub(<10); Handpile/Windrow<10; Cover Ign Pts;Fall Burn Piles	1-0 Cont- DF 80%; PP/SP 20%; 300TPA; Hoe	1st &3rd Yr, Manual Grub; RFE	No	Good Plant; Mod Regen Potential	Originally labelled as Unit '227B'
228-H	127.5	4,800' NW-NE		15-65%	Fall Residual Sub(<10); Handpile/Windrow<10; Cover Ign Pts;Fall Burn Piles	1-0 Cont- RF 33%/SP 33%/IC 33%; 300TPA; Hoe	1st &3rd Yr, Manual Grub; RFE	Yes - RF	Fair-Good Plant; Low-Mod Regen Potential	PCT along SE unit boundary
230-S	13.5	3,500' NW	I	65%	Fall Residual Sub(<10); Handpile/Windrow<10; Cover Ign Pts;Fall Burn Piles	1-0 Cont- DF 100%; 300TPA; Hoe	1st &3rd Yr, Manual Grub; RFE	No	Good Plant; Mod Regen Potential	Originally labelled as Unit '230 A' Natural regen potential exists for WF
232-S	20.2	3,700' SE	II	25-60%	Fall Residual Sub(<10); Handpile/Windrow<10; Cover Ign Pts;Fall Burn Piles	1-0 Cont- PP 50%; DP 50%; 300TPA; Hoe	1st &3rd Yr, Manual Grub; RFE	No	Fair-Good Plant; Low-Mod Regen Potential	
233-S	12.6	3,300' N	II	45-70%	Fall Residual Sub(<10); Handpile/Windrow<10; Cover Ign Pts;Fall Burn Piles	1-0 Cont- DF 90%; SP 10%; 300TPA; Hoe	1st &3rd Yr, Manual Grub; RFE	No	Good Plant; High Regen Potential	

Appendix A– Salvage Units Reforestation Prescriptions

SALVAGE REFORESTATION SUMMARY Alternative 2 - Westside Fire Recovery Project, Klamath National Forest Happy Complex Fire February 2015										
UNIT	**ACRES**	**ELEV/ ASPECT**	**DUNN S.C.**	**SLOPE**	**SITE PREP/FUELS TREATMENT**	**PLANTING/ CULTURAL PRESCRIPTION**	**RELEASE**	**ANIMAL PROTECT**	**SOILS**	**REMARKS**
234-S	23.4	3,500‘ SW	III	40-65%	Fall Residual Sub(<10); Handpile/Windrow<10; Cover Ign Pts;Fall Burn Piles	1-0 Cont- PP 100%; 300TPA; Hoe	1st &3rd Yr, Manual Grub; RFE	No	Fair Plant; Low Regen Potential	
235-H	14.5	3,000‘ N	I	45-70%	Fall Residual Sub(<10); Handpile/Windrow<10; Cover Ign Pts;Fall Burn Piles	1-0 Cont- DF 90%; SP 10%; 300TPA; Hoe	1st &3rd Yr, Manual Grub; RFE	No	Good Plant; High Regen Potential	
235-G	5.6	3,000 N	I	15-35%	Fall Residual Sub; Machine Pile;Fall Burn Piles	1-0 Cont- DF 90%; SP 10%; 300TPA; Hoe	1st &3rd Yr, Manual Grub; RFE	No	Good Plant; High Regen Potential	
236-S	25.4	3,200’ NW	II	65%	Fall Residual Sub(<10); Handpile/Windrow<10; Cover Ign Pts;Fall Burn Piles	1-0 Cont- DF 40%; PP 60%; 300TPA; Hoe	1st &3rd Yr, Manual Grub; RFE	No	Good Plant; Mod Regen Potential	Originally labelled as Unit ‘236’
239-S	32.8	3,000 NW	III	75-80%	Fall Residual Sub(<10); Handpile/Windrow<10; Cover Ign Pts;Fall Burn Piles	1-0 Cont- DF 90%; SP 10%; 300TPA; Hoe	1st &3rd Yr, Manual Grub; RFE	No	Poor Plant; Poor-Non Regen Potential	Originally labelled as Unit ‘239’
240-S	14.4	2,500’ NW	III	75%	Fall Residual Sub(<10); Handpile/Windrow<10; Cover Ign Pts;Fall Burn Piles	1-0 Cont- DF 100%; 300TPA; Hoe	1st &3rd Yr, Manual Grub; RFE	No	Plant; Regen Potential	Originally labelled as Unit ‘240’
242-H	30.4	2,500’ NE	I	75%	Fall Residual Sub(<10); Handpile/Windrow<10; Cover Ign Pts;Fall Burn Piles	1-0 Cont- PP 100%; 300TPA; Hoe	1st &3rd Yr, Manual Grub; RFE	No	Poor Plant; Low Regen Potential	Originally labelled as Unit ‘242’ needs road on top or helicopter. Lower ML1 road needs decommissioning
243-H	123.9	3,000‘ NW-SE	II	45-70%	Fall Residual Sub(<10); Handpile/Windrow<10; Cover Ign Pts;Fall Burn Piles	1-0 Cont- PP 75%; DF 25%; 300TPA; Hoe	1st &3rd Yr, Manual Grub; RFE	No	Fair-Good Plant; Low Regen Potential	
243-S	40.6	3,000‘ NW-SE	II	45-70%	Fall Residual Sub(<10); Handpile/Windrow<10; Cover Ign Pts;Fall Burn Piles	1-0 Cont- PP 75%; DF 25%; 300TPA; Hoe	1st &3rd Yr, Manual Grub; RFE	No	Fair-Good Plant; Low Regen Potential	Originally labelled as Unit ‘243-1’
244-S	12.3	3,800‘ SW	III	25-70%	Fall Residual Sub(<10); Handpile/Windrow<10; Cover Ign Pts;Fall Burn Piles	1-0 Cont- PP 75%; DF 25%; 300TPA; Hoe	1st &3rd Yr, Manual Grub; RFE	No	Fair Plant; Low Regen Potential	
245-S	118.9	4,400‘ W-S	III	25-70%	Fall Residual Sub(<10); Handpile/Windrow<10; Cover Ign Pts;Fall Burn	1-0 Cont- PP 75%; DF 25%; 300TPA; Hoe	1st &3rd Yr, Manual Grub; RFE	No	Fair Plant; Low Regen Potential	

SALVAGE REFORESTATION SUMMARY Alternative 2 - Westside Fire Recovery Project, Klamath National Forest Happy Complex Fire February 2015										
UNIT	ACRES	ELEV/ ASPECT	DUNN S.C.	SLOPE	SITE PREP/FUELS TREATMENT	PLANTING/ CULTURAL PRESCRIPTION	RELEASE	ANIMAL PROTECT	SOILS	REMARKS
					Piles					
262-G	46.2	3,600‘ X	II	10-25%	Fall Residual Sub; Machine Pile;Fall Burn Piles	1-0 Cont- DF 90%; SP 10%; 300TPA; Hoe	1st &3rd Yr, Manual Grub; RFE	No	Good Plant; High Regen Potential	
263-G	28.3	3,600‘ W-X-N	II	10-45%	Fall Residual Sub; Machine Pile;Fall Burn Piles	1-0 Cont- DF 75%; PP 25%; 300TPA; Hoe	1st &3rd Yr, Manual Grub; RFE	No	Good Plant; Mod-High Regen Potential	
264-G	23.8	3,600’ W	II	10-35%	Fall Residual Sub; Machine Pile;Fall Burn Piles	1-0 Cont- DF 75%; PP 25%; 300TPA; Hoe	1st &3rd Yr, Manual Grub; RFE	No	Good Plant; Mod-High Regen Potential	
265-S	37.2	3,800‘ E	I	40-65%	Fall Residual Sub(<10); Handpile/Windrow<10; Cover Ign Pts;Fall Burn Piles	1-0 Cont- DF 90%; SP 10%; 300TPA; Hoe	1st &3rd Yr, Manual Grub; RFE	No	Good Plant; High Regen Potential	
266-G	19.4	3,400’ X-E	I	15-35%	Fall Residual Sub; Machine Pile;Fall Burn Piles	1-0 Cont- DF 50%; PP 50%; 300TPA; Hoe	1st &3rd Yr, Manual Grub; RFE	No	Low-Good Plant; Mod Regen Potential	
267-S	29.7	2,400’ W	II	40-65%	Fall Residual Sub(<10); Handpile/Windrow<10; Cover Ign Pts;Fall Burn Piles	1-0 Cont- DF 25%; PP 75%; 300TPA; Hoe	1st &3rd Yr, Manual Grub; RFE	No	Fair-Good Plant; Low-Mod Regen Potential	
268-H	22.5	3,400’ X-E	I	15-35%	Fall Residual Sub; Machine Pile;Fall Burn Piles	1-0 Cont- DF 50%; PP 50%; 300TPA; Hoe	1st &3rd Yr, Manual Grub; RFE	No	Low-Good Plant; Mod Regen Potential	
500-S	32.8	3,600’ E-SE	II-III	10-55%	Fall Residual Sub(<10); Handpile/Windrow<10; Cover Ign Pts;Fall Burn Piles	1-0 Cont- PP 75%; DF 25% 300TPA; Hoe	1st &3rd Yr, Manual Grub; RFE	No	Good Plant; Mod Regen Potential	50% of Unit is Mechanically Pilable for Site-prep
501-H	169.9	4,500’ S-SW	III	45-75%	Fall Residual Sub(<10); Handpile/Windrow<10; Cover Ign Pts;Fall Burn Piles	1-0 Cont- PP 100%; 300TPA; Hoe	1st &3rd Yr, Manual Grub; RFE	No	Fair Plant; Low Regen Potential	Originally MC Stand; Very Tough to Regenerate to MC
501-S	82.6	5,400’ SE-S	III	35-55%	Fall Residual Sub(<10); Handpile/Windrow<10; Cover Ign Pts;Fall Burn Piles	1-0 Cont- PP 100%; 300TPA; Hoe	1st &3rd Yr, Manual Grub; RFE	No	Fair Plant; Low Regen Potential	Originally MC Stand; Very Tough to Regenerate to MC
503-S	46.7	5,200’ NE-E	III	40-65%	Fall Residual Sub(<10); Handpile/Windrow<10;	1-0 Cont- PP 50%; DF 50%; 300TPA; Hoe	1st &3rd Yr, Manual Grub;	No	Good Plant; Mod Regen	Not Diorite

SALVAGE REFORESTATION SUMMARY
Alternative 2 - Westside Fire Recovery Project, Klamath National Forest
Happy Complex Fire February 2015

UNIT	ACRES	ELEV/ ASPECT	DUNN S.C.	SLOPE	SITE PREP/FUELS TREATMENT	PLANTING/ CULTURAL PRESCRIPTION	RELEASE	ANIMAL PROTECT	SOILS	REMARKS
					Cover Ign Pts;Fall Burn Piles		RFE		Potential	
505-H	73.5	3,600' W	III	25-55%	Fall Residual Sub(<10); Handpile/Windrow<10; Cover Ign Pts;Fall Burn Piles	1-0 Cont- PP 100%; 300TPA; Hoe	1st &3rd Yr, Manual Grub; RFE	No	Fair Plant; Low-Mod Regen Potential	Pockets of Heavy Surface Rock
505-S	55.0	4,400' W	III	25-55%	Fall Residual Sub(<10); Handpile/Windrow<10; Cover Ign Pts;Fall Burn Piles	1-0 Cont- PP 100%; 300TPA; Hoe	1st &3rd Yr, Manual Grub; RFE	No	Fair Plant; Low-Mod Regen Potential	Pockets of Heavy Surface Rock
506-S	15.7	5,900' E	II	40-55%	Fall Residual Sub(<10); Handpile/Windrow<10; Cover Ign Pts;Fall Burn Piles	1-0 Cont- WF 50%; DF 50%; 300TPA; Hoe	1st &3rd Yr, Manual Grub; RFE	Yes - WF	Good Plant; Mod-High Regen Potential	
508-G	117.8	5,800' E	III	15-45%	Fall Residual Sub; Machine Pile;Fall Burn Piles	1-0 Cont- WF 25%; DF 25%; RF 25%; PP 25% 300TPA; Hoe	1st &3rd Yr, Manual Grub; RFE	Yes - WF RF	Fair-Good Plant; Mod Regen Potential	North of Tom Martin Peak
508-H	84.7	6,600' W-NW-N	III	40-70%	Fall Residual Sub(<10); Handpile/Windrow<10; Cover Ign Pts;Fall Burn Piles	1-0 Cont- WF 25%; DF 25%; RF 25%; PP 25% 300TPA; Hoe	1st &3rd Yr, Manual Grub; RFE	Yes - WF RF	Fair-Good Plant; Low-Mod Regen Potential	North of Tom Martin Peak. Pockets of heavy surface rock/scree.
508-S	122.3	6,000' N-NW	III	35-65%	Fall Residual Sub(<10); Handpile/Windrow<10; Cover Ign Pts;Fall Burn Piles	1-0 Cont- WF 25%; DF 25%; RF 25%; PP 25% 300TPA; Hoe	1st &3rd Yr, Manual Grub; RFE	Yes - WF RF	Fair-Good Plant; Mod Regen Potential	North of Tom Martin Peak
509-G	15.4	6,000' NW-X	III	20-35%	Fall Residual Sub; Machine Pile;Fall Burn Piles	1-0 Cont- WF 25%; DF 25%; RF 25%; PP 25% 300TPA; Hoe	1st &3rd Yr, Manual Grub; RFE	Yes - WF RF	Good Plant; Mod Regen Potential	
510-S	18.2	5,600' E	II	35-60%	Fall Residual Sub(<10); Handpile/Windrow<10; Cover Ign Pts;Fall Burn Piles	1-0 Cont- WF 25%; DF 25%; RF 25%; PP 25% 300TPA; Hoe	1st &3rd Yr, Manual Grub; RFE	Yes - WF RF	Good Plant; Mod Regen Potential	
515-H	75.6	3,200' NE	III	40-65%	Fall Residual Sub(<10); Handpile/Windrow<10; Cover Ign Pts;Fall Burn Piles	1-0 Cont- PP 50%; DF 50%; 300TPA; Hoe	1st &3rd Yr, Manual Grub; RFE	No	Good Plant; Mod-High Regen Potential	Stand Burned Very Hot Very Dissected
515-S	229.5	3,600' E	III	40-65%	Fall Residual Sub(<10); Handpile/Windrow<10; Cover Ign Pts;Fall Burn	1-0 Cont- PP 50%/DF 50%; 300TPA; Hoe	1st &3rd Yr, Manual Grub; RFE	No	Very Good Plant; Mod-High Regen	Stand Burned Very Hot

SALVAGE REFORESTATION SUMMARY Alternative 2 - Westside Fire Recovery Project, Klamath National Forest Happy Complex Fire February 2015										
UNIT	**ACRES**	**ELEV/ ASPECT**	**DUNN S.C.**	**SLOPE**	**SITE PREP/FUELS TREATMENT**	**PLANTING/ CULTURAL PRESCRIPTION**	**RELEASE**	**ANIMAL PROTECT**	**SOILS**	**REMARKS**
					Piles				Potential	
516-S	11.3	3,800' S	II	20-50%	Fall Residual Sub(<10); Handpile/Windrow<10; Cover Ign Pts;Fall Burn Piles	1-0 Cont- PP 100%; 300TPA; Hoe	1st &3rd Yr, Manual Grub; RFE	No	Fair Plant; Low-Mod Regen Potential	67% of Unit is Mechanically Pilable for Site-prep
517-G	51.4	4,400' S-X	II	15-25% Benchy	Fall Residual Sub; Machine Pile;Fall Burn Piles	1-0 Cont- PP 100%; 300TPA; Hoe	1st &3rd Yr, Manual Grub; RFE	No	Good Plant; High Regen Potential	
518-C	13.3	5,200' S	III	10-50%	Fall Residual Sub(<10); Handpile/Windrow<10; Cover Ign Pts;Fall Burn Piles	1-0 Cont- PP 100%; 300TPA; Hoe	1st &3rd Yr, Manual Grub; RFE	No	Fair Plant; Low Regen Potential	Yoder? Cable Endline?
520-H	193.3	4,800' W-S-E	III	35-75%	Fall Residual Sub(<10); Handpile/Windrow<10; Cover Ign Pts;Fall Burn Piles	1-0 Cont- PP 50%/DF 50%; 300TPA; Hoe	1st &3rd Yr, Manual Grub; RFE	No	Good Plant; Mod Regen Potential	Very Dissected
521-G	75.6	5,400' X	III	10-25%	Fall Residual Sub; Machine Pile;Fall Burn Piles	1-0 Cont- WF 50%/DF 50%; 300TPA; Hoe	1st &3rd Yr, Manual Grub; RFE	Yes - WF	Good Plant; Mod Regen Potential	Includes Large Fire Safety Zone
522-S	36.8	5,400' NE	III	25-50%	Fall Residual Sub(<10); Handpile/Windrow<10; Cover Ign Pts;Fall Burn Piles	1-0 Cont- PP 50%/DF 50%; 300TPA; Hoe	1st &3rd Yr, Manual Grub; RFE	No	Good Plant; Mod Regen Potential	
523-S	176.9	5,200' S-E	III	30-65%	Fall Residual Sub(<10); Handpile/Windrow<10; Cover Ign Pts;Fall Burn Piles	1-0 Cont- PP 50%/DF 50%; 300TPA; Hoe	1st &3rd Yr, Manual Grub; RFE	No	Fair-Good Plant; Low-Mod Regen Potential	
524-S	187.0	5,400' E-NE	III	25-50%	Fall Residual Sub(<10); Handpile/Windrow<10; Cover Ign Pts;Fall Burn Piles	1-0 Cont- PP 50%/DF 50%; 300TPA; Hoe	1st &3rd Yr, Manual Grub; RFE	No	Good Plant; Mod Regen Potential	
525-G	35.7	5,400' S-X-E	IV	30-60%	Fall Residual Sub; Machine Pile;Fall Burn Piles	1-0 Cont- JP 75%/DF 25% 300TPA; Hoe	1st &3rd Yr, Manual Grub; RFE	No	Poor-Fair Plant; Low Regen Potential	Serpentine
525-S	214.7	5,200' S	IV	30-60%	Fall Residual Sub(<10); Handpile/Windrow<10; Cover Ign Pts;Fall Burn Piles	1-0 Cont- JP 75%/DF 25% 300TPA; Hoe	1st &3rd Yr, Manual Grub; RFE	No	Poor-Fair Plant; Low Regen Potential	Serpentine
527-S	22.0	5,500' N	III	40-70%	Fall Residual Sub(<10); Handpile/Windrow<10;	1-0 Cont- PP 25%/DF 75% 300TPA; Hoe	1st &3rd Yr, Manual Grub;	No	Good Plant; Mod Regen	Faulkstein Camp

SALVAGE REFORESTATION SUMMARY Alternative 2 - Westside Fire Recovery Project, Klamath National Forest Happy Complex Fire February 2015										
UNIT	**ACRES**	**ELEV/ ASPECT**	**DUNN S.C.**	**SLOPE**	**SITE PREP/FUELS TREATMENT**	**PLANTING/ CULTURAL PRESCRIPTION**	**RELEASE**	**ANIMAL PROTECT**	**SOILS**	**REMARKS**
					Cover Ign Pts;Fall Burn Piles		RFE		Potential	
528-H	140.3	4,800' S-SE-E	III	40-75%	Fall Residual Sub(<10); Handpile/Windrow<10; Cover Ign Pts;Fall Burn Piles	1-0 Cont- PP 50%/DF 50%; 300TPA; Hoe	1st &3rd Yr, Manual Grub; RFE	No	Fair-Good Plant; Low-Mod Regen Potential	Very Dissected
528-G	34.7	4,800' S-SE-E	III	10-35%	Fall Residual Sub; Machine Pile;Fall Burn Piles	1-0 Cont- PP 50%/DF 50%; 300TPA; Hoe	1st &3rd Yr, Manual Grub; RFE	No	Fair-Good Plant; Low-Mod Regen Potential	Very Dissected
528-S	47.1	4,800' S-SE-E	III	40-75%	Fall Residual Sub(<10); Handpile/Windrow<10; Cover Ign Pts;Fall Burn Piles	1-0 Cont- PP 50%/DF 50%; 300TPA; Hoe	1st &3rd Yr, Manual Grub; RFE	No	Fair-Good Plant; Low-Mod Regen Potential	Very Dissected
530-S	19.2	4,800' S	III	25-70%	Fall Residual Sub(<10); Handpile/Windrow<10; Cover Ign Pts;Fall Burn Piles	1-0 Cont- PP 75%/DF 25% 300TPA; Hoe	1st &3rd Yr, Manual Grub; RFE	No	Fair-Good Plant; Low Regen Potential	
531-S	23.3	5,200' NE	III	45-70%	Fall Residual Sub(<10); Handpile/Windrow<10; Cover Ign Pts;Fall Burn Piles	1-0 Cont- PP 25%/DF 75% 300TPA; Hoe	1st &3rd Yr, Manual Grub; RFE	No	Good Plant; Mod Regen Potential	
532-S	12.8	5,200' E	III	45-70%	Fall Residual Sub(<10); Handpile/Windrow<10; Cover Ign Pts;Fall Burn Piles	1-0 Cont- PP 25%/DF 75% 300TPA; Hoe	1st &3rd Yr, Manual Grub; RFE	No	Good Plant; Mod Regen Potential	
533-H	23.3	4,400' E	II	40-70%	Fall Residual Sub(<10); Handpile/Windrow<10; Cover Ign Pts;Fall Burn Piles	1-0 Cont- PP 50%/DF 50%; 300TPA; Hoe	1st &3rd Yr, Manual Grub; RFE	No	Good Plant; Mod Regen Potential	
536-G	21.8	2,500' E	III	15-35%	Fall Residual Sub; Machine Pile;Fall Burn Piles	1-0 Cont- SP 25%/DF 25%/PP 50%; 300TPA; Hoe	1st &3rd Yr, Manual Grub; RFE	No	Fair-Good Plant; Mod Regen Potential	Behind Scott Bar Station
537-H	81.7	2,400' E-SE	III	30-65%	Fall Residual Sub(<10); Handpile/Windrow<10; Cover Ign Pts;Fall Burn Piles	1-0 Cont- SP 25%/DF 25%/PP 50%; 300TPA; Hoe	1st &3rd Yr, Manual Grub; RFE	No	Fair-Good Plant; Low-Mod Regen Potential	Adjacent to Private; Swanson Gulch

Appendix A– Salvage Units Reforestation Prescriptions

SALVAGE REFORESTATION SUMMARY Alternative 2 - Westside Fire Recovery Project, Klamath National Forest Happy Complex Fire February 2015										
UNIT	**ACRES**	**ELEV/ ASPECT**	**DUNN S.C.**	**SLOPE**	**SITE PREP/FUELS TREATMENT**	**PLANTING/ CULTURAL PRESCRIPTION**	**RELEASE**	**ANIMAL PROTECT**	**SOILS**	**REMARKS**
539-H	16.9	2,600' NE	III	30-65%	Fall Residual Sub(<10); Handpile/Windrow<10; Cover Ign Pts;Fall Burn Piles	1-0 Cont- SP 25%/DF 25%/PP 50%; 300TPA; Hoe	1st &3rd Yr, Manual Grub; RFE	No	Fair-Good Plant; Low-Mod Regen Potential	
545-H	20.4	5,800' S	III	45-65%	Fall Residual Sub(<10); Handpile/Windrow<10; Cover Ign Pts;Fall Burn Piles	1-0 Cont- SP 25%, 75%PP; 300TPA; Hoe	1st &3rd Yr, Manual Grub; RFE	No	Fair Plant; Low Regen Potential	
546-H	29.9	6,000' E	III	40-65%	Fall Residual Sub(<10); Handpile/Windrow<10; Cover Ign Pts;Fall Burn Piles	1-0 Cont- WF 25%; DF 25%; RF 25%; PP 25% 300TPA; Hoe	1st &3rd Yr, Manual Grub; RFE	Yes - WF RF	Fair-Good Plant; Low-Mod Regen Potential	

SALVAGE REFORESTATION SUMMARY Alternative 2 - Westside Fire Recovery Project, Klamath National Forest Whites Fire February 2015										
UNIT	**ACRES**	**ELEV/ ASPECT**	**DUNN S.C.**	**SLOPE**	**SITE PREP/FUELS TREATMENT**	**PLANTING/ CULTURAL PRESCRIPTION**	**RELEASE**	**ANIMAL PROTECT**	**SOILS**	**REMARKS**
402-G	8.3	5,200' SW	III	50-60%	Fall Residual Sub; Machine Pile;Fall Burn Piles	1-0 Cont- PP 100%; 300TPA; Hoe	1st &3rd Yr, Manual Grub; RFE	No	Good Plant; Low-Mod Regen Potential	
403-S	19.3	4,800' SW	II	50-60%	Fall Residual Sub(<10); Handpile/Windrow<10; Cover Ign Pts;Fall Burn Piles	1-0 Cont- PP 100%; 300TPA; Hoe	1st &3rd Yr, Manual Grub; RFE	No	Good Plant; Low-Mod Regen Potential	
404-S	31.0	4,800' SW	III	50-60%	Fall Residual Sub(<10); Handpile/Windrow<10; Cover Ign	1-0 Cont- PP 100%; 300TPA; Hoe	1st &3rd Yr, Manual Grub; RFE	No	Good Plant; Low-Mod Regen Potential	

SALVAGE REFORESTATION SUMMARY
Alternative 2 - Westside Fire Recovery Project, Klamath National Forest
Whites Fire February 2015

UNIT	ACRES	ELEV/ ASPECT	DUNN S.C.	SLOPE	SITE PREP/FUELS TREATMENT	PLANTING/ CULTURAL PRESCRIPTION	RELEASE	ANIMAL PROTECT	SOILS	REMARKS
					Pts;Fall Burn Piles					
406-H	114.4	5,600' SW	III	50-60%	Fall Residual Sub(<10); Handpile/Windrow<10; Cover Ign Pts;Fall Burn Piles	1-0 Cont- PP 100%; 300TPA; Hoe	1st &3rd Yr, Manual Grub; RFE	No	Good Plant; Low-Mod Regen Potential	
407-S	34.3	4,000' W-SW	II	25-55% Benchy	Fall Residual Sub(<10); Handpile/Windrow<10; Cover Ign Pts;Fall Burn Piles	1-0 Cont-DF 25%/PP 75%; 300TPA; Hoe	1st &3rd Yr, Manual Grub; RFE	No	Good Plant; Low-Mod Regen Potential	
409-H	19.7	2,800' NW	II	30-60%	Fall Residual Sub(<10); Handpile/Windrow<10; Cover Ign Pts;Fall Burn Piles	1-0 Cont-DF 50%/PP 50%; 300TPA; Hoe	1st &3rd Yr, Manual Grub; RFE	No	Fair Plant; Fair-Mod Regen Potential	
410-G	14.7	2,800' E	II	20-35%	Fall Residual Sub; Machine Pile;Fall Burn Piles	1-0 Cont-DF 75%/PP 25%; 300TPA; Hoe	1st &3rd Yr, Manual Grub; RFE	No	Fair Plant; Fair-Mod Regen Potential	Water Pipe to Meadow on West Boundary of Unit
411-H	57.5	2,700' E-SE	II	40-65%	Fall Residual Sub(<10); Handpile/Windrow<10; Cover Ign Pts;Fall Burn Piles	1-0 Cont-DF 50%/PP 50%; 300TPA; Hoe	1st &3rd Yr, Manual Grub; RFE	No	Fair Plant; Fair-Mod Regen Potential	Scattered Surface Rock
414-S	28.70	4,200' NE	I	35-60%	Fall Residual Sub(<10); Handpile/Windrow<10; Cover Ign Pts;Fall Burn Piles	1-0 Cont-DF 100%; 300TPA; Hoe	1st &3rd Yr, Manual Grub; RFE	No	Good Plant; Mod-High Regen Potential	Very Productive Site
415-H	243.3	3,600' E-NE	I	35-60%	Fall Residual Sub(<10); Handpile/Windrow<10; Cover Ign Pts;Fall Burn Piles	1-0 Cont-DF 100%; 300TPA; Hoe	1st &3rd Yr, Manual Grub; RFE	No	Good Plant; Mod-High Regen Potential	Very Productive Site

Appendix A– Salvage Units Reforestation Prescriptions

SALVAGE REFORESTATION SUMMARY Alternative 2 - Westside Fire Recovery Project, Klamath National Forest Whites Fire February 2015										
UNIT	**ACRES**	**ELEV/ ASPECT**	**DUNN S.C.**	**SLOPE**	**SITE PREP/FUELS TREATMENT**	**PLANTING/ CULTURAL PRESCRIPTION**	**RELEASE**	**ANIMAL PROTECT**	**SOILS**	**REMARKS**
416-S	18.1	5,200' N	III	35-65%	Fall Residual Sub(<10); Handpile/Windrow<10; Cover Ign Pts;Fall Burn Piles	1-0 Cont- DF 50%; RF 25%; WF 25% 300TPA; Hoe	1st &3rd Yr, Manual Grub; RFE	Yes - RF WF	Fair Plant; Mod Regen Potential	Downhill Skyline
417-S	184.9	5,000' N-NE	III	35-65%	Fall Residual Sub(<10); Handpile/Windrow<10; Cover Ign Pts;Fall Burn Piles	1-0 Cont- DF 50%; RF 25%; WF 25% 300TPA; Hoe	1st &3rd Yr, Manual Grub; RFE	Yes - RF WF	Fair Plant; Mod Regen Potential	
418-S	14.8	5,200' E	III	35-65%	Fall Residual Sub(<10); Handpile/Windrow<10; Cover Ign Pts;Fall Burn Piles	1-0 Cont- DF 50%; RF 25%; WF 25% 300TPA; Hoe	1st &3rd Yr, Manual Grub; RFE	Yes - RF WF	Fair Plant; Mod Regen Potential	Adjacent to Private
420-S	10.1	3,700' N	II	35-60%	Fall Residual Sub(<10); Handpile/Windrow<10; Cover Ign Pts;Fall Burn Piles	1-0 Cont- DF 100%; 300TPA; Hoe	1st &3rd Yr, Manual Grub; RFE	No	Good Plant; Mod-High Regen Potential	Wet Spot on A spur Needs Reconstruction
423-H	61.2	4,400' NW	III	40-75%	Fall Residual Sub(<10); Handpile/Windrow<10; Cover Ign Pts;Fall Burn Piles	1-0 Cont-DF 75%/PP 25%; 300TPA; Hoe	1st &3rd Yr, Manual Grub; RFE	No	Fair Plant; Fair-Mod Regen Potential	
424-S	50.2	6,000' NW	III	25-60%	Fall Residual Sub(<10); Handpile/Windrow<10; Cover Ign Pts;Fall Burn Piles	1-0 Cont- DF 50%/RF 25%/WF 25%; 300TPA; Hoe	1st &3rd Yr, Manual Grub; RFE	Yes - RF WF	Good Plant; Mod Regen Potential	
426-S	19.7	5,400' S-W	III	35-65%	Fall Residual Sub(<10); Handpile/Windrow<10; Cover Ign Pts;Fall Burn Piles	1-0 Cont-DF 25%/PP 75%; 300TPA; Hoe	1st &3rd Yr, Manual Grub; RFE	No	Fair-Good Plant; Low Regen Potential	

Management Direction

Forest-Wide Standards and Guidelines—Timber Management

21-41 Salvage and sanitation harvesting shall be high priority in management areas where the harvest of timber is compatible with the area's management objectives. Areas not currently scheduled for timber harvest may be considered for salvage as well, assuming that harvest is compatible with the desired future condition proposed for that area. Salvage opportunities should be pursued aggressively.

21-43 Encourage restocking of lands left understocked and non-stocked after wildland fires.

MA-17 General Forest

MA17-10 Salvage trees killed by wildfire, pest infestations or other natural processes consistent with the area goals. Salvage and reforestation efforts are a high priority. Minimize the loss of timber value where possible.

MA17-9 Non-stocked lands should be reforested as soon as possible.

MA-15 Partial Retention VQO

MA15-13 Timber salvage of trees killed by wildfire, pest infestation or other natural processes should be implemented in a manner consistent with maintaining the resource management goals of the area.

MA13 Designated and Recommended Recreational Rivers

MA13-15 Lands may be managed for a full range of silvicultural uses, to the extent currently practiced. Timber harvesting would be allowed under standard restrictions to protect the immediate river environment, water quality, scenic, fish and wildlife and other values. Schedule moderate timber yields, compatible with area goals (pg. 4-122)

MA12- Recommended and Designated Scenic River

A wide range of silvicultural treatments may be used to meet Scenic River objectives. Salvage of trees killed by wildland fire, pest infestations or other natural processes is permitted consistent with area resource management goals. Salvage and reforestation efforts are a moderate priority. Minimize the loss of timber value where possible.

MA 11- Retention Visual Quality Objective (VQO)

Salvage of trees killed by wildland fire, pest infestation or other natural processes is permitted consistent with area goals

MA10 Riparian Reserves

MA10-58 Fell trees where they pose a safety risk.

MA7-Special Interest Area
Salvage of burned or pest-killed trees may be allowed to promote the management goals and objectives of the SIA. Reforestation of these areas to meet SIA objectives shall be a high priority .

MA5 Special Habitat-LSR
Conditions of late-successional forest ecosystems are enhanced to serve as habitat for late-successional species. Continuous areas of multi-layered forests with high quality habitat characteristics and attributes are common. Vegetation removal to eliminate public hazards and salvage are permitted if it benefits habitat.
MA5-30.1 The potential for benefit to species associated with late successional-forest condition age is greatest when stand-replacing events are involved. In addition, salvage should only occur in stands where disturbance has reduced canopy closure to less than 40%.
MA5-30.6 Removal of snags and logs may be necessary to reduce hazards to humans along roads and trails and in or adjacent to campgrounds.

Silvicultural Objectives: Reestablish a sustainable mixed conifer forest.

Retain green trees using “Marking Guidelines for Fire-Injured Trees in California” at a 70% mortality threshold for green tree retention requirements and as a seed source (Smith and Cluck 2011).

Surviving green trees within the Westside Fire Recovery project area will not be removed during project implementation as hazard trees unless at a 70% mortality threshold and also highly defective according to the “Hazard Tree Guidelines for Forest Service Facilities and Roads in the Pacific Southwest Region and within striking distance of a road open to the public or the logging operations during project implementation (Angwin et al. 2012). A small number of green trees may also be cut or damaged in units where the location of corridors is constrained by topography. Surviving green trees are an important seed source particularly in the first two years after the fire before hardwoods and brush completely dominate the site, so conservative high risk marking is appropriate.

Literature Cited

Angwin, P.A., Cluck, P.J. Zambino, B.W. Oblinger, and W.C. Woodruff. 2012. Hazard Tree Guidelines for Forest Service Facilities and Roads in the Pacific Southwest Region. USDA Forest Service, Forest Health Protection, Pacific Southwest Region, Report # RO-12-01: 40 p.

Smith, C.L. and D.R. Cluck. 2011. Marking guidelines for fire-injured trees in California. USDA Forest Service. Forest Health Protection, Region 5, Susanville, CA. Report # RO-09-01. 13 p.

Appendix B– Salvage Units by Alternative

Unit[5]	Acres	Alt2	Alt3	Alt4	Alt5
402	8.3	Yes	Yes	Yes	No
403	19.3	Yes	Yes	Yes	No
404	31.0	Yes	Yes	Yes	No
409	19.7	Yes	Yes	Yes	No
411	57.5	Yes	Yes	Yes	Yes
410	14.7	Yes	Yes	Yes	Yes
407	25.4	Yes	Yes	Yes	No
406	114.4	Yes	Yes	Yes	No
418	14.8	Yes	No	Yes	No
416	18.1	Yes	No	Yes	No
420	10.1	Yes	No	Yes	No
417	184.9	Yes	Yes	Yes	No
423	61.2	Yes	Yes	Yes	No
424	50.2	Yes	No	Yes	No
426	19.7	Yes	Yes	Yes	No
500	32.8	Yes	Yes	Yes	No
505	55.0	Yes	Yes	Yes	No
501	82.6	Yes	Yes	Yes	No
503	46.7	Yes	Yes	Yes	Yes
506	15.7	Yes	Yes	Yes	No
515	38.7	Yes	Yes	Yes	No
505-1	73.5	Yes	Yes	Yes	No
501-1	169.9	Yes	Yes	Yes	No
516	11.3	Yes	No	Yes	Yes
517	51.4	Yes	Yes	Yes	Yes
518	13.3	Yes	No	Yes	Yes
509	15.4	Yes	Yes	Yes	No
510	18.2	Yes	Yes	Yes	No
508	78.3	Yes	Yes	Yes	Yes
508-1	33.4	Yes	Yes	Yes	No
508-2	36.3	Yes	Yes	Yes	Yes
508-3	20.9	Yes	Yes	Yes	Yes
530	19.2	Yes	Yes	Yes	No
531	23.3	Yes	Yes	Yes	No
532	12.8	Yes	No	Yes	No
533	23.3	Yes	No	Yes	No
515-1	228.3	Yes	Yes	Yes	No
58	70.1	Yes	Yes	Yes	No
59	44.3	Yes	Yes	Yes	No
51	88.2	Yes	Yes	Yes	No
52	64.2	Yes	Yes	Yes	No
53	56.9	Yes	Yes	Yes	No
54	45.7	Yes	Yes	Yes	No
56	126.3	Yes	Yes	Yes	No
Unit	Acres	Alt2	Alt3	Alt4	Alt5
52-1	59.5	Yes	Yes	Yes	No
57	88.3	Yes	Yes	Yes	No
53-1	61.5	Yes	Yes	Yes	No
51-1	190.7	Yes	Yes	Yes	No
59-1	21.0	Yes	Yes	Yes	No
57-1	126.2	Yes	Yes	Yes	No
55-1	11.3	Yes	No	Yes	No
55-2	16.6	Yes	Yes	Yes	No
60	233.1	Yes	Yes	Yes	Yes
61	315.8	Yes	Yes	Yes	No
62	37.2	Yes	Yes	Yes	No
62-1	161.7	Yes	Yes	Yes	No
536	21.8	Yes	Yes	Yes	Yes
537	81.7	Yes	Yes	Yes	Yes
206	53.7	Yes	Yes	Yes	Yes
203	49.8	Yes	Yes	Yes	Yes
207	13.1	Yes	No	Yes	Yes
208	69.1	Yes	Yes	No	No
209	23.3	Yes	Yes	Yes	No
212	70.4	Yes	No	Yes	No
226	36.7	Yes	Yes	No	No
228	103.8	Yes	Yes	Yes	No
224	75.3	Yes	Yes	Yes	No
225	18.0	Yes	No	Yes	No
233	12.6	Yes	No	Yes	Yes
232	20.2	Yes	Yes	Yes	Yes
234	23.4	Yes	Yes	Yes	Yes
235	5.0	Yes	No	No	No
235-1	9.5	Yes	No	No	No
202	17.6	Yes	No	Yes	Yes
219	11.8	Yes	No	Yes	No
262	46.2	Yes	Yes	Yes	No
214	11.4	Yes	No	Yes	No
216	32.8	Yes	No	Yes	No
215	14.0	Yes	No	Yes	No
212-1	10.3	Yes	No	Yes	No
213	32.1	Yes	Yes	Yes	Yes

[5] This summary of alternatives includes all the original proposed salvage units for Alternatives 2, 3, 4 and 5. Some units and acres may change in the Final Silviculture Report, however, no additional units are anticipated.

Appendix B– Salvage Units by Alternative

227	18.6	Yes	Yes	Yes	No
225-1	21.7	Yes	Yes	Yes	No
226-1	41.7	Yes	Yes	Yes	No
226-2	42.2	Yes	Yes	Yes	No
200	19.3	Yes	Yes	Yes	Yes
200-1	7.6	Yes	No	Yes	Yes
220	48.7	Yes	Yes	Yes	Yes
Unit	Acres	Alt2	Alt3	Alt4	Alt5
222	12.6	Yes	No	Yes	Yes
221	11.9	Yes	No	Yes	Yes
263	28.3	Yes	Yes	Yes	No
239	32.8	Yes	Yes	Yes	Yes
240	14.4	Yes	No	Yes	Yes
242	16.5	Yes	Yes	Yes	Yes
230	13.5	Yes	No	Yes	Yes
264	23.8	Yes	Yes	Yes	No
265	37.2	Yes	Yes	Yes	No
211-1	29.7	Yes	No	Yes	No
266	19.4	Yes	Yes	Yes	No
243	118.2	Yes	Yes	No	Yes
204	19.4	Yes	No	Yes	Yes
244	12.3	Yes	No	No	No
245	118.9	Yes	Yes	No	No
223	19.6	Yes	No	Yes	Yes
216-1	15.6	Yes	No	Yes	No
217	12.6	Yes	No	Yes	No
268	22.5	Yes	No	Yes	No
21	13.8	Yes	Yes	Yes	No
20	16.7	Yes	Yes	Yes	No
21-1	3.4	Yes	Yes	Yes	No
23	555.8	Yes	Yes	Yes	No
22	62.2	Yes	Yes	Yes	No
218	10.3	Yes	No	Yes	No
267	29.7	Yes	No	Yes	No
22-1	27.9	Yes	Yes	Yes	Yes
236	15.1	Yes	No	Yes	No
1109	44.7	Yes	No	Yes	Yes
1110	59.4	Yes	No	Yes	Yes
1142	83.9	Yes	No	Yes	Yes
1128	15.8	Yes	No	Yes	Yes
1128-1	8.9	Yes	No	Yes	Yes
1155	56.2	Yes	No	Yes	Yes
1135	70.3	Yes	No	No	Yes

1140	142.1	Yes	No	Yes	Yes
1136	87.4	Yes	No	Yes	Yes
1129	61.3	Yes	No	Yes	Yes
1217	13.7	Yes	No	Yes	Yes
1151	97.5	Yes	No	Yes	Yes
527	22.0	Yes	Yes	Yes	No
522	36.8	Yes	Yes	Yes	No
525	31.4	Yes	Yes	No	No
Unit	Acres	Alt2	Alt3	Alt4	Alt5
524	187.0	Yes	Yes	No	No
523	95.3	Yes	Yes	Yes	Yes
521	75.6	Yes	Yes	Yes	No
520	193.3	Yes	Yes	No	No
528	43.9	Yes	Yes	Yes	Yes
528-1	34.7	Yes	Yes	Yes	No
525-1	4.3	Yes	Yes	Yes	No
528-2	140.3	Yes	Yes	Yes	Yes
539	16.9	Yes	Yes	Yes	Yes
415	243.3	Yes	Yes	Yes	No
414	28.7	Yes	Yes	Yes	No
003	27.6	Yes	Yes	Yes	No
003-1	11.7	Yes	Yes	Yes	No
003-2	70.0	Yes	No	Yes	No
005	13.4	Yes	Yes	Yes	No
005-1	3.9	Yes	Yes	Yes	No
005-3	32.7	Yes	Yes	Yes	No
005-4	3.4	Yes	Yes	Yes	No
005-5	81.9	Yes	Yes	Yes	No
005-7	49.6	Yes	Yes	Yes	No
005-8	18.2	Yes	Yes	Yes	No
005-9	51.7	Yes	Yes	Yes	No
005-10	9.8	Yes	Yes	Yes	Yes
005-11	142.2	Yes	Yes	Yes	No
058	197.0	Yes	Yes	Yes	No
058-1	306.3	Yes	Yes	Yes	No
005-12	75.3	Yes	Yes	Yes	Yes
056	145.0	Yes	No	Yes	No
013	59.2	Yes	Yes	Yes	Yes
022	61.9	Yes	Yes	Yes	No
031	20.6	Yes	Yes	Yes	Yes
032	295.3	Yes	Yes	Yes	Yes
032-1	17.4	Yes	Yes	Yes	Yes
033	8.0	Yes	Yes	Yes	Yes
033-1	39.6	Yes	Yes	Yes	Yes

Appendix B– Salvage Units by Alternative

034	37.2	Yes	Yes	Yes	Yes
033-2	1.7	Yes	Yes	Yes	No
035	15.7	Yes	No	Yes	Yes
036	58.1	Yes	Yes	Yes	Yes
039	28.1	Yes	Yes	Yes	Yes
040	34.2	Yes	Yes	Yes	Yes
525-2	214.7	Yes	Yes	No	No
1137	31.3	Yes	No	Yes	No
1108	12.0	Yes	No	Yes	Yes
Unit	Acres	Alt2	Alt3	Alt4	Alt5
508-4	28.2	Yes	Yes	Yes	Yes
508-5	7.7	Yes	Yes	Yes	No
508-6	10.4	Yes	Yes	Yes	Yes
508-7	7.7	Yes	Yes	Yes	Yes
508-8	34.9	Yes	Yes	Yes	Yes
508-9	20.2	Yes	Yes	Yes	Yes
545	20.4	Yes	Yes	Yes	No
546	29.9	Yes	Yes	Yes	No
236-1	10.3	Yes	No	Yes	No
227-1	13.3	Yes	Yes	No	No
228-1	47.8	Yes	Yes	Yes	No
64	19.2	Yes	Yes	Yes	No
65	56.6	Yes	Yes	Yes	No
1129-1	50.0	Yes	No	Yes	Yes
228-2	23.7	Yes	Yes	No	No
50-1	26.0	Yes	Yes	Yes	No
54-1	36.9	Yes	Yes	Yes	No
242-1	10.3	Yes	Yes	Yes	Yes
242-2	3.6	Yes	Yes	Yes	Yes
243-1	40.6	Yes	Yes	No	No
235-2	5.6	Yes	No	No	No
52-2	6.8	Yes	Yes	Yes	No
62-2	19.0	Yes	Yes	Yes	No
228_3	22.4	Yes	Yes	Yes	No
227_1_1	10.1	Yes	Yes	Yes	No
227-2	17.0	Yes	Yes	No	No
407-1	8.9	Yes	Yes	No	No
1155-1	36.4	Yes	No	No	Yes
55_1_1	16.9	Yes	Yes	No	No
55_2_1	10.9	Yes	Yes	No	No
55-3	10.6	Yes	Yes	No	No
55-4	45.2	Yes	Yes	Yes	No
23-1	101.1	Yes	Yes	Yes	Yes
23-2	321.7	Yes	Yes	Yes	No

058-3	197.5	Yes	Yes	No	No
058-6	30.8	Yes	No	No	No
211	17.0	Yes	Yes	Yes	No
60-1	93.4	Yes	Yes	Yes	No
23_1_1	124.2	Yes	Yes	Yes	Yes
005-10-1	6.5	Yes	Yes	Yes	No
005_9_1	9.2	Yes	Yes	Yes	Yes
23_1_1_1	23.8	Yes	Yes	Yes	No
22-1-1	20.8	Yes	Yes	Yes	No
243-1-1	0.0	Yes	Yes	No	No
Unit	Acres	Alt2	Alt3	Alt4	Alt5
243-2	0.3	Yes	Yes	No	No
243-3	5.4	Yes	Yes	No	No
523-1	81.7	Yes	Yes	Yes	No
528-1-1	3.3	Yes	Yes	Yes	No
515-1-1	1.2	Yes	Yes	Yes	Yes
515_1_2	41.8	Yes	Yes	Yes	Yes
515-1-1_1	36.9	Yes	Yes	Yes	Yes
508_1_1	30.4	Yes	Yes	Yes	Yes
508-4-1	16.0	Yes	Yes	Yes	No
508-6-1	0.3	Yes	Yes	Yes	No

Appendix C– General Reforestation Prescriptions

Reforestation prescriptions are designed to create a stand composition based on historic information and to increase the likelihood of long-term survivability of these reforested units in a fire-adapted ecosystem; this composition includes hardwoods as well as conifers. Units identified for proposed planting include areas where no suitable green trees exist or the number of remaining green trees can't provide a seed source for natural regeneration. Planting is proposed for areas where residual green trees were assessed during site visits for immediate seed-cone potential and were found to be inadequate for providing a reliable seed source. Remaining green trees will contribute to overall post-fire stocking levels but cannot be relied upon solely for overall re-seeding needs.

Overall, species considered for planting in the project area include Douglas-fir, sugar pine, ponderosa pine, incense cedar, white fir, and red fir. A mosaic distribution will be achieved over time due to the spatial variability achieved by micro-site selection for planting. Conifers will not be planted next to green hardwoods; these hardwoods will be included in average spacing. Seedlings will be widely spaced on poorer sites including southerly aspects and/or rocky soils. Trees will be planted in clusters to achieve groups of conifers throughout the landscape to mimic natural stands. Seedling survival rates and competition from brush species will create a natural mosaic of species and stocking densities. In order to effectively reforest these units, an average of 130 to 300 trees per acre will be planted to achieve acceptable levels of stocking, depending on the site conditions described below. Initial planting spacing recommendations considered Forest Plan land management objectives for projected stocking needs, and the likelihood of achieving those objectives, for each unit evaluated for reforestation.

Tree planting (or reforestation) will be by hand methods, using either bare root or container stock. Hand planting will increase the likelihood for survival and provide for the desired spatial variability within treatment units and across the project area. Tree species used for planting will roughly correspond with historical stand composition, varying by forest type from unit to unit. In general, mostly pines will be planted on droughty south-facing slopes and ridges. South-facing slopes and ridges will be planted at lower densities compared to other areas within the project area. Douglas-fir will be planted at higher densities as the primary species on lower sheltered slopes and northern aspects. True fir will be re-established at the higher elevations at the highest density to reflect how these units would have naturally established. Hardwoods will not be planted, due to their ability to naturally regenerate following fire either by epimoric sprouting, belowground sprouting, or by natural re-establishment as seedlings from seed caches found within the stand. Epimoric sprouting refers to the shoots that grow from buds on stems or branches of hardwoods, often in response to stress. Growth of existing hardwoods will be encouraged; hardwoods will be included in the target stocking for units in areas where they exist.

Additional planting establishment techniques may be used to increase survival of planted trees. These techniques include, but are not limited to: animal protection devices for browse reduction; shade blocks for improved microsite conditions; and hand grubbing to remove competing vegetation around seedlings for survival.

Release of seedlings will be conducted using a manual treatment called "grubbing". The key to successful conifer seedling establishment is to keep competing plants, and specifically water uptake by competing plant roots, from impinging on conifer seedlings. Grubbing, in general, consists of removing all vegetation within a minimum 5 foot radius circle from a planted or naturally regenerated conifer seedling.

Appendix D– Process for Evaluating Reforestation Needs

The concept of reforestation has evolved over the course of the last several decades for a number of reasons. Policy changes, climate change predictions, listing of threatened, endangered and sensitive species, public involvement, new findings by the scientific community and wildfire activity have all influenced the way public forest lands are being managed. The image that many seem to have regarding reforestation is a homogenous stand of pine closely spaced together with a somewhat unnatural appearance (figure D-1). Reforestation with the intent of producing a commercial crop of timber is much different than reforestation with the intent of establishing conifers on a site where they historically existed and at a density similar to that of this complex fire-adapted ecosystem.

Figure D-1. Stand 529-5 is an example of a homogenous pine plantation at relatively close spacing (Happy Camp Complex).

A comprehensive evaluation process was conducted to ensure that only the most favorable sites would be recommended for reforestation. There are many limitations that would preclude reforesting every acre of high severity burn including Forest Plan direction, budget, and area access, but there are also ecological benefits to be specific about where and how we choose to plant. A list of general criteria was developed to establish a starting point for making these determinations. Within each criterion, however, there are a number of different scenarios that could influence the final decision. The intent of this document is to explain as clearly as possible the decision-making process behind choosing sites to reforest. The complexity of forest dynamics and the influence of current and past management practices create many gray areas where professional judgment and the best available science have been used together to make the final determination for reforestation proposals. To start the process, vegetation burn severity maps were overlayed with existing plantation layers. Initially, most plantations were evaluated to verify the accuracy of the burn severity maps. Once a basic, reliable trend was established, only plantations that were shown in the highest severity areas were visited on the ground. During site visits, the following observations were made: size of trees on site (recent conifers and remnant stump existence, figure), presence of residual conifer seed source (figure D-1), percent of stand burned, road accessibility, type of site preparation needed (figure 4), prevalence of brush and hardwoods (figure 5) and site quality. Some stands were difficult to assess in terms of success of regeneration, so further information from stand record cards was used to verify the history of activities within those stands including number of times planted, survival of seedlings, natural regeneration success, pest issues and site quality. Further evaluation was conducted using topographic maps to summarize aspect and slope position of the stands evaluated as being

favorable for reforestation. It is generally accepted that south aspects are brushier and burn with higher severity than north aspects and should not be reforested with conifers. However, some south aspects do support conifer stands. Within the Westside Fire Recovery Project, some south aspect stands are proposed for reforestation based on the following information: sites are of a quality capable of supporting conifers, reforestation will be of a density (widely spaced) appropriate for the site and consistent with historic range of variability, surviving conifers to provide a seed source for natural regeneration were limited or non-existent.

Figure D-2. Unit P018 (stand 433-15) had a mix of hardwood component and remnant large tree stumps. This east facing aspect on a middle 1/3 slope is proposed for handcut, pile, and plant (Whites Fire).

Appendix D– Process for Evaluating Reforestation Needs

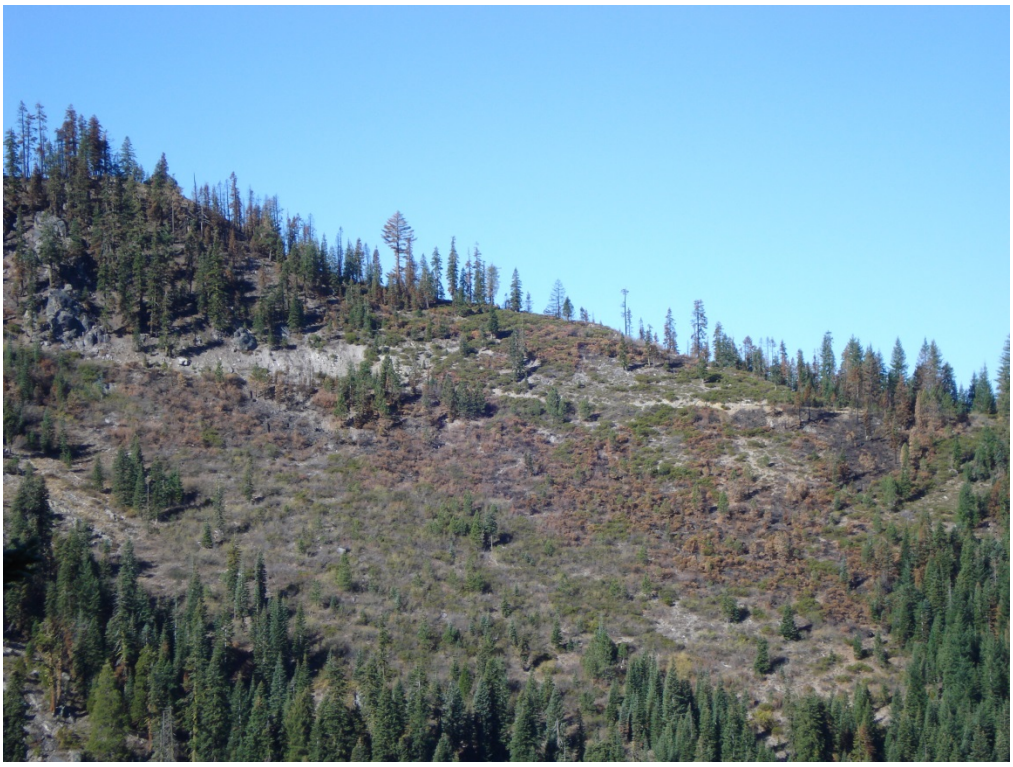

Figure D-3. Stand 433-22 is a plantation that had a low severity burn and was excluded from site preparation and reforestation due to the presence of green seed trees, upper slope position and existing vegetation (Whites Fire).

Figure D-4. Unit P092 (stand 121-203) in the Beaver Fire Area proposed for site preparation using mastication and planting. Mastication was chosen due to favorable machine access, gentle slope percent, diameter of material on site and low levels of existing ground fuel (Beaver Fire).

Appendix D– Process for Evaluating Reforestation Needs

Figure D-5 . Unit P110 is a stand that burned at high severity that is proposed to have a fuels treatment to reduce standing fuels and to promote oak regeneration (Beaver Fire).

While evaluating the existing plantations, adjacent natural stands not proposed for commercial harvest were also evaluated using the same criteria described above. The primary differences in evaluations were that stand record card history was not available for these natural stands and tree size was generally larger than what was found in the existing plantations which affects our ability to prepare the site for planting.
Sites proposed for reforestation will be planted to reflect historic species composition utilizing site quality, elevation, and aspect to determine species and quantity of each. Spacing and density will also vary to target the best sites for planting rather than emphasize a strict, uniformly-spaced pattern. The end result of stand conditions based on these reforestation techniques will be a heterogeneous stand with mixed species, clumps of conifers scattered throughout and a hardwood or brush component intermixed where they express site dominance. The desired condition is to have a conifer forest that resembles what existed prior to wildfire disturbance, historic human disturbances or land management activities while considering the effects of potential changes in climate and future wildfire conditions.