

Appendix E Silvicultural Prescriptions, Marking Guidelines, & Stand Inventory Summary

I. Management Direction and Objectives

Management Direction

On matrix lands, as defined by the Medford District Resource Management Plan (RMP) and the Record of Decision (ROD) for the Northwest Forest Plan the following objectives are to be met.

- Produce a sustainable supply of timber and other forest commodities to provide jobs and contribute to community stability.
- Provide connectivity (along with other allocations such as riparian reserves) between late-successional reserves.
- Provide habitat for a variety of organisms associated with both late-successional and younger stands.
- Provide for important ecological functions such as dispersal of organisms, carryover of some species from one stand to the next, and maintenance of ecologically valuable structural components such as down logs, snags and large trees
- Provide early successional habitat
- Reduce tree mortality and restore the vigor, resiliency, and stability of forest stands

Treatment Objectives

Implement management activities that would initiate the development of a landscape that has the ability to buffer and absorb disturbances, such as fire, insects, disease, drought, floods and potential climate change, rather than to magnify those disturbances. To meet this objective the following management treatments are planned.

- Manage mature forest stands to develop and maintain healthy large conifer trees, favoring drought tolerant species (ponderosa pine, sugar pine, incense cedar and Douglas-fir).
- Reduce densities in overstocked forest stands to increase tree vigor and redistribute growth to the largest and healthiest trees.
- Regenerate forest stands that are declining, retaining structural and functional components and provide for the reestablishment of shade intolerant conifer species.

II. Site/Stand Condition

1. General Description of the site

The proposed treatment area is located within Jackson County and approximately 25-30 air miles northeast of the city of Medford. The area is located in portions of Sections 1, 11, 12, 13, 14, 15, 22, 23, 27, & 35 in Township 33S, Range 1E and Section 33 in Township 32S and Range 2E and Sections 3, 4, 5, 7, 8, 9, 17, 18, 19 in Township 33S, Range 2E.

2. Drainage/Watershed

The proposed treatment area is located within the Lost Creek and Lower Big Butte Creek watersheds.

3. Abiotic Conditions

a. Soil Type

The project area has McNull, Medco and McMullin soil associations. McNull soils are the dominant soil association in the project area. These soils are moderately deep and well drained. Erosion hazard is high for slopes greater than 35%. The underlying bedrock restricts root growth, causing a higher wind throw potential. Medco soils are deep and moderately well drained. Medco soils are subject to severe slumping and are considered fragile soils. A dense clay layer resists root growth and increases wind

throw and compaction potential. This layer can also result in a perched water table. McMullin soils are shallow, well drained soils containing 35% rock fragments. High temperature in the surface layer and insufficient moisture increase seedling mortality.

b. Site Index

The site index for Douglas-fir within the treatment area ranges between 63 to 104 and averages 81 based on Hann-Scrivani site index equations (Hann and Scrivani, 1987). Site index is the average height of the dominant trees at 50 years. Site index is relatively independent of stand density and provides a comparable measure of site productivity between different forest stands.

c. Topography/Precipitation

The elevation in the treatment area ranges from a low of 1900 feet above sea level (ASL) at the edge of Lost Creek Lake to 4100 feet ASL near the top of Flounce Rock. Slopes over most of the project area can be classified as moderate, with most ranging from 10%-50%. Areas of steeper slopes >55%, occupy a small percentage of the total project area

Precipitation amounts average from 35-45" annually. Forms of precipitation include rain and snow, with a combination of rain and snow occurring in the transient snow zone (between 3500 and 5000 feet). Average dry season (May-September) precipitation is 5-6 inches.

d. Existing Site Problems

Fragile soils and slope stability is a concern where slopes exceed 35%. Specific areas of concern are scattered throughout the project area and are identified as sensitive soils in the RMP, map 6. Appendix D of the Medford District RMP provides management direction and mitigation measures when operating on these soil types.

Wind throw is a potential risk throughout the project area due to the soil types present. Two of the soil associations (McNull and Medco) have an underlying bedrock layer that restricts root growth and reduces the anchoring function that roots provide. Where these soil types occur, the risk of wind throw is higher, particularly on ridges, in saddles and in areas with perched water tables.

The high evapotranspiration demand during prolonged hot and dry summer days causes greater tree stress particularly in overstocked forest stands. Plants require at least 75% water content in functional cells (Bradford and Hsiao, 1982). During hot, dry periods, the uptake of moisture can not keep up with the loss through transpiration, when this occurs the plant closes leaf stomates to maintain adequate cell water content. With the leaf stomates closed, carbon dioxide is not taken into the plant through photosynthesis and the conversion of carbon dioxide and water into carbohydrates or "food" does not occur. Without the creation of "food", the life processes of the tree are interrupted resulting in increased tree stress and a higher risk of insect attack or disease infection. Reduced resin flow in water stressed trees, enables insects to successfully attack the tree (Kramer and Kozlowski, 1979).

4. Biotic Conditions

a. Plant Series

Abrupt changes in aspect, slope, soil type and past disturbances (wildfire, insects, disease, and logging) affect forest structure and the type of tree species present. These landscape changes result in a mosaic of forest conditions. This mosaic includes different levels of canopy closure, shifting tree species dominance and varying tree age and size classes.

Four forest plant series are present within the project area, Oregon white oak, ponderosa pine, Douglas-fir and white fir. These plant series generally follow an elevation gradient from lowest to highest. The Oregon white oak series occupies low, hot, dry sites with shallow soils, and it is commonly found on southerly aspects. The ponderosa pine series occurs on sites with shallow droughty soils but generally is found at slightly higher elevations than the Oregon White Oak series. At higher elevations or on sites with

a more northerly aspect the Douglas-fir series occurs. The white fir series occupies the highest elevation sites in the project area. These sites are the most productive as well as the coolest and wettest.

The Douglas-fir plant series is the most common in the project area. Ponderosa pine, sugar pine and incense-cedar make up a small percentage of the overstory tree canopy with Douglas-fir the dominant overstory as well as understory tree species. Madrone and black oak are the main hardwood species. Shrub competition within this plant series is generally low to moderate following canopy opening disturbances. Shrub species present in varying amounts are: ocean spray, hazel, deerbrush ceanothus, Oregon grape (dwarf & piper's), poison oak, and vine maple at the higher elevations.

Two non-forested plant communities are also common within the project area. The first is a shrub or chaparral community, the common shrub species include: buckbrush (*Ceanothus cuneatus*), deerbrush (*Ceanothus integerrimus*), poison oak (*Rhus diversiloba*), and whiteleaf manzanita (*Arctostaphylos viscida*). Tree species present may include black oak (*Quercus kelloggi*) and madrone (*Arbutus menziesii*) with conifer species generally lacking in the overstory. The second non-forested community is meadows. Meadows are present throughout the area and typically can be found on very shallow soils that experience hot and dry temperatures during the summer. Meadows vary in vegetative composition and may include a variety of mosses, mat forming shrubs, grasses and herbs. Rock outcrops are also common.

b. Stand History

Portions of the proposed treatment area have been logged within the past 40 years. In the early 1950's, partial cutting of individual large trees occurred on the west side of Lost Creek Lake. During the 1960's through the 1990's, the majority of logging activity occurred near Flounce Rock in Sections 4, 5 & 33. Timber harvesting in this area consisted of partial cutting, overstory removal, clearcutting and salvage of dead and dying trees. The last harvest entry on any site occurred in 1996, with the salvage of wind throw trees near Flounce Rock in Sections 33 & 5.

Prior to harvest activities, fire was the primary disturbance event. Frequent, low intensity fires were common on the lower elevation sites of the watershed. These fires periodically removed the smaller and less fire resistant tree and shrub species, thereby reducing the competition between residual trees for site resources.

c. Structure Description

The majority of the stands can be classified as multi-layer uneven aged stands. Groups of older trees randomly occur and are representative of the role frequent fire had in the structural development of the stand; with frequent fires most forest stands developed multiple age classes. Decades of fire suppression has lead to the creation of dense stagnant understories in many forest stands. Without the natural thinning effect of low to moderate fires, the amount of understory vegetative continues to increase.

Hardwoods make up the middle layer of many stands and occur as clumps or a widely scattered stand component. Hardwoods represent an early drought tolerant seral tree component, competition between adjacent trees and conifer canopy closure has reduced the vigor and increased the mortality of many of the large hardwood trees.

d. Coarse Woody Debris (CWD)

Coarse woody debris provides habitat for wildlife, invertebrate, microbial and fungal species, as well as providing for important ecological functions such as moisture retention, soil stabilization, and nutrient recycling. Within the project area, coarse woody debris amounts are low with decay class 1 or 2 coarse woody debris greater than 16" dbh limited. Decay class 3, 4, 5 coarse woody debris larger than 16" dbh is also limited on sites below 3000' ASL. The lack of the older decay classes may be linked to lower historic (prior to fire suppression) stand densities, and the frequent wildfires that occurred prior to fire suppression. These repeated fires would have kept the understory and surface layer relatively clean and void of large buildups of woody debris.

Where coarse woody debris does occur it will not be removed from the site and will be protected from disturbance. In forest stands identified for regeneration harvests, trees would be designated and reserved to meet coarse woody debris requirements.

e. Snags

ROD standards and guidelines require that overtime, 1-2 snags be present per acre to meet the requirement for cavity nesting birds at 40% of potential population levels. All classes of snags will be retained as part of the silvicultural prescription. During harvest operations, existing snags will be reserved from felling where they are not a safety hazard, and where necessary, additional green trees will be reserved to meet the target levels. If a snag needs to be fallen for safety concerns, the snag will be left on site to function as coarse woody debris.

f. Tree and Stand Health, Insect and Disease

Laminated root rot (*Phellinus weirri*) is common in Section 33 adjacent to the Ulrich/Flounce Rock road and is causing tree decline in white fir and Douglas-fir. Areas below Willits ridge have experienced higher amounts of wind throw due to this root rot pathogen.

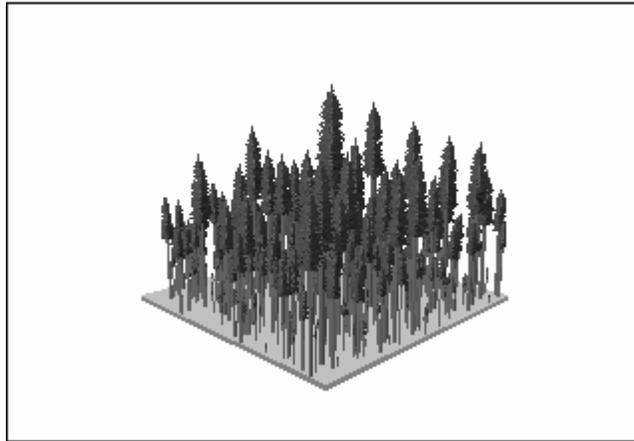
Stem rots (*Phellinus pini*, *Oligoporus amarus*, and *Phaelos schweinitzii*) are also present in all tree species, but do not pose a serious concern for stand health. The trees infected with stem rots enhance forest diversity by providing trees with unique structural defects that serve as plant and wildlife habitat, as well as future coarse woody debris.

The greatest concern and impact upon individual tree and stand health is the level of inter-tree competition resulting from the high numbers of trees within many forest stands. Overstocked stands contain more trees than the site has resources (moisture, nutrients, and growing space) to provide for (Figure 1). This condition leads to increased tree stress particularly during prolonged hot summer days without any precipitation. Decreased tree vigor is magnified during periodic drought years when the cumulative effects of below average amounts of precipitation causes the interruption of basic functional processes (photosynthesis, transpiration, respiration, translocation assimilation) over an extended period of time. In forest stands proposed for management entry stand exams were completed to determine the "relative density". Relative density is a measure of crowding in a stand of trees. It compares the number of trees present to the number of trees that the site has resources to support. Relative density (RD) levels within the units proposed for treatment range between 50% and 100% with an average relative density of 81%. As a point of reference crowns begin to close when the RD approaches 15% and the mortality of suppressed trees begins after the relative density reaches 65% (Perry, 1994; Hann and Wang, 1990). Maintaining the relative density in forest stands between an upper end of 50% and a lower end of 25% prevents excessive tree loss from competition.

Tree senescence or "aging" also plays a role in the condition and vigor of individual trees. As a tree increases in size and builds up a complex branch system, it shows a decrease in metabolism, gradual reduction in growth of vegetative and reproductive tissues, loss of apical dominance, increase in dead branches, slow wound healing, heartwood formation, increased susceptibility to injury from certain insects and diseases, and from unfavorable environmental conditions, and loss of geotrophic responses (growth of stems upward and of roots downward in response to gravity). There is also a decrease in the proportion of photosynthetic to non-photosynthetic tissue, this reduction results in less carbohydrates being produced (Kramer and Kozlowski, 1979). Movement of food, water, and minerals becomes more difficult as the distance from the roots to the top of the tree increases. This problem is magnified when water becomes a limiting resource in tall trees. Water deficits may cause needle and stem mortality as evident by snag tops or dead branches and needles in the upper part of the crowns.

In addition to the high numbers of trees per acre and tree aging other factors contribute to individual tree health and vigor. Factors such as, the amount of understory shrub growth, soil type, precipitation, aspect, crown position in the canopy, topography, root pathogens and insects all combine to affect tree vigor and its ability to maintain basic functional processes.

Figure 1. Present Conditions: Forest stands are overstocked with more trees than the site has water, nutrients and growing space to sustain. Without reducing tree density levels to the carrying capacity of the site, tree and stand vigor will decline. As trees increase in size they require more growing space and a larger volume of soil to supply an increasing need for water and nutrients.



III. Analysis in support of the prescription

The target stand reflects not only what is planned for the future but also what is expected immediately after treatment. The target stand represents optimum conditions to strive for through management.

Three types of silvicultural treatments are proposed for the project area. These are: Individual tree selection, regeneration harvest and density management. Individual operational inventory (O.I.) units have been grouped under one of these categories based on the proposed treatment.

1. Density Management(DM) - The O.I. units proposed for this treatment are listed in the marking guidelines.

a. Present Conditions

Stand densities are high, with the number of trees per acre above the long term carrying capacity of the site. In the forest stands identified for this type of treatment, the average relative density is 81%. At relative density levels greater than 55%, the following tree and stand changes begin to occur: competition related mortality becomes significant, increased sensitivity to the effects of drought, self thinning starts, growth declines, volume growth per acre is offset by mortality and an increased susceptibility of trees to insect and disease attack. The tree species composition of these stands is a mixture of Douglas-fir and minor amounts of ponderosa pine and sugar pine. Hardwood species include madrone and black oak.

b. Target Stand - Density Management (DM)

The main objective within these stands is to improve individual tree and stand health. Harvesting within these units will be targeted toward reducing the stocking levels within those areas where overstocked conditions of sapling, pole and mature and timber exists. Density levels will be reduced by removing the

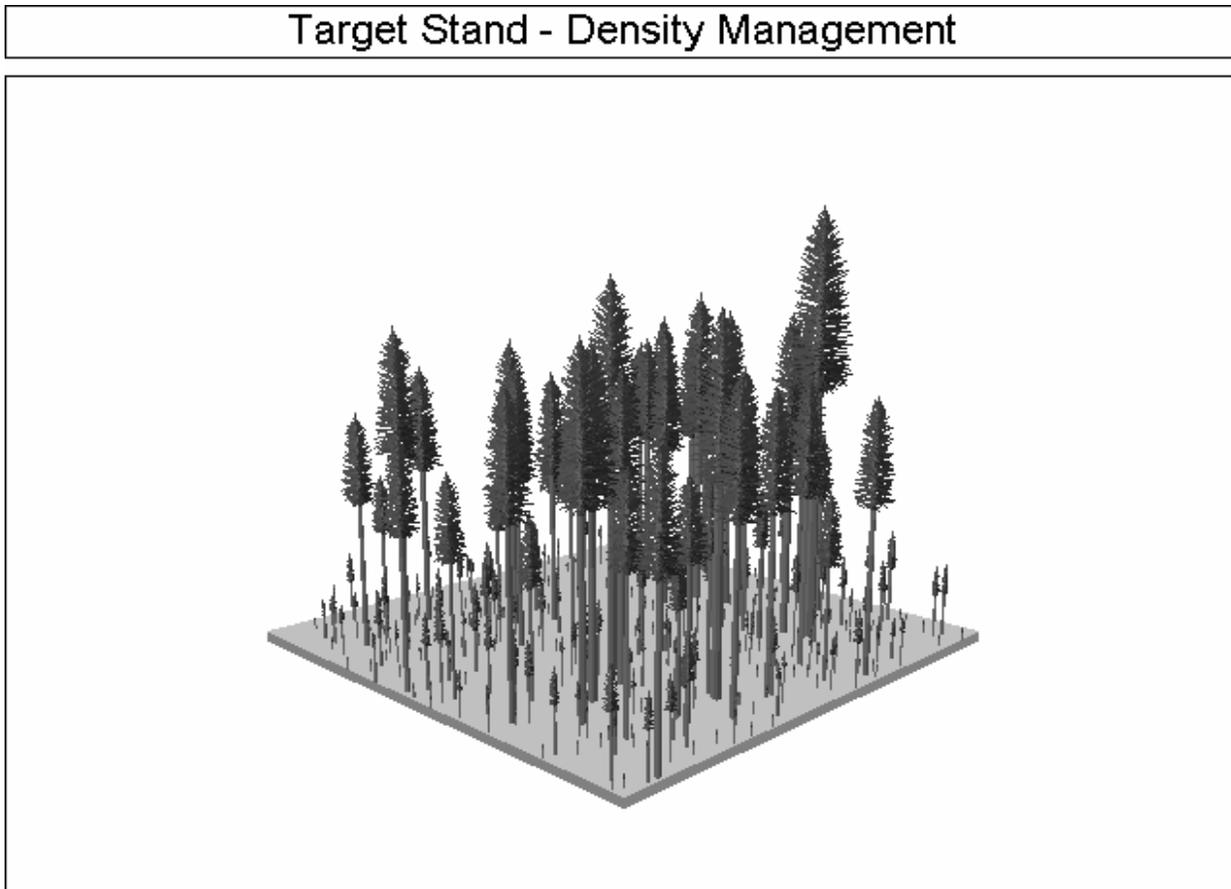
suppressed crown class trees and increasing the spacing of the intermediate and dominant/co-dominant crown classes. Remaining trees will have crown ratios greater than 35% and will be the better formed trees. Ponderosa pine, sugar pine, incense-cedar and Douglas-fir will make up the preferred leave species. Large (>20" dbh) healthy ponderosa and sugar pine will be favored over equally healthy Douglas-fir. The crowns of the retained pines should be full, with a minimum crown ratio of 35%, needles should be dark green, crown tops should be pointed (not rounded) and there should be no evidence of resin flow on the upper bole of sugar pine. The residual crown closure of these stands will range within 50-60%.

Large (>12"dbh) healthy hardwoods (madrone and black oak) will remain as a scattered stand component. Removal of competing trees will provide the necessary top light required for the continue growth of these trees.

Survey and manage species may occur within the stands. Where sites do occur; sites will be buffered and protected, these buffer patches will provide for additional within stand structural diversity.

All stage 1 and 2 snags >20"DBH will remain for wildlife, future coarse woody debris, and structural diversity.

Figure 2. Stand structure following density management. This is a visual reference only; results will vary from stand to stand.



YEAR	DENSITY MANAGEMENT TREATMENT
0	<p>Harvest</p> <ul style="list-style-type: none"> * Thin from below first, removing the suppressed component of the stand, followed by the thinning of the main canopy to reduce densities and to remove any trees that are insect or disease infected or otherwise declining (based upon crown ratio and form). Healthy conifer trees less than 8" dbh that are not in competition with healthy trees larger than 8" dbh will be thinned at an approximate 14' spacing (space off of existing leave trees). Madrone clumps would be cut or girdled to the largest stem, when not in direct competition with residual conifers. * Residual stocking will range from a relative density of 35-50+ and crown closures of 50-60%. * Favored leave species are ponderosa pine, sugar pine, incense-cedar and Douglas-fir. * Reserve ponderosa and sugar pine >20 inches DBH, to maintain genetic and structural diversity. * Use existing and widely spaced skid trails and directional falling to reduce impacts to the site and residual stands. * Reserve the largest hardwoods 12" dbh or greater, 2-4 per acre. * Heavy slash concentrations will be hand piled. * Slash all sprung, severely damaged, spindly crowned, low crown ratio (<40%) conifers and hardwoods between 1&7".
10-20	<p>Conduct stand exam to assess stand conditions. Evaluate the health of the stand for excess tree mortality, reduced radial growth and condition of large ponderosa and sugar pine to assure presence in the stands. A second thinning entry would likely occur to maintain tree vigor and species diversity.</p>
20-50	<p>Assess the stands for current objectives. Possible additional partial cut entries or regeneration harvest may be necessary.</p>

2. Regeneration Harvest (RH)

Three different regeneration silvicultural methods may be implemented, Structural Retention, Modified Even-aged and Modified Even-aged in a Connectivity Block. The target stand conditions for each of these methods are the same, except for the number of trees greater than 20 inches in diameter at breast height (dbh) that are left. Listed below are the number of trees > 20" dbh that are to be left.

- Structural Retention - 16-25 trees per acre > 20" dbh
- Modified Even-aged - 6-8 trees per acre > 20" dbh
- Modified Even-aged / Connectivity Block - 12-18 trees per acre > 20" dbh.

The O.I. units proposed for these treatments are listed in the marking guidelines.

a. Present Conditions

Alternative 2 follows ROD/RMP guidelines using stand age in determining the timing of regeneration harvests, forest stands would be managed using a 150-year area control rotation. The silvicultural treatments proposed in Alternative 3 are based upon stand conditions and landscape objectives, rather than stand age alone..

These forest stands have been tractor logged in the past. Selective harvesting was the primary silvicultural method applied. This resulted in stands developing multiple tree canopy layers. The overstory tree component is declining due to high stand density levels, root pathogens and tree senescence. Overstory tree species are primarily Douglas-fir with lesser amounts of white fir; the minor species include sugar pine, incense-cedar and ponderosa pine.

The shrub species present across most of these units consists of Oregon grape (dwarf and piper's), deerbrush ceanothus, hazel, oceanspray and vine maple common in the higher elevations. In most units, shrub cover is low to moderate, occurring in patches or as a scattered vegetative component. Hardwood species include madrone, and black oak. Generally the hardwoods are widely scattered or occur in small clumps and are a minor compositional component of the stands.

Natural regeneration (seedlings and saplings) of Douglas-fir, incense cedar and a lesser amount of white fir is present in most of these units, with density levels varying from stand to stand.

b. Target Stand - Regeneration Harvest (RH)

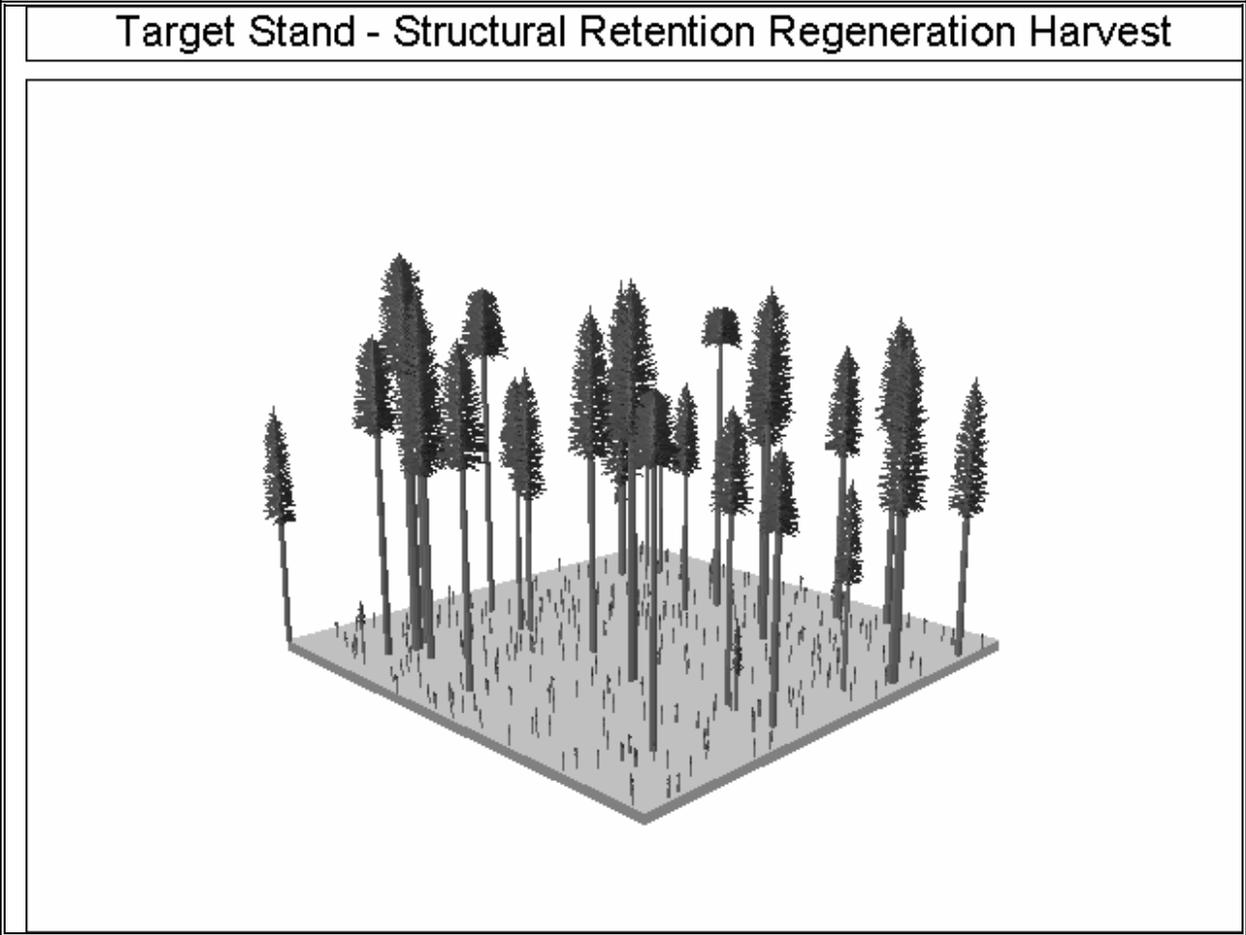
The minimum number of remaining large (>20"DBH), overstory green trees will vary from 6-25 trees per acre. Douglas-fir, sugar pine, ponderosa pine, incense-cedar and hardwood species will be the preferred leave species. In areas of laminated root rot, healthy co-dominant and dominant ponderosa pine, sugar pine, incense cedar and hardwood species would be favored over Douglas-fir when available. Leave trees will be the largest and full crowned, healthy trees.

Pre-harvest snags would remain and additional healthy or cull green trees >20inches DBH, will be reserved if needed to meet the required 1-2 wildlife snags per acre, or to meet coarse woody debris requirements. Two to four large hardwoods >12"DBH, per acre will be reserved for wildlife and stand diversity. Tree form (height and crown condition) will determine which hardwoods to leave .

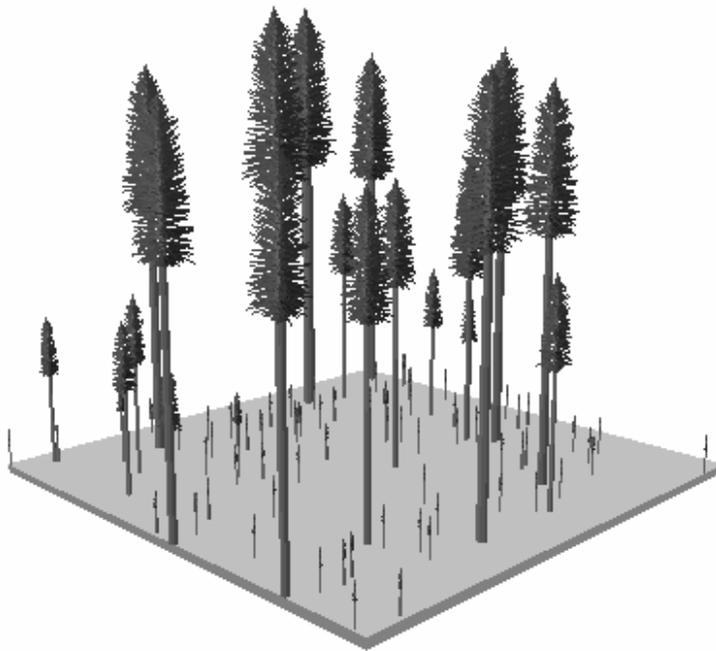
Survey and manage species may occur within the stands. Where sites do occur; sites will be buffered and protected, these buffer patches will provide for additional within stand structural diversity.

To prepare nonstocked sites for tree planting, logging slash will be piled and burned along with severed shrubs and regeneration with poor crowns. Piling will be accomplished by hand or excavator. Excavator piling would occur where side slopes are <30%. To promote species diversity within these units where planting is required, a mixture of Douglas-fir, resistant sugar pine, ponderosa pine and incense-cedar will be planted following site preparation activities. Plant approximately 300-500 trees per acre, species mix will be approximately, Douglas-fir 70%, sugar or ponderosa pine 20%, and incense-cedar 10%. In areas of laminated root rot the species mix would be altered towards low susceptibility species to reduce further effects of the root pathogen. The species mix would be approximately, 5-10% Douglas-fir, 70% ponderosa and sugar pine and 20% incense cedar (T33S-2E-33).

Figures 3&4. Stand structure following structural retention and modified even-aged regeneration harvest. These illustrations are a visual reference only; results will vary from stand to stand.



Target Stand - Modified Even-Aged Regeneration Harvest



REGENERATION HARVEST

YEAR	TREATMENT
0	<ul style="list-style-type: none"> * Harvest - Leave target number of green conifer trees/acre, >20"dbh and all vigorous ponderosa pine, incense cedar, sugar pine and hardwoods 8-20" dbh. * A minimum of 1.8 snags/acre (stage 1&2) and 120 linear feet coarse woody debris (decay class 1&2, 16" X 16') would be left. * Use widely spaced designated skid trails, directional falling and log length skidding to reduce site impacts. * Site preparation: Slash trees damaged from logging activities, 1-6". Leave all healthy unmerchantable trees. Brush and hardwoods are to be treated either by excavator removal or slashing. Excavator or hand pile brush and slash and burn. Limit piling of logging slash to pieces < 16" diameter. * Rip skid trails
0-1	<ul style="list-style-type: none"> * Plant with a mix of ponderosa pine, Douglas-fir, sugar pine and incense-cedar, modify planting mix in areas of laminated root rot (T32S-R2E-33).

	Apply appropriate maintenance (vexar tubing, mulching, shading, scalping, baiting) treatments to insure planting success.
1	* Conduct 1st year survival survey, assess need for supplemental planting or additional maintenance treatment.
3	* Conduct 3rd year survey, assess need for replanting and/or additional maintenance needs.
5	* Conduct 5th year stocking survey. Target stand will have a minimum of 280 well spaced trees per acre. Competing vegetation will have been controlled, with trees growing rapidly.
10	* Precommercial thin the understory if more than 400 trees per acre. Favor pine species, Douglas-fir and Incense-cedar. Favor ponderosa pine, sugar pine and incense cedar over Douglas-fir and white fir in laminated root rot areas. Thin to approximately 300 trees per acre
35	* Average diameter at breast height is 10", commercial thin if stand density is appropriate, otherwise delay until crown closure and competition reduces growth rates. Thin to approximately 200 trees per acre.
45-80	* Commercial thin if appropriate, favor leaving the pines, Douglas-fir and incense-cedar.
100+	* Assess stand and watershed conditions for possible regeneration harvest.

3. Selective Cut (SC)

The O.I. units proposed for this treatment is listed in the marking guidelines.

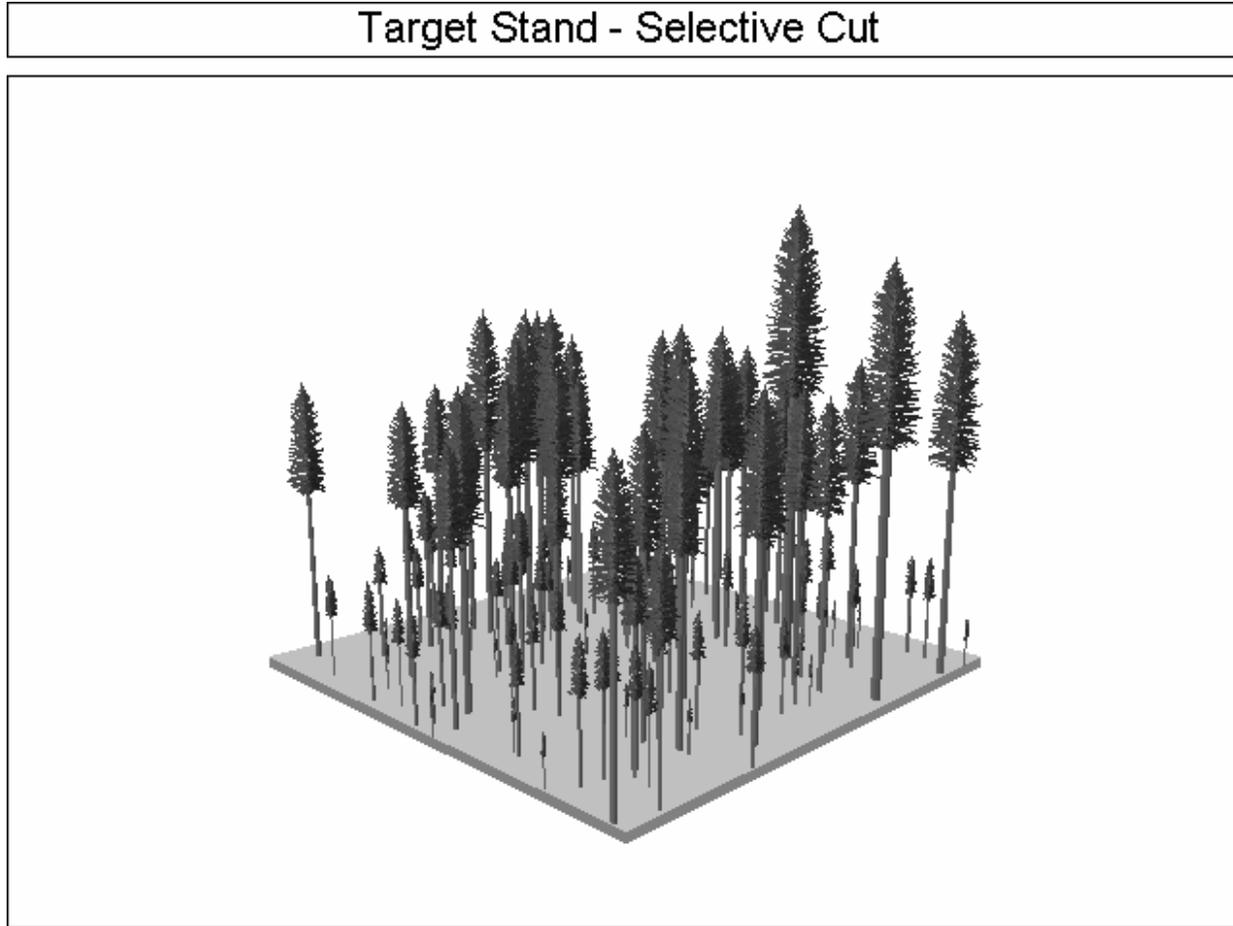
a. Present condition:

In the stands recommended for selective cut, a large percentage of the trees have good crown ratios and vigor; a smaller percentage of the trees are showing symptoms of decline (poor crown ratios, chlorotic thinning foliage or crown form is declining). Competition between trees for limited site resources is intense as stand densities are high. The average relative density for these stands is 83%. Past logging activities have created small canopy gaps that have resulted in stands with a variable stand structure. The tree species composition is a mixture of predominantly Douglas-fir with lesser amounts of ponderosa pine, sugar pine, incense cedar, black oak and madrone.

b. Target stand:

Following the harvest entry, these stands are composed of healthy trees of all species and diameter classes. Large healthy ponderosa pine have been retained to insure their continued presence in the stand. Species composition is dominated by Douglas-fir, followed by smaller amounts of ponderosa pine, sugar pine, incense cedar and large hardwoods. Vertical and biological diversity is present through the retention of trees of all ages and size classes. Survey and manage species may occur within the stands and where sites do occur patches of less than one acre will be buffered and protected. These patches will provide for additional within stand structural diversity. The estimated range of canopy closure is between 50-60%. Coarse woody debris (CWD) is present and provides conditions favorable for nutrient recycling, soil mycorrhizae, and the development of nitrogen fixing bacteria. Cull trees have been left to insure that a near-term "pulse" of CWD and snags will be available. Large (>12"dbh) healthy hardwoods (madrone and black oak) will remain as a scattered stand component. Removal of competing trees will provide the necessary top light required for the continue growth of these trees.

Figure 5. Stand structure following a selective cut. This is a visual reference only; results will vary from stand to stand.



YEAR	SELECTIVE CUT TREATMENT
0	<ul style="list-style-type: none"> * Initial harvest - Reduce stand densities by marking risk trees in all diameter classes, do not mark <i>any</i> trees 50" dbh or greater. Tree vigor as defined by crown form and crown condition, is the primary factor to be used in determining risk trees. Thin even-aged pockets where appropriate. * Use widely spaced designated skid trails, directional falling and log length skidding to reduce site impacts. * Treat logging slash by lopping and scattering heavy slash concentrations. * Slash all sprung or severely damaged conifers and hardwoods between 1&6"
10-20	<ul style="list-style-type: none"> * Conduct stand exam to assess stand conditions and to determine if any additional management treatments are needed.

IV. Monitoring

Implementation of the standard and guidelines in the Record of Decision (ROD) and management direction contained within the Medford District Resource Management Plan and Final Environmental Impact Statement (RMP/FEIS) require a monitoring system to insure effective on-the-ground results. The ROD states the following: "Monitoring is an essential component of natural resource management because it provides information on the relative success of management strategies. The implementation of these standards and guidelines will be monitored to ensure that management actions are meeting the objectives of the prescribed standards and guidelines, and that they will comply with laws and management policy. Monitoring will provide information to determine if the standards and guidelines are being followed (implementation monitoring), verify if they are achieving the desired results (effectiveness monitoring), and determine if underlying assumptions are sound (validation monitoring). Some effectiveness and most validation monitoring will be accomplished by formal research."

Monitoring of the proposed actions will follow the outline in the Medford District RMP/EIS, Volume II, Appendices 147-163. Monitoring will be specific to the land allocations and resources affected in the Lost Creek and Lower Big Butte Creek watershed sale area.

Monitoring should:

- Detect changes in ecological systems from both individual and cumulative management actions and natural events
- Provide a basis for natural resources policy decisions
- Provide standardized data
- Compile information systematically
- Link overall information management strategies for consistent implementation
- Ensure prompt analysis and application of data in the adaptive management process
- Distribute results in a timely manner

Monitoring begins with resource assessment and data collection which describes the existing conditions prior to management actions. Data collection is in the form of sampling which provides a representative description of the proposed treatment area. Stand exams were completed in the proposed sale area. Stand information was collected, using a comprehensive stand exam process. Within stands, a systematic sampling grid was used to establish plot centers. From the plot centers a variable plot and two nested fixed plots were used to record tree and site data.

This information is then used in a BLM stand exam program that provides a variety of analysis reports. These reports provide a description of stand characteristics and a detailed assessment of stand conditions and health.

Post harvest monitoring can then be implemented, using the pre-harvest stand information to determine if the objectives have been met.

Flounce Around Marking Guidelines

Summary of Treatment Objectives

Management Direction

The stands adjacent to Lost Creek Lake and Highway 62 are designated visual resource management (VRM) class II. Management activities within this designation “may be seen but should not attract the attention of the casual observer. Changes should repeat the basic elements of form, line color, texture, and scale found in the predominant natural features of the characteristic landscape”. Meeting this management guideline is the primary objective when marking in these stands. When in doubt, err on the conservative side.

Treatment Objectives

1. To reduce density levels towards the carrying capacity of the site. In second growth stands, to thin from below to redistribute growth to vigorous dominant and co-dominant trees. In selectively cut stands, remove low vigor trees across all diameter classes to reduce inter-tree competition while maintaining or promoting the development of large trees and multiple canopy layers.
2. To favor a return to the seral phase of the Douglas-fir and white fir plant series as a long term silvicultural approach to provide for sustainable forest conditions. Favored species should be the shade intolerant and intermediates, ponderosa pine, sugar pine, incense cedar, Douglas-fir and hardwood species.
3. To maintain healthy ponderosa pine and sugar pine as a stand and landscape component.
4. Maintain approximately 50-60% canopy closure in all density management and selectively cut stands. This range of canopy closure will minimize canopy openings, the growth of understory brush, maintain connectivity and provide a variety of plant and animal habitat across the landscape.
5. To regenerate stands with declining growth rates or deteriorating conditions and to prepare units for seedling establishment and growth by providing suitable site conditions for planting; within treatment areas retain coarse woody debris, snags and large green conifers for long term site productivity and biological legacies.

Selective Cut (SC)

1. Reducing stand densities, removing low vigor trees and retaining approximately 50-60% canopy closure, are the primary objectives for these stands.
 - Dependant upon the spatial arrangement of low vigor trees, canopy closure will vary across the stand.
 - Tree selection criteria should be based upon the retention of the desired basal area with tree vigor (risk factors) used as the primary aid in determining individual trees to mark. Refer to the attached low vigor and high risk of mortality guidelines. Ideally, trees selected for removal should be proportional to their presence within the stand, although this will not always be possible. For example, if the size class distribution within a stand is, 70% of the trees are 8- 20" dbh, 20% of the trees are 20-32" dbh and 10% of the trees are 32"dbh or greater, then the majority of the trees selected would be in the 8-20" size class with lesser amounts marked in the 20-32" size class and even fewer marked that are greater than 32" dbh.
 - The average residual basal area of treated stands will range between 140 to 180 square feet per acre. See below for the approximate residual basal area for each stand.

- Clumpiness of residual trees is okay, meeting the target basal area is more important than meeting a spacing requirement. Spatial and structural variability is a desired stand condition.
- Trees will be marked across all diameter classes. Minimize marking trees greater than 40" dbh and do not mark *any* trees 50" dbh or greater, regardless of condition.

2. Favor drought and fire tolerant tree species, such as ponderosa pine, sugar pine, incense cedar, Douglas-fir and hardwood species. Laminated root rot occurs occasionally within the sale area, specifically in stands above 3500 feet (32S-2E-33 & 33S-2E-4). In this area, white fir should be discriminated against because of its susceptibility to laminated root rot and also its low tolerance of fire and drought.

3. Large (>20" dbh) healthy ponderosa and sugar pine should be favored over equally healthy Douglas-fir. The crowns of the retained pines should be full, with a minimum crown ratio of 35%, needles should be dark green, crown tops should be pointed (not rounded) and there should be no evidence of resin flow on the upper bole of sugar pine. Pine species with poor crowns characterized by a ragged appearance as well as foliage which is bunchy and of poor color should be removed, do not retain.

4. Leave all hardwoods, greater than 12" dbh for species diversity, canopy layers and root disease resistance.

5. Leave all snags, stages 1-5.

6. Leave all coarse woody debris, decay classes 1-5.

7. Minimize the marking of large, >20" dbh, broken, fork top and deformed trees. Retain for plant and animal habitat, as well as future sources of coarse woody debris and snags.

Alternatives 2 & 4 -Selective Cut Units (target basal area):

32s-2e-33 OI 003 (160) 33s-2e-31 OI 007 (180-200) 33s-1e-01 OI 004 (140-160)
 33s-1e-11 OI 001 (140-160) 33s-1e-11 OI 008 (140-160) 33s-1e-35- OI 005 (160)

Alternatives 3 & 5 -Selective Cut Units (target basal area):

32s-2e-33 OI 003 (160) 33s-2e-04 OI 002 (160) 33s-2e-31 OI 007 (180-200)
 33s-1e-01 OI 003 (140) 33s-1e-01 OI 004 (140-160) 33s-1e-11 OI 001 (140-160)
 33s-1e-11 OI 008 (140-160) 33s-1e-35- OI 005 (160)

**** The stand data provided below is not absolute, rather it is an estimate based upon sampling. It is intended to provide a general description/measure of stand density, composition and structure. The recommendations for the treatment of logging slash may change following post harvest surveys ****

32s-2e-33 OI 003

Trees/acre <8" dbh: 308 (0-2: 250, 2-4: 28, 4-8: 30) Trees/acre >8" dbh: 89

Basal Area: 246 Sq ft Canopy Closure: 100 Aspect: E Relative Density Index: .83

Laminated root rot (LRR) is present within this unit and is affecting Douglas-fir and white fir. No discrete pockets are identifiable rather it occurs as a diffuse, widely occurring pathogen. Where possible stand densities and canopy closures should be maintained at higher levels to minimize potential wind throw adjacent to laminated root rot pockets.

- Along the east/west section line, a wet riparian area runs parallel to the section line on private ownership, the buffer has been flagged in yellow. The remaining area has scattered overstory trees with many areas containing Douglas-fir saplings 8 to 20 feet in height. The brush component is well established with dogwood and vine maple 10-15' in height. RX: Mark low vigor dominant overstory trees, leave any pre-dominant trees, 50" dbh or greater, regardless of condition. Excavator pile from skidtrails (logging slash and brush) and burn. Thin pockets of trees less than 8" dbh at 14X14' spacing. Plant holes with ponderosa pine, incense cedar and sugar pine, do not plant any Douglas-fir.
- In the northeast corner, riparian areas and their buffers reduce the available matrix acres to three small 2 acre patches. All buffer areas have been flagged. Treatment RX: SC, LS & HP concentrations & burn.

- Three additional treatment areas remain in this OI, refer to map. In these areas, a selective cut is prescribed to remove risk trees. On the east side of the main ridgeline maintain higher densities and crown closure to minimize wind throw potential. LS & HP concentrations & burn.

33s-2e-04 OI 002

The central part of this OI consists of many seeps, springs and riparian areas. This area has been buffered and flagged in yellow. Matrix areas remaining include, a small stand on the south end, a narrow strip above the riparian area and a block on the northern end. Additional springs are present and have been buffered with yellow flagging in the northern portion of the OI adjacent to the north/south ownership line. RX: SC, using an excavator and staying on existing skidtrails, remove and pile brush and logging slash in the northern block and burn. No treatment is necessary in the southern area other than lop and scatter.

33s-2e-31 OI 007

Trees/acre <8" dbh: 309 (0-2: 214, 2-4: 0, 4-8: 95) Trees/acre >8" dbh: 86

Basal Area: 211 Sq ft Canopy Closure: 93 Aspect: N Relative Density Index: .73

This unit contains an undesignated recreation site that is used heavily throughout the year. Maintain this area as a recreational site by removing only hazard & low vigor trees that would pose a safety hazard within the next five years. HP logging slash and burn.

33s-1e-1 OI 003

This section is a designated connectivity block. The objectives are to provide for habitat connectivity for old growth dependant and associated species by minimizing fragmentation of interior habitat and maintaining at least 25% of the section in late-successional conditions.

A riparian reserve divides OI 003 in the middle. The northern part contains two different stand structures.

1. Trees/acre <8" dbh: 991 (0-2: 382, 2-4: 306, 4-8: 305) Trees/acre >8" dbh: 120

Basal Area: 223 Sq ft Canopy Closure: 100 Aspect: SE Relative Density Index: .94

On the western ½, madrone 8-12" dbh and trees less than 8" are the dominant structural component, with scattered overstory trees present. RX: Slash all trees 7" dbh and less from under the drip-line of larger full crown overstory trees. Thin the remaining trees less than 8", space off of existing overstory leave trees. Spacing for trees 1-7" dbh should be approximately 14' apart. Leave trees should have good leader growth, (4"+) with at least 40% crown ratio and no chlorotic foliage. Madrone less than 8" should be slashed and madrone, 8"-16" girdled. LS & HP concentrations and burn.

2. Trees/acre <8" dbh: 300 (0-2: 229, 2-4: 57, 4-8: 14) Trees/acre >8" dbh: 73

Basal Area: 195 Sq ft Canopy Closure: 88 Aspect: SE Relative Density Index: .68

The eastern ½ contains a mature stand with occasional small DF reprod patches. RX: SC, LS & HP concentrations and burn.

The southern part of this OI is a mature stand with an occasional small DF reprod patch.

Trees/acre <8" dbh: 527(0-2: 412, 2-4: 46, 4-8: 69) Trees/acre >8" dbh: 87

Basal Area: 220 Sq ft Canopy Closure: 100 Aspect: NE Relative Density Index: .83

RX: SC, LS & HP concentrations and burn.

33s-1e-1 OI 004

This portion of the OI is on the west side of the 32s-1e-27 road. RX: Selectively cut declining overstory trees. After yarding, thin trees less than 8" and slash DF with spindly crowns and low crown ratios. Space off of existing leave trees, spacing for trees 1-7" dbh should be approximately 14' apart. Leave trees should have good leader growth, (4"+) with at least 40% crown ratio and no chlorotic foliage. HP or EX pile from skid trails used during logging.

33s-1e-11 OI 001

The stand has an open canopy with DF, and occasionally PP & SP. Pini conks are present in about 20% of DF. The overall crown condition of dominant and co-dominant trees is good. Scattered pockets that contain large trees should be thinned by removing suppressed and intermediate trees. RX: SC risk trees. Vigorous PP & SP should be favored; pines species should have full crowns with dark green foliage and minimal weak spots. Pine species with poor crowns characterized by a ragged appearance as well as foliage which is bunchy and of poor color should not be retained. Thin second growth pockets, slash DF with spindly crowns and low crown ratios. Space off of existing leave trees, spacing for trees 1-7" dbh should be approximately 14' apart. Leave trees should have good leader growth, (4"+) with at least 40% crown ratio and no chlorotic foliage. LS & HP concentrations near road and burn.

33s-1e-11 OI 008

RX: SC, thin pockets and precommercial thin pockets of trees less than 8" dbh, LS.

33s-1e-35-005

Trees/acre <8" dbh: 771 (0-2: 625 2-4: 63, 4-8: 83) Trees/acre >8" dbh: 138

Basal Area: 234 Sq ft Canopy Closure: 100 Aspect: N Relative Density Index: .94

This OI contains an older stand that is generally of low vigor. Within the unit there are rocky ridges and rock piles created from rock breaking away from a vertical wall on the south portion of the OI. A buffer from the upper meadow area extends into the OI. An Army Corps of Engineers survey monument is present near the eastern edge of OI. RX: Light ITM removing highest risk, precommercial thin 0-8" dbh, spacing off of leave trees at a 14' spacing. LS & HP concentrations and burn.

Density Management (DM)

1. Density reduction and the retention of approximately 50-60% canopy closure are the primary objectives for these stands. Thin from below in second growth stands/clumps, low vigor co-dominant or dominant trees may be removed for density reduction and if tree vigor is lower than adjacent trees.

- Stocking will be reduced to Relative Densities of 35-45%.
- Leave trees need to be dominant and co-dominant with the best crown ratios.
- In higher elevation stands, favor healthy ponderosa pine, sugar pine, Douglas-fir and incense cedar over white fir.
- Large (>20" dbh) healthy ponderosa and sugar pine should be favored over equally healthy Douglas-fir. The crowns of the retained pines should be full, with a minimum crown ratio of 35%, needles should be dark green, crown tops should be pointed (not rounded) and there should be no evidence of resin flow on the upper bole of sugar pine. Pine species with poor crowns characterized by a ragged appearance as well as foliage which is bunchy and of poor color should be removed, do not retain.
- Trees to be removed are in excess of wildlife, CWD and biological diversity needs.

2. Leave all large fire remnant trees >50" dbh, regardless of condition.

3. Leave all hardwoods

4. Leave all snags (stages 1-5)

Alternatives 2 & 4 -Density Management Units (relative density & target basal area):

33s-2e-03 003 (RD 40, 160)

33s-2e-05 003 (RD 45, 180)

33s-2e-08 005 (RD 40, 140)

33s-2e-09 002 (RD 35, 140)

33s-2e-17 001 (RD 40, 140)

33s-2e-19 004 (RD 35, 140)

33s-1e-01 004 (RD 35, 140)

33s-1e-23-779 (RD 40, 120)

33s-1e-23-005 (RD 45, 140)

33s-1e-27-003 (RD 40, 160)

33s-1e-11-010 (RD 35, 140)

33s-1e-35-006 (RD 40, 140)

33s-1e-35-007 (RD 40, 140)

33s-1e-35-012 (RD 35, 140)

Alternatives 3 & 5 - Density Management Units (relative density & target basal area):

33s-2e-03 003 (RD 40, 160)	33s-2e-05 003 (RD 45, 180)	33s-2e-08 005 (RD 40, 140)
33s-2e-09 002 (RD 35, 140)	33s-2e-17 001 (RD 40, 140)	33s-2e-19 004 (RD 35, 140)
33s-1e-01 004 (RD 35, 140)	33s-1e-23-779 (RD 40, 120)	33s-1e-23-005 (RD 45, 140)
33s-1e-27-003 (RD 40, 160)	33s-1e-11-010 (RD 35, 140)	33s-1e-35-006 (RD 40, 140)
33s-1e-35-007 (RD 40, 140)	33s-1e-35-008 (RD 35, 140)	33s-1e-35-012 (RD 35, 140)

Density Management Units

33s-2e-03-003

Trees/acre <8" dbh: 967 (0-2: 700, 2-4: 200, 4-8: 66) Trees/acre >8" dbh: 225
Basal Area: 307 Sq ft Canopy Closure: 100 Aspect: S Relative Density Index: 1.00
Stand structure is multi-layered, with high stand densities. RX: DM, favor healthy ponderosa and sugar pines where available. After yarding, thin trees less than 8" and slash DF with spindly crowns and low crown ratios. Space off of existing leave trees, spacing for trees 1-7" dbh should be approximately 14' apart. Leave trees should have good leader growth, (4"+) with at least 40% crown ratio and no chlorotic foliage. Riparian reserve yellow/white flagging extends across the road into the unit. Northern 1/3 of the OI is tractor ground, the southern 2/3 is cable. HP or EX pile from skid trails on tractor ground and hand pile the rest.

33s-2e-05-003

Trees/acre: 0 trees <8" dbh, Trees/acre >8" dbh: 128
Basal Area: 248 Sq ft Canopy Closure: 87 Aspect: E Relative Density Index: .67
Even-aged stand located on ridge-line between the Elk Creek and Lost Creek watersheds. RX: DM leaving at least 60% or higher canopy closure. The higher canopy closure will meet TSZ objectives as well as retain the necessary structure to minimize wind-throw potential. LS

33s-2e-08-005

Trees/acre <8" dbh: 423(0-2: 137, 2-4: 183, 4-8: 103) Trees/acre >8" dbh: 121
Basal Area: 225 Sq ft Canopy Closure: 100 Aspect: E Relative Density Index: .82
Adjacent to the proposed Flounce Rock environmental area, an old military trail crosses the southern tip of the OI, and needs to be buffered (the buffer distance is 50' on each side of the trail). A riparian reserve needs to be buffered in the northern end of the OI. RX: Immediately south of the riparian reserve is an area suitable for density management. In the middle 1/3 of the OI, a scattered overstory with a dense understory (less than 8") is present. Mark the risk trees and thin the understory at a 14'X14' spacing. The southern 1/3 is suitable for DM, HP & burn.

33s-2e-09-002

Trees/acre <8" dbh: 353 (0-2: 100, 2-4: 100, 4-8: 153) Trees/acre >8" dbh: 118
Basal Area: 221 Sq ft Canopy Closure: 99 Aspect: E Relative Density Index: .79
The old military trail runs along the western boundary of the OI and needs to be buffered., the buffer distance is 50' on each side of the trail. The OI contains 8" dbh+ pockets to treat, otherwise sapling to pole size thickets are present under a scattered overstory. A small "bowl", with a high-water table is present in the southeastern portion of the OI, wind-throw is common, minimize management activities (marking trees & logging skidtrails) within this area. RX: DM, treat the understory less than 8" throughout the OI, slash DF with spindly crowns and low crown ratios, space off of existing leave trees. Spacing for trees 1-7" dbh should be approximately 14' apart. Leave trees should have good leader growth, (4"+) with at least 40% crown ratio and no chlorotic foliage. HP or EX pile & burn.

33s-2e-17-001

Trees/acre <8" dbh: 673 (0-2: 286, 2-4: 229, 4-8: 157) Trees/acre >8" dbh: 149
Basal Area: 253 Sq ft Canopy Closure: 100 Aspect: S Relative Density Index: .98
Immediately south of the east/west ownership boundary is a home site development area. The OI is a

mix of stand conditions, containing pockets of 8" dbh+ trees and areas of trees less than 8" dbh. The primary treatment objective is to reduce the fire hazard adjacent to the home sites and environmental education area. The amount of trees greater than 8" to be removed will be low. RX: DM 8"+ pockets. Favor healthy dominant and co-dominant PP and IC. Treat trees less than 8" throughout the OI, slash DF with spindly crowns and low crown ratios. Space off of existing leave trees, spacing for trees 1-7" dbh should be approximately 14' apart. Leave trees should have good leader growth, (4"+) with at least 40% crown ratio and no chlorotic foliage. HP & burn.

33s-2e-19-004

Trees/acre <8" dbh: 567 (0-2: 271, 2-4: 83, 4-8: 213) Trees/acre >8" dbh: 169
Basal Area: 221 Sq ft Canopy Closure: 100 Aspect: N Relative Density Index: .86
This OI is part of a proposed recreation site named Seth Bullis and identified in the RMP. This management treatment will not alter the potential for recreation development in the future.

The OI is a mix of stand conditions, containing pockets of 8"+ trees and areas of trees less than 8". The OI has a couple of old dump sites that need to be flagged and avoided during management activities (See Craig Brown for a map). The access road to the Fire Glen campground passes through this OI and will provide access. RX: DM 8"+ pockets. Favor healthy pine species where available. Treat trees less than 8" throughout the OI, slash DF with spindly crowns and low crown ratios. Space off of existing leave trees, spacing for trees 1-7" dbh should be approximately 14' apart. Leave trees should have good leader growth, (4"+) with at least 40% crown ratio and no chlorotic foliage. HP & burn.

33s-1e-1-004

Trees/acre: 11 trees (4-8) <8" dbh, Trees per acres >8" dbh: 136
Basal Area: 318 Sq ft Canopy Closure: 100 Aspect: W Relative Density Index: .84
Riparian reserves have been flagged with yellow/white, one spring/seep need to be checked for a buffer, it is located near the north side of the unit. RX: DM, LS & HP concentrations & burn.

33s-1e-23-779

Trees/acre <8" dbh: 458 (0-2: 183, 2-4: 229, 4-8: 45) Trees/acre >8" dbh: 111
Basal Area: 183 Sq ft Canopy Closure: 90 Aspect: NE Relative Density Index: .70
Meadows are adjacent to the OI, also the Four Corners campground access road and campsite are within the OI. The eastern boundary of the unit should not extend beyond the bench and parking area. Two large pockets of trees exist on either side of the 33-1E-27 road, stand density should be reduced by removing suppressed and intermediate small diameter classes 8-20" dbh. Trees greater than 20" dbh and in excess of wildlife and future CWD needs should be removed only if exhibiting low vigor characteristics. Thin pockets of conifer reproduction, slash DF with spindly crowns and low crown ratios. Space off of existing leave trees, spacing for trees 1-7" dbh should be approximately 14' apart. Leave trees should have good leader growth, (4"+) with at least 40% crown ratio and no chlorotic foliage. HP & burn.

33s-1e-23-005

Trees/acre <8" dbh: 277 (0-2: 0, 2-4: 131, 4-8: 147) Trees/acre >8" dbh: 188
Basal Area: 234 Sq ft Canopy Closure: 100 Aspect: SE Relative Density Index: .82
Above the road, thin the 8-16" dbh conifer size classes, larger size classes may be removed if exhibiting low vigor characteristics. Thin pockets of conifer reproduction; slash DF with spindly crowns and low crown ratios. Space off of existing leave trees, spacing for trees 1-7" dbh should be approximately 14' apart. Leave trees should have good leader growth, (4"+) with at least 40% crown ratio and no chlorotic foliage. East of the 33-1E-27 road, there are 8"-20" dbh DF available for thinning, vigorous PP & SP should be favored. Pines species selected for retention should have full crowns with dark green foliage and minimal weak spots. Pine species with poor crowns characterized by a ragged appearance as well as foliage which is bunchy and of poor color should be removed. HP & burn.

33s-1e-27-003

Trees/acre <8" dbh: 229 (0-2: 57, 2-4: 57, 4-8: 115) Trees/acre >8" dbh: 113
Basal Area: 237 Sq ft Canopy Closure: 98 Aspect: N Relative Density Index: .78

This OI occupies a north aspect and is generally of good form and vigor. Density reduction by thinning trees less than 16" dbh would benefit the stand by reducing inter-tree competition, larger size classes may be removed if exhibiting low vigor characteristics. This OI is surrounded by withdrawn low site productivity lands, generally composed of oaks, manzanita, and varying amounts of Douglas-fir and lesser amounts of ponderosa pine & sugar pine. A trail that originated from the 33-1E-27 road defines the western and southwestern boundary of the OI, leave a 25' no cut buffer adjacent to the trail. The trail origin could not be located but it's ending portion is still intact. A meadow buffer may be necessary on the southern end of the OI.

LS/HP concentrations & burn.

33s-1e-11-010

Trees/acre <8" dbh: 275 (0-2: 183, 2-4: 92, 4-8: 0) Trees/acre >8" dbh: 75

Basal Area: 186 Sq ft Canopy Closure: 85 Aspect: N Relative Density Index: .65

This is a Douglas-fir stand with occasional madrone, and sugar pine the stand is mostly >8" dbh, with a light thinning of 8/10/12" dbh classes available. No PCT is necessary. The slope has experienced some movement, with some pistol butt Douglas-fir present. LS

33s-1e-35-006

Trees/acre <8" dbh: 332 (0-2: 229, 2-4: 92, 4-8: 12) Trees/acre >8" dbh: 97

Basal Area: 207 Sq ft Canopy Closure: 93 Aspect: W Relative Density Index: .73

Three issues affect the shape, size and potential management of this OI. 1). Viewpoint Mike trail is adjacent to the western side of the unit 2). A buffer from meadow above the OI extends into unit 3). A riparian reserve extends into the middle of the OI running east/west. Leave a 25' no cut buffer on either side of the trail. RX: DM, HP & burn.

33s-1e-35-007

Trees/acre <8" dbh: 478 (0-2: 240 2-4: 60, 4-8: 178) Trees/acre >8" dbh: 147

Basal Area: 266 Sq ft Canopy Closure: 100 Aspect: N Relative Density Index: .97

This OI contains a variety of stand structures, from areas containing small diameter classes, suitable for PCT, to areas containing even-aged pockets of 8" dbh+ trees. A scattered overstory of large pre-dominant trees is also common. Wildlife trees were previously flagged in southern portion of stand adjacent to old harvest unit, these trees are to be protected with a designated buffer. RX: DM, Vigorous PP & SP should be favored, pines species should have full crowns with dark green foliage and minimal weak spots. Pine species with poor crowns characterized by a ragged appearance as well as foliage which is bunchy and of poor color should not be retained. Thin pockets of conifer reproduction, slash DF with spindly crowns and low crown ratios. Space off of existing leave trees, spacing for trees 1-7" dbh should be approximately 14' apart. Leave trees should have good leader growth, (4"+) with at least 40% crown ratio and no chlorotic foliage. Trees greater than 20" dbh and in excess of wildlife and future CWD needs may be removed if exhibiting low vigor characteristics. Minimize marking trees > 40" dbh and do not mark any trees 50" dbh or greater, regardless of condition. LS/HP or EX pile logging slash concentrations and burn.

33s-1e-35-008

Trees/acre <8" dbh: 555 (0-2: 400, 2-4: 0, 4-8: 155) Trees/acre >8" dbh: 93

Basal Area: 217 Sq ft Canopy Closure: 100 Aspect: N Relative Density Index: .83

A small piece of this OI remains after the 300' meadow buffer has been applied. Thin pockets of conifer reproduction, slash DF with spindly crowns and low crown ratios. Space off of existing leave trees, spacing for trees 1-7" dbh should be approximately 14' apart. Leave trees should have good leader growth, (4"+) with at least 40% crown ratio and no chlorotic foliage.

RX: DM LS/ HP logging slash concentrations and burn.

33s-1e-35-012

Trees/acre <8" dbh: 114 (0-2: 0, 2-4: 0, 4-8: 114) Trees/acre >8" dbh: 134

Basal Area: 241 Sq ft Canopy Closure: 94 Aspect: N Relative Density Index: .74

This OI is a young even-aged predominantly Douglas-fir stand that has large black oak (24-32" dbh) as a scattered stand component (approximately 3/acre). When the black oak has a full and vigorous crown and disease free bole these trees should be retained for diversity by favoring them over conifers. RX: DM, LS/HP concentrations & burn.

Modified even-aged – Regeneration Harvest (RH)

The minimum requirements are:

1. 1.8 wildlife trees/acre.
2. 120 linear feet of CWD.
3. 6-8 green conifers/acre, >20" dbh (proportionally representing the total range of tree sizes >20").

These are minimum levels, where additional healthy green trees are available they should be left.

Determination of leave and take trees should be based upon tree vigor (live crown ratio and crown form) and as opposed to the strict implementation of the 6-8 leave tree guideline. Let tree condition dictate where and how many trees are left. Leave trees should have the following attributes: a). Low susceptibility to wind, snow and ice damage, measured by a height to diameter ratio of 70 or below b). Crown ratio >35% with a healthy crown, dark foliage, dense needles c). Disease free d). Favor healthy seral species, ponderosa pine, sugar pine, incense cedar, where possible.

4. All healthy ponderosa pine, Douglas-fir, incense cedar, sugar pine and hardwoods regardless of size should be left (<1"-20"dbh). These trees should have the following attributes: a). crown ratios 35% b). healthy foliage. c). disease and insect free.

5. Retain all large hardwoods, >12" dbh.

6. Units do not have to be uniform in appearance; diversity, patchiness is desirable.

Alternatives 2 & 4 - Modified even-aged- Regeneration harvest units: 33S-1E-35-008 & 33S-1E-35-012N.

Alternatives 3 & 5 - Modified even-aged – Regeneration harvest unit: 33S-1E-35-012N.

33s-1e-35-012

Trees/acre <8" dbh: 210(0-2: 76, 2-4: 76, 4-8: 57) Trees/acre >8" dbh: 107

Basal Area: 250 Sq ft Canopy Closure: 100 Aspect: N Relative Density Index: .80

Approximately 6 acres in size. RX: RH 6-8TPA > 20" dbh. EX pile logging slash/brush and burn, plant.

33s-1e-35-008

Trees/acre <8" dbh: 555 (0-2: 400, 2-4: 0, 4-8: 155) Trees/acre >8" dbh: 93

Basal Area: 217 Sq ft Canopy Closure: 100 Aspect: N Relative Density Index: .83

A small piece of this OI remains after the 300' meadow buffer has been applied. Thin pockets of conifer reproduction, slash DF with spindly crowns and low crown ratios. Space off of existing leave trees, spacing for trees 1-7" dbh should be approximately 14' apart. Leave trees should have good leader growth, (4"+) with at least 40% crown ratio and no chlorotic foliage.

RX: RH 6-8 TPA > 20"dbh. EX pile logging slash concentrations and burn.

Connectivity Block – Regeneration Harvest (RH)

The minimum requirements are:

1. 1.8 wildlife trees/acre.
2. 120 linear feet of CWD.
3. 12-18 green conifers/acre, >20" dbh (proportionally representing the total range of tree sizes >20").

These are minimum levels, where additional healthy green trees are available they should be left.

Determination of leave and take trees should be based upon tree vigor (live crown ratio and crown form)

and as opposed to the strict implementation of the 12-18 leave tree guideline. Let tree condition dictate where and how many trees are left. Leave trees should have the following attributes: a). Low susceptibility to wind, snow and ice damage, measured by a height to diameter ratio of 70 or below b). Crown ratio >35% with a healthy crown, dark foliage, dense needles c). Disease free d). Favor healthy seral species, ponderosa pine, sugar pine, incense cedar, where possible.

4. All healthy ponderosa pine, Douglas-fir, incense cedar, sugar pine and hardwoods regardless of size should be left (<1"-20"dbh). These trees should have the following attributes: a). crown ratios 35% b). healthy foliage. c). disease and insect free.

5. Retain all large hardwoods, >12" dbh.

6. Units do not have to be uniform in appearance; diversity, patchiness is desirable.

Alternatives 2 & 4 – Connectivity Block - Regeneration harvest unit: 33S-1E-1- 003.

Alternatives 3 & 5 – Connectivity Block – Regeneration harvest unit: none

33s-1e-1 OI 003

This section is a designated connectivity block. The objectives are to provide for habitat connectivity for old growth dependant and associated species by minimizing fragmentation of interior habitat and maintaining at least 25% of the section in late-successional conditions.

A riparian reserve divides OI 003 in the middle. The northern part contains two different stand structures.

1. Trees/acre <8" dbh: 991 (0-2: 382, 2-4: 306, 4-8: 305) Trees/acre >8" dbh: 120

Basal Area: 223 Sq ft Canopy Closure: 100 Aspect: SE Relative Density Index: .94

On the western ½, madrone 8-12"dbh and trees less than 8" are the dominant structural component, with scattered overstory trees present. RX: Slash all trees 7" dbh and less from under the drip-line of larger full crown overstory trees. Thin the remaining trees less than 8", space off of existing overstory leave trees.

Spacing for trees 1-7" dbh should be approximately 14' apart. Leave trees should have good leader growth, (4"+) with at least 40% crown ratio and no chlorotic foliage. Madrone less than 8" should be slashed and madrone, 8"-16" girdled. LS & HP concentrations and burn.

2. Trees/acre <8" dbh: 300 (0-2: 229, 2-4: 57, 4-8: 14) Trees/acre >8" dbh: 73

Basal Area: 195 Sq ft Canopy Closure: 88 Aspect: SE Relative Density Index: .68

The eastern ½ contains a mature stand with occasional small DF reprod patches. RX: RH, EX pile slash and burn.

The southern part of this OI is a mature stand with an occasional small DF reprod patch.

Trees/acre <8" dbh: 527(0-2: 412, 2-4: 46, 4-8: 69) Trees/acre >8" dbh: 87

Basal Area: 220 Sq ft Canopy Closure: 100 Aspect: NE Relative Density Index: .83

RX: RH, EX pile slash and burn on tractor portion of unit and LS & HP concentrations and burn on cable portion.

Structural Retention – Regeneration Harvest (RH)

The minimum requirements are:

1. 1.8 wildlife trees/acre.

2. 120 linear feet of CWD.

3. 16-25 green conifers/acre, >20" dbh (proportionally representing the total range of tree sizes >20").

These are minimum levels, where additional healthy green trees are available they should be left.

Determination of leave and take trees should be based upon tree/crown vigor as opposed to the strict implementation of the 16-25 leave tree guideline. Let tree condition dictate where and how many trees are left. Leave trees should have the following attributes: a). Low susceptibility to wind, snow and ice damage, measured by a height to diameter ratio of 70 or below b). Crown ratio >35% with a healthy crown, dark

- foliage, dense needles c). Disease free (specifically mistletoe free Douglas-fir) d). Favor healthy seral species, ponderosa pine, sugar pine, incense cedar, where possible.
4. All healthy ponderosa pine, Douglas-fir, incense cedar, sugar pine and hardwoods regardless of size should be left (<1"-20"dbh). These trees should have the following attributes: a). crown ratios 35% b). healthy foliage c). disease and insect free.
 5. Retain all large hardwoods, >12" dbh.
 6. Tree diameter should not be the deciding factor for marking a tree, crown vigor should.
 7. Units do not have to be uniform in appearance; diversity, patchiness is desirable.

Alternatives 2 & 4 - Structural Retention - Regeneration harvest unit: 33S-2E-4-002, 32S-2E-33-003.

Alternatives 3 & 5 - Structural Retention - Regeneration harvest unit: 32S-2E-33-003

32s-2e-33 OI 003, approximately 12 acres.

Trees/acre <8" dbh: 302 (0-2: 286, 4-8: 16)

Trees/acre >8" dbh: 90

Basal Area: 254 Sq ft Canopy Closure: 100 Aspect: E Relative Density Index: .85

Laminated root rot (LRR) is present throughout this stand. RX: SGFMA RH leaving 16-25 tpa, favoring incense cedar and any pines available. Plant with PP, SP, IC and protect any established hardwoods. EX pile & burn.

33s-2e-04 OI 002

The central part of this OI consists of many seeps, springs and riparian areas. This area has been buffered and flagged in yellow. Matrix areas remaining include, a small stand on the south end, a narrow strip above the riparian area and a block on the northern end. Additional springs are present and have been buffered with yellow flagging in the northern portion of the OI adjacent to the north/south ownership line. RX: SGFMA RH leaving 16-25 tpa, favoring incense cedar and any pines available. Plant with PP, SP, IC and protect any established hardwoods. EX pile & burn.

Estimate the average diameter of potential leave trees and determine the desired spacing in feet by referring to the table below. Follow the basal area and spacing table as closely as possible. Once the area has been marked verify the leave basal area using a relaskop or prism, adjust basal area as necessary. As the average diameter changes spacing will also change holding stand density constant.

RELATIVE DENSITY - 35%		
AVERAGE LEAVE TREE DBH	LEAVE TREE BASAL AREA	LEAVE TREE SPACING
8"	99	12' X 12'
10"	111	15' X 15'
12"	121	17' X 17'
14"	131	19' X 19'
16"	140	21' X 21'
18"	148	23' X 23'
20"	157	25' X 25'
22"	164	26' X 26'
24"	171	28' X 28'
26"	178	30' X 30'
28"	185	32' X 32'
30"	191	33' X 33'

RELATIVE DENSITY - 40%		
AVERAGE LEAVE TREE DBH	LEAVE TREE BASAL AREA	LEAVE TREE SPACING
8"	113	12' X 12'
10"	126	14' X 14'
12"	139	16' X 16'
14"	150	18' X 18'
16"	160	20' X 20'
18"	170	21' X 21'
20"	179	23' X 23'
22"	188	25' X 25'
24"	196	26' X 26'
26"	204	28' X 28'
28"	212	30' X 30'
30"	219	31' X 31'

.RELATIVE DENSITY - 45%		
AVERAGE LEAVE TREE DBH	LEAVE TREE BASAL AREA	LEAVE TREE SPACING
8"	127	11' X 11'
10"	142	13' X 13'
12"	156	15' X 15'
14"	168	17' X 17'
16"	180	18' X 18'
18"	191	20' X 20'
20"	201	22' X 22'
22"	211	23' X 23'
24"	220	25' X 25'
26"	229	26' X 26'
28"	238	28' X 28'
30"	246	29' X 29'

Characteristics of low vigor trees

1. Low vigor trees

a. Low vigor, ponderosa pine trees are defined as those trees meeting the following criteria:

- * Crowns are ragged and thin.
- * Foliage in parts of crown thin bunchy, or unhealthy, needles average to shorter than average in length.
- * Needle color poor to fair.
- * Some twigs or branches lack foliage and some twigs or branches are fading or dead.
- * Localized weaken parts of crowns present.
- * Crown top is rounded, and the crown width is narrow or flat on one or more sides.

b. Low vigor Douglas-fir and white fir trees are defined as:

- * Crown has thin appearance when viewed against the sky.
- * Short needle length
- * Needle color very poor, yellowish.
- * Dead or dying twigs or branches in the crown forming holes, sparse and ragged crown appearance.
- * Poor crown ratio.
- * Mistletoe infected.

c. Trees affected by root rot, visual characteristics are:

- * groups of trees affected, with trees showing variable levels of decline.
- * trees have reduced height growth, look at top of trees for reduced increment growth.
- * yellow foliage, decline of the crown is from the top to the bottom.
- * distress cone crop.

- * bark beetles sometimes present because of the stressed trees.
- * windthrow trees common, wood at the base of the downed trees is soft and stringy or has begun to delaminate.

2. Insect infested trees

Douglas-fir and white fir trees undergoing attack from Douglas-fir bark beetle, as identified by red boring dust present in bark crevices or on the ground near the base of the tree. Foliage is thinning and yellowish in appearance. Borers typically begin their attack in the top of the tree, then may spread to the lower bole. Pitch streamers may also be present on the mid to upper bole.

Ponderosa pine trees undergoing current attack from western pine beetle or red turpentine beetle. Pitch tubes should contain reddish/brown granular frass. Pitch tubes clear in color indicate the tree has been successful in expelling the beetle, these trees should not be marked if otherwise healthy.

All snags and coarse woody debris will be maintained as they presently occur; snags that are a safety hazard may be felled but will be left on site.