Waterman West Integrated Vegetation Management Project
(Waterman West)
Lower Trinity Ranger District
Six Rivers National Forest

Proposed Action Summary

Introduction

The Six Rivers National Forest proposes to manage vegetation and hazardous fuel on approximately 3,500 acres of mixed conifer hardwood stands, oak woodlands, Ceanothus shrublands established within the area affected by the Megram Fire (1999), and conifer plantations through commercial timber harvesting, timber stand improvement, and fuel reduction treatments. The Waterman West Integrated Vegetation Management Project (Waterman West) has been developed to respond to hazardous fuels and forest health concerns around the communities of Willow Creek and Salyer, California. The proposed action, designed to be a community fire protection and forest health project, falls within the category of Hazardous Fuel Reduction Projects intended to achieve the goals of Title I of the Healthy Forest Restoration Act of 2003 (HFRA). By the authority of the HFRA, the proposed action qualifies for an expedited environmental analysis process under the National Environmental Policy Act. This project meets the intent and spirit of the HFRA by virtue of its design through a collaborative process as a hazardous fuel reduction and forest health project proposed within a federally recognized Wildland Urban Interface Area (WUI).

The area affected by the proposal includes National Forest System lands administered by the Lower Trinity Ranger District in Humboldt and Trinity Counties, California, specifically along Waterman, Campbell, and Baldwin Ridges within the lower Trinity River watershed. The units are located in portions of : T7N, R5E, Sec. 9-11, 13-16, 21-27, 34, 35; T7N, R6E, Sec. 30-32; T6N, R5E, Sec. 1-3, 10-12, 14, 15; T6N, R6E, Sec. 5, 6 Humboldt Baseline and Meridian in Humboldt and Trinity Counties (Figure 1).

Purpose of and Need for Action

Purpose for Action

Current conditions in the project area do not meet desired conditions as defined by the Six Rivers National Forest Land and Resource Management Plan 1995 (Forest Plan). Decades of fire suppression and loss of cultural burning in these fire-adapted forests has significantly changed species composition, tree density, stand structure, and surface and ladder fuels. These changes have also made many areas prone to insect infestations and disease outbreaks. Thus, the purpose of this project is to manage forest stands and fuels through mechanical removal, manual treatments, and burning to reduce hazardous fuel conditions and the risk and impacts of large-scale, stand-replacing wildfire to the communities of Willow Creek and Salyer. Specifically, there is a need to:

- Reduce hazardous fuel conditions and impacts from wildfires to the communities of Willow Creek and Salyer and the immediately surrounding forest and create conditions that produce less than four-foot flame lengths (Forest Plan, p. IV–116);
- Reduce stand densities (Forest Plan, p. IV–77);

- Promote the development and maintenance of diverse stand structures and species composition (Forest Plan, p. IV–73); and
- Begin steps to restore fire-adapted ecosystem functions, such that when fire returns to the ecosystem, impacts are minimized (Forest Plan, p. IV–116).

In addition, there is an opportunity to manage vegetation to accelerate the development of late successional forest characteristics in overstocked shrub, pole, and early mature seral stands, some classified as late successional reserves, in order to create a seral stage distribution within the historic range of variability (Forest Plan, p. IV–76 and 78).

Need for Action

The Waterman West project is located within the Mainstem Trinity Watershed Analysis Area (MTWAA). According to the analysis (USDA Forest Service 2003), several factors indicate the overall area has a high potential for large, sustained, severe wildfires:

- The period from 1990-2001 shows a high-risk rating, which means at least one fire is expected in 0 to 10 years per thousand acres.
- Fire behavior modeling indicates that 60 to 65 percent of the MTWAA has the potential for high to extreme rate-of-spread and flame lengths during late summer weather patterns.
- In the event of a wildfire, the steep topography, large un-roaded areas, extended arrival times, and lower suppression priority than more populated areas could severely hamper ground-based suppression effectiveness.

The Waterman West Project planning area is located in an area classified as wildland-urban interface (WUI) by the Six Rivers National Forest. Under the National Fire Plan and the Healthy Forest Initiative, emphasis is placed on reducing the impact of wildfire within the WUI around communities at risk. Treatment would be implemented primarily along the upper third slopes of key ridges adjacent to the Willow Creek and Salyer communities. The project would provide strategic suppression locations across the landscape while reducing contiguous fuel accumulations and the risk of stand-replacing wildfires (Figure 2).

Figure 1. Picture of Unit 59 showing fuel accumulations with the forest stand.

As stated in the MTWA, returning to more of a pre-European fire regime, which is generally a low-intensity, short interval (stand maintenance) regime with scattered areas of high intensity, would contribute to a forest that is more resilient to the effects of wildfires, and reduce the probability of stand-replacing wildfires on a large scale. Large-scale, stand-replacing wildfires tend to occur when there is heavy fuel loading both horizontally and vertically, and often when this is combined with periods of drought or high winds, high temperatures, and low relative humidity. Low-intensity wildfires would allow fire suppression to be conducted more effectively and safely, which could increase the protection of communities and natural resources. A fire-resilient forest may contribute to greater options for appropriate management response and would be a benefit because a wildland fire can burn through an area of low fuel loading with minimal impacts to forest lands.

Forest Plan Management Areas

The Forest Plan uses management areas to guide management of the National Forest System lands within the Six Rivers National Forest. Each management area provides for a unique combination of activities, practices, and uses. The Waterman West project area includes seven management areas (Table 1). Goals, objectives and desired conditions of each are summarized below. The Forest Plan (*Chapter 4*) contains a detailed description of each management area. Please note the acres in the Riparian Reserve are encompassed within the other areas (i.e., acres are not additive).

Table 1. Management area acres within the Waterman West proposed action units.

Matrix			Special Habitat			Riparian Reserves
General Forest	Partial Retention	Retention	Bald Eagle Winter Roost	Late successional Reserves	100 Acre LSR	
1734	687	41	20	1084	51	268

Matrix

1. General Forest (GF)

The primary goals for general forest management area are to produce a sustained yield of timber, contribute younger seral stages to the overall vegetation mosaic of the forest, and conserve key components of functional habitat for mature and old growth-associated species. The general forest management area will be managed using a variety of silvicultural strategies designed to maintain the range of stand conditions typical of the plant associations and disturbance regimes found on the Forest. Forest stands of all ages will be managed to have a multi-storied structure.

To accommodate the thinning and uneven-age management regime, total road densities may increase slightly in certain parts of the management area during project implementation. However, all temporary roads will be decommissioned and obliterated for 300 feet at the intersection of a system road, unless designated as a recreation trail in the Forest travel management process.

The desired condition is a mosaic of forested stands comprised of a variety of vegetative species. The composition and structure of individual stands will vary depending on vegetative series and seral stage development. In some areas, the conifer component will be sparse due to vegetative manipulations designed to mimic natural disturbances and openings. Other areas will consist of mature forest stands with many components of late successional and old growth stands.

2. Partial Retention Visual Quality Objective (PR)

The primary goal for partial retention (views along the Trinity River and nearby communities) is to maintain the area in a near-natural appearing condition; provide an attractive, forested landscape where management activities remain visually subordinate to the character of the landscape; and manage for a programmed, sustained harvest of forest products in areas that are timber-suited.

The desired condition is a near-natural or natural appearance as seen from sensitive viewing locations. The visual effects of management activities remain subordinate to the character of the landscape. (LRMP, IV-63, 64)

3. Retention Visual Quality Objective (RT)

The primary goal for retention is to maintain the area in a natural or near-natural appearing condition; manage human activities so they are subordinate to the character of the landscape; and manage for a programmed, sustained harvest of wood products in areas that are timber-suited.

Signs of management activities will not be apparent under the desired condition in areas managed to meet retention visual quality objectives (VQOs). Views from visually important roads and trails, primarily along the Highway 299 corridor, will appear forested and provide a natural or near-natural appearance. Management activities will not be visually evident to the average visitor to the area.

Vegetative or ground-disturbing management activities will repeat the representative characteristics of the landscape and will not dominate the visual character of the viewed landscape. (LRMP, IV-57, 58)

Special Habitat

1. Bald Eagle Winter Roost Areas (SHE)

This management area includes protection for winter roosts for bald eagle. The desired condition for bald eagle winter roost areas is for these areas to be fairly dense stands of mature and old growth conifers. Large snags and live conifers with open crowns and stout lateral limbs for perching will be common. The vegetative features of the stands will provide protection from weather. These sites will be isolated from areas of excessive human activity.

2. Late Successional Reserves (LSR)

The management emphasis and goal for LSR is to protect and enhance conditions of late successional and old growth forest ecosystems, which serve as habitat for late successional and old growth related species (LRMP, IV-34, 35). These reserves are designed to maintain a functional, interacting, late successional and old growth forest ecosystem. (FSEIS ROD page C-11)

Late successional reserves will contain multi-storied diverse assemblages of plant and animal species with moderate to high accumulations of down logs, snags, and tree cavities, as well as fungi, lichens, and bryophytes. Natural processes will occur, including fire. Populations of late successional and old growth related species will contribute to viability throughout their range. Materials for Native American uses will be available as directed under treaty rights. Fire and other disturbance regimes will resemble the natural rates under which the forest ecosystem evolved.

3. Late Successional Reserves of 100 Acres (L100)

The management emphasis and goal for LSR is to protect and enhance conditions of late successional and old growth forest ecosystems, which serve as habitat for late successional and old growth related species (LRMP, IV-34, 35). These reserves are designed to maintain a functional, interacting, late successional and old growth forest ecosystem (FSEIS ROD page C-11).

Standards and guidelines in the Late Successional Reserves specify the protection of 100-acres of owl habitat around all known owl activity centers. Management of stands surrounding these areas will be designed to reduce risks of natural disturbance.

Riparian Reserves

Under the Aquatic Conservation Strategy, Riparian Reserves are used to maintain and restore riparian structures and functions of intermittent streams, confer benefits to riparian-dependent and associated species other than fish, enhance habitat conservation for organisms that are dependent on the transition zone between upslope and riparian areas, improve travel and dispersal corridors for many terrestrial animals and plants, and provide for greater connectivity of the watershed. The Riparian Reserves will also serve as connectivity corridors among the Late successional Reserves.

The desired condition is for water temperature, sediment loads, and nutrient cycling to be at levels that provide for productive riparian and aquatic ecosystems. In-stream flows and fluvial processes will

occur at the rates under which the stream system evolved. Habitat diversity, channel stability, and water quality will be high. Water table elevation in wet meadows will be at or near pre-grazing levels and will provide for the needs of aquatic and riparian biota. Large woody debris recruitment rates will be sufficient to maintain suitable stream habitat conditions. Riparian vegetation and nearby lower slope terrestrial plant communities will have a diverse multi-storied structure and provide shade and maintain microclimate in the reserve corridor. In some drainages, these reserve corridors will extend to the ridgeline saddles and connect with the corridors of other watersheds to provide for travel and dispersal of animals and maintain habitat connectivity across the landscape. Riparian Reserves include unstable and potentially unstable lands as well as all ponds, springs and stream courses showing evidence of annual scour.

Proposed Action

The proposed action is designed to move the existing conditions within the Waterman West planning area towards the desired future conditions as defined by the Forest Plan. In the forest stands, approximately 918 acres of commercial thinning would involve a combination of ground-based and skyline/cable-logging systems and the construction or reconstruction of needed roadways and landings (Table 2). Timber stand improvement will be accomplished in the youngest plantations, 687 acres, by pre-commercial thinning. On 812 acres, the canopy has reached the desired condition and the understory needs to be opened through a Biomass Thinning, in order to minimize the connectivity of the ground fuels with the canopy. The primary goal in biomass units is to manage fuels and understory structure to create a more fire resilient stand, while exploring strategies to utilize the material. This material will be utilized for the highest and best use possible. These uses may include chipping for power production, grinding for compost, and fuel wood, to name a few. Fire risk would be reduced in fuel reduction zones of varying widths along key ridges adjacent to the communities of Willow Creek and Salyer.

Table 2. Waterman West Proposed Treatment or Action and Approximate Acre/Distance/Volume for Treatment.

Treatment or Associated Action	Approximate Amount*:
Commercial Thin	918 acres
Timber Stand Improvement in Plantations	687 acres
Biomass Thin	812 acres
Landing Construction	304 (see Table 4)
Temporary Road Construction	5.6 miles
Thin/Prune/Pile and/or Mastication	975 acres
Prescribed Burn**	2,763 acres

* Area/Distance/Volume/Count

** Prescribed burn includes all treatment areas except those in plantations less than 40-years old. Of these acres, biomass utilization will be evaluated.

The Waterman West Project is being proposed to reduce the fuel loading on National Forest System lands along strategic ridgelines within the proposed wildland-urban interface (WUI) of the greater Willow Creek area. The project is located entirely on the Lower Trinity Ranger District and is mostly along Waterman and Campbell Ridges covering approximately 3,500 acres.

The vegetation seral stages in the proposed action area range from brush to late mature and old growth. Encompassed with these stands are approximately 579 of old growth and 253 acres of late

mature (Table 3). All treatments in old growth stands would occur in the understory, would be implemented with no commercial timber harvest, and may utilize the thinned material for biomass. Please note that minor edits in acres will occur during field review and GIS edits.

Table 3. Vegetation seral stages in the proposed action area

Shrub Harvest	581
Pole Harvest	1106
Early Mature	449
Early Harvest	41
Early with Predoms	118
Mid Mature	465
Mid Harvest	16
Late Mature	253
Old growth	579
Other	20

Forest Health Treatments

Approximately 920 acres would be commercially thinned under a modified thin-from-below, termed free thinning, silvicultural prescription. Treatments would reduce the density of understory, low- to mid-canopy-level trees, and co-dominants, while promoting the development of large trees. Some canopy-level thinning would occur to promote the growth of hardwoods and diverse forest structures. Seral stages range from early to late mature, with the late mature being represented as patches within earlier development stages.

Thinning reduces the stand density of trees to improve growth and yield, enhance stand health, and reduce potential mortality. More specifically, low thinning, or thinning from below, is the removal of trees primarily from the lower crown classes to favor those in the upper crown classes. Low thinning reduces competition between conifer trees for onsite resources such as light, water, and nutrients. Stand densities vary, but stand selected for thinning are typically well stocked or overstocked and have sufficient density to respond to thinning.

The focus of this treatment is to retain the largest trees with the best crowns. These trees are generally at or above the average canopy and have the best opportunity to take advantage of onsite resources to maintain or increase growth. Treatments are designed to maintain the existing native species diversity, including hardwoods, in the unit being treated. Generally, the following types of trees would be retained: all predominant conifers (larger, older trees left from previous stands that have large limbs and live crown ratios generally greater than 50 percent); dominant conifers (trees from the current stand and live crown ratios generally greater than 40 percent); co-dominant and intermediate conifers with growing space in the canopy for crown development; and healthy dominant or co-dominant hardwood trees (particularly black oak and Pacific madrone), or pockets of smaller diameter hardwoods. Some damage of hardwoods is anticipated, as it would not always be possible to maintain and/or avoid damage to these hardwoods during timber harvest operations.

First priority for removal would be the smaller trees having the poorest crowns. These trees are normally below the average canopy and would eventually die as a result of competition for light, water, and nutrients. Some co-dominant trees would also be removed to increase growth of adjacent trees and to meet the desired residual stand density. Generally, the following types of trees would be removed from the stand: suppressed conifers (live crown ratios generally less than 20 percent); intermediate conifers without growing space in the canopy for crown development (live crown ratios generally less than 20 percent); co-dominant conifers that do not have growing space in the canopy for further crown development (live crown ratios generally less than 30 percent), or co-dominant trees needed to reduce stand density to desired levels; and co-dominant, intermediate, and suppressed conifers adjacent to predominant conifers, dominant or co-dominant hardwoods, or pockets of smaller diameter hardwoods, to facilitate the survival of these trees.

In plantations younger than forty years, the proposed vegetation treatments would remove trees in the suppressed, intermediate and co-dominant crown positions favoring the healthiest, best growing trees in the dominant and co-dominant crown positions. Thinning would favor the Douglas-fir regeneration planted within the units. Generally, tanoak becomes established in areas where this regeneration is sparse or absent, so these areas will be thinned to encourage the healthiest, best growing trees, regardless of species.

Some selective thinning within outer portions of Riparian Reserves would be accomplished through a combination of skyline yarding, tractor yarding, and hand thinning. In the case of tractor thinning, yarding of trees would be accomplished through end-lining of selected trees without heavy equipment entering Riparian Reserves. No stream crossings would occur. No other road activities would occur in Riparian Reserves. All treatments in Riparian Reserves would promote Aquatic Conservation Objectives, as defined by the Northwest Forest Plan (USDA Forest Service 1994).

In previously unmanaged natural stands growing on moderate or better quality sites, a minimum of 60 percent average canopy closure would be maintained after initial thinning and fuels treatments. In old growth stands, treatments would be implemented with no commercial harvest. Skidding of small hardwoods and sub-merchantable conifers may be planned to accomplish fuel reduction goals and use of biomass.

Sawlogs that are removed during treatments (an estimate of 8 to 9 million board feet of initial volume) would be sold as a by-product of forest health treatments.

Log landings would be used for skyline and tractor logging, and for decking and disposal of forest residues. Approximately 87 new landings and 4 processing sites would be created adjacent to system and temporary roads (Table 4). Approximately 51 existing landings may require minor earthwork to expand dimensions and minor clearing and/or blading. Most landings would vary in size from 1/4 to 1 acre in size. Four processing areas would vary in size between a half-acre and 2.25 acres where biomass would be collected and processed within the project area.

Table 4. Number of new and existing landing and disposal sites considered

Existing Landings	51
New Landing and/or Disposal area	91
Ro ad Landings	204
Grand Total	**306**

Where terrain limits the ability to create new landings, the yarder will yard material from the road bed (road landings). In these instances, material would be decked or piled above or below road bed but no earthwork would be performed. Additional trees may need to be removed to account for swing of machinery and yarded material. The size of these openings would vary, but are mainly less than ¼ acre. Approximately 203 of these road landing locations would be needed.

Individual treatments and units, and over-all prescriptions are provided in Appendix A.

Fuels Treatments

Potential fire impacts would be reduced in fuel reduction zones along key ridges (Waterman, Baldwin and Campbell) and key access routes in the project area adjacent to the communities of Willow Creek and Salyer. Fuel generated through pre-commercial and commercial thinning or brush cutting would be disposed of by pile, jackpot and/or understory burning, chipping or mastication and/or removal off-site for use as biomass. Excess natural fuels would be treated similarly. A list of proposed fuels treatments by unit is given in Appendix A - Table 6, Table 7, Table 8, and Table 9 (pages 15 to 20).

All units are planned to have an understory burn treatment (USB). Some units may have an USB as the first treatment, while others may be understory burned as a follow-up treatment within 10 years of initial treatments. Most units have either a jackpot, hand pile or removal/biomass treatment as initial treatments to reduce ladder and some surface fuels to allow understory burning to be used most effectively. Understory burning is planned to be used as a maintenance tool.

Treetops, un-utilized material, and cut and removed material would be decked on landings and/or disposal sites associated with each unit, or placed below roads at the tops of the skyline yarding corridors. If these areas are not large enough to accommodate the volume of material, other landings or disposal sites may be used. This material would be made available to the public for firewood and biomass utilization for at least 2 years. After that time, any remaining material could be burned.

In a few areas only accessible by foot and adjacent to private property, surface and understory ladder fuels on federal lands would be cut and treated by hand, within a buffer of the property line. No commercial harvesting or road construction would occur in these areas.

Masticated units would not be planned for follow-up burning for at least 5 years. Any piles or decks on closed, temporary roads could be burned as soon as they are cured. Some of the masticated units would be planted with a desirable mix of conifer trees, if natural regeneration does not occur within the first five years after treatment, to accelerate the development of a shaded fuelbreak along these ridgetop features.

Biomass treatments could be accomplished by using skyline, endline or machine equipment. Machine removal could include skidders, small dozers, or small equipment like ATVs.

Transportation Needs

Approximately 5.6 miles of temporary roads would be constructed for this project (Table 5). Of these, 3.3 miles would be constructed on undisturbed ground and 2.3 miles would be on existing alignment. All temporary roads created for the project are located outside of Riparian Reserves (no stream crossings) and would be decommissioned after use. Special attention would be given to obliterating the first 300 feet of the temporary road at the intersection with a system road.

Table 5. Proposed action temporary road miles

New Temporary Roads on Undisturbed Ground	3.3
Reconstructed Temporary Roads on Existing Alignment	2.3
Temporary Road Total	**5.6**

Lastly, during road maintenance or reconstruction either existing rock sources or commercial rock would be used for source material. No new rock sources would be created. Dust abatement would be accomplished by using either water or other abatement material, such as lignin sulfinate. Water would be collected from existing sources.

Design Features

Design features have been developed to mitigate or reduce adverse impacts and achieve desired outcomes. These measures were guided by the direction in the Forest Plan, project specific objectives, and concerns identified by the Forest Service. Standards and guides from the Forest Plan that are applicable to the project are also listed. A full list of these features is given in Appendix A (pages 21 to 28).

Adaptive Management

To continuously improve forestry practices, adaptive management would be incorporated into the proposed project. Adaptive management is a systematic process for continually improving management policies and practices by examining the results of an action and learning from the outcome. For instance: monitoring the results of actions might indicate the need to change a course of action; or scientific findings and/or the needs of society may indicate such a need. Any changes however, would not be implemented unless they have been considered in the environmental analysis.

What's Next

Public comments are crucial to help us identify issues or concerns with this proposal so we can refine details and design appropriate protection measures. The next step in this process is for us to develop an environmental analysis (EA) evaluating the potential effects of this proposal on the environment. When complete, the EA will be released for public comment before a decision is issued.

References

USDI and USDA (U.S. Department of the Interior and U.S. Department of Agriculture). 2000. Managing the Impacts of Wildland Fires on Communities and the Environment - A Report to the President (aka National Fire Plan) http://www.fireplan.gov/resources/annual_report.html

U.S. Department of Agriculture, Forest Service. 1995. Six Rivers National Forest land and resource management plan. Pacific Southwest Region, San Francisco, CA

U.S. Department of Agriculture, Forest Service. 2003. Mainstem, Trinity Watershed Analysis. Six Rivers National Forest, Lower Trinity Ranger District.

U.S. Department of Agriculture, Forest Service and U.S. Department of the Interior, Bureau of Land Management. 1994. Record of Decision for Amendments to Forest Service and Bureau of Land Management Planning Documents within the Range of the Northern Spotted Owl and Standards and Guidelines of Management of Habitat for Late successional and Old growth Forest Related Species within the Range of the Northern Spotted Owl (known as the Northwest Forest Plan (NWFP)), Portland, OR. April 13, 1994.

Appendix A

Treatment and Prescription Narrative

Table 6. Treatment Table for Ridgetop Fuel Units

Table 7. Treatment Table for Plantation Units

Table 8. Treatment Table for Biomass Units

Table 9. Treatment Table for Commercial Thin Units

Design Features and Applicable Standards and Guides Listing

Figure 2. Project Vicinity Map

Figure 3. Proposed Treatment Areas: North Section Map

Figure 4. Proposed Treatment Areas: South Section Map

Treatment and Prescription Narrative

Seral Stages

Shrub Harvest (SH). Shrub stage plantations that resulted from previous harvesting.

Shrub Natural (SN). Shrub stage vegetation that is natural.

Pole Harvest (PH). Pole stage plantations that resulted from previous harvesting.

Early Mature (EM). Generally dense, closed canopy, single layer stands dominated by trees with the top layer of conifers between 11 and 18 inches in diameter at breast height (DBH); shrub and herb layers are lacking or non-existing.

Early Harvest (EH). Early mature stands with past selective harvesting.

Early with Predoms (EA). Early mature stands with scattered predominant trees.

Mid Mature (MM). Generally dense, closed canopy stands, with one or two layers, dominated by trees with the top layer of conifers between 18 and 30 inches in DBH. Shrub and herb layers exhibit low cover.

Mid Harvest (MH). Mid mature stands with past selective harvesting.

Mid with Predoms (MA). Mid mature stands with scattered predominant trees.

Late Mature (LM). Generally dense, closed canopy stands with two or more layers, dominated by trees with the top layer of conifers 30 inch DBH and larger. Shrub and herb layers begin to increase in cover.

Late Harvest (LH). Late mature stands with past selective harvesting.

Old growth (OG). Old growth Douglas-fir stands tend to exhibit high structural diversity. They contain very large and very old (greater than 200 years) live trees. They contain multiple structural layers with gaps, large snags, large down woody debris, and highly variable under-stories. Understories tend to be much patchier than in younger forest stands.

Fuel Treatments

Jackpot Burning (JB)

The burning of concentrations of natural and activity fuels not only reduces potential fire intensity and duration, but also can be used to reduce the quantity and/or growth of some small diameter trees and brush, including sprouts. It can also be used to enhance the establishment and quality of particular desirable plants, such as hazel and bear grass.

Hand pile and burn (HPB)

Hand piling and burning includes cutting brush and small diameter trees, limbing of green vegetation, and piling of this treated material along with dead and down fuels.

Chip/Masticate (CM)

Mechanically chip and or masticate concentrations of natural and activity fuels. Mastication is the process of converting live and dead biomass into surface fuel by breaking up larger pieces into smaller pieces by using a front-end and/or boom mounted rotary or drum blade or head.

Understory Burning (USB)

Understory burning is burning surface fuels and some ladder fuels under a canopy layer. This type of burning would result in some burn impacts to mid and upper canopy layer. Scattered, small openings are considered beneficial in the forested environment. Understory burning, like jackpot burning, is not only a fuels reduction tool but also a silvicultural tool to control or enhance understory vegetation. The use of under-burning is prescribed to reduce the quantity and/or growth of small diameter trees and brush and/or to enhance the development of desirable plants.

Whole tree yarding (WTY)

Whole tree yarding refers to pulling the top of the tree (when the top is attached to last log) and piling it at landings, tops of yarding corridors, or disposal areas for future treatment (such as biomass, firewood gathering, or burning).

Silvicultural Prescriptions

Note: Some stands contain distinctly different plant aggregations that would require different treatments. Where this situation exists, the prescription field gives the general treatment for each aggregation separated by an underscore (_).

Biomass Thin (BT)

Thin trees 4" DBH and larger from below to a specified density to provide growing space for the residual trees – remove trees in the suppressed, intermediate and co-dominant crown positions favoring the healthiest, best growing trees in the dominant and co-dominant crown positions. Treatment results in a biomass product.

Lop and Scatter (LS)

Cut concentrations of natural and activity fuels into pieces and scatter evenly so fuel is not concentrated and breaks down through natural decay process.

Low Thinning or Thinning from below (LT)

Thinning from below leaves the dominant and generally largest trees. In canopy level treatments it removes suppressed, intermediate and smaller co-dominant trees, the trees most likely to die from competition or suppression. In some of the older and more diverse stands, a low thinning is proposed to remove the majority of smallest trees and brush that exist in the sub-canopy, thereby having no effect on the canopy layer of trees. In all stands, the dominant and predominant trees would remain unless they interfere with a roadway, landing/disposal site, skyline corridor, or a visual corridor (see prescription VC below).

Free Thinning (FT)

Free thinning favors particular desired trees by combining various crown-class, species, spacing, and health or damage criteria. Free thinning is a way to thin stands for a range of forest management objectives and can be particularly useful when thinning mixed-species stands with variable density, spacing, or species composition. Thinning to maintain or enhance a healthy hardwood component well into the future would require the removal of some adjacent or overtopping co-dominant conifers, in addition to the removal of suppressed and intermediate trees. In all stands, the dominant and pre-dominant trees would remain unless they interfere with a roadway, landing/disposal site, skyline corridor, or a visual corridor (VC). The great variability that exists within many of the project stands requires a mix of strategies for the whole stand. In many cases a combination of free thinning and low thinning would be applied within the same stand and in these cases "FT" for Free Thinning is used in Table 7.

Pre-commercial Thin (PCT)

Thin trees from below to a specified density to provide growing space for the residual trees – remove trees in the suppressed, intermediate and co-dominant crown positions favoring the healthiest, best growing trees in the dominant and co-dominant crown positions. No merchantable product results from this treatment.

Prune (PR)

The removal of lower limbs on residual trees.

Thin (T)

The removal of understory trees to minimize ladder fuels and provide growing space for the residual trees. This treatment could also be a CT, BT or PCT depending on forest structure and operability for equipment.

Treatment System

Cable . Cable systems may include one of the following within the project area. Skyline systems require full suspension of logs over streams and buffer areas and front-end suspension in the remainder of yarding corridors. Equipment must have lateral yarding capability and be able to hold the carriage stationary until products are yarded to the corridor. Equipment must be capable of yarding from roadway with additional landing excavation held to a minimum consistent with safe yarding operations. Only mobile swing-boom type yarders with rubber tires would be considered. A yoader system is an alternate cable system. It is a type of yarder, a machine that moves logs up to the landing by reeling in the skyline carriage. The yoader is also equipped with clamps to move logs around as needed once they are on the landing and utilizes no back “guy tree”. This equipment also eliminates the need for a separate piece of loading equipment.

Ground. Ground based treatment systems include a variety of equipment options including, but not limited to, crawler tractors, rubber tired skidders, feller-bunchers, mechanical harvesters and forwarders, and horses.

Sawlog Yield

The volumes displayed in Table 9 represent very rough visual estimates of initial byproduct yields from trees designated for removal. There would also be additional trees designated for removal because: they are used as yarder “guy trees”; they are located in new proposed temporary roadways, new landings, skyline corridors, or loader “swing circles”; they are designated as hazard trees along certain roadways; or because additional marking is needed after skyline corridor or skid trail layout in order to fully meet the intent of the prescription.

Table 6. Treatment table for Ridgetop Fuels Units.

Unit ID	Stand	Area Estimate (Acres)	LRMP Management Area	Seral Stage	Silvicultural Rx	Minimum Residual Canopy Closure (%)	Fuels Rx
400	6	76.4	GF, PR, RT	EM, EH, MM, LM, OG	T_PR	60	HPB
401	0	27.4	GF, PR	SH, MM, MH, OG	T_PR	N/A	CM_LS
402	2	45.3	GF, LSR	SH, PH, EA, MM	T_PR	60	HPB
403	1	18.0	GF, LSR	SH, PH, MM	T_PR	60	HPB
404	5	16.3	GF, LSR	SH, EM, OG	T_PR	N/A	CM_LS
405	4	45.0	GF, LSR	SH, PH, OG	T_PR	60	HPB
406	3	6.9	LSR	OG	T_PR	60	HPB
407	9	48.8	GF, LSR	SH, EM, EA, MM, LM, OG	T_PR	N/A	CM_LS
408	8	42.5	GF, LSR	SH, PH, EM, OG	T_PR	N/A	CM_LS
409	10	19.2	LSR	PH, OG	T_PR	60	HPB
410	7	7.3	GF, LSR	SH, PH, LM	T_PR	N/A	CM_LS
411	13	12.9	GF, LSR	SH, PH, LM	T_PR	N/A	CM_LS
412	14	31.1	GF, LSR	SH, PH, LM	T_PR	60	HPB
413	11	7.6	LSR	SH, PH, OG	T_PR	60	HPB
414	12	11.4	LSR	SH, PH, OG	T_PR	N/A	CM_LS
415	15	0.9	LSR	SH, PH	T_PR	N/A	CM_LS
416	17	9.5	LSR	LM	T_PR	60	HPB
417	19	39.3	GF, LSR	SH, PH	T_PR	60	HPB
418	18	54.3	GF, L100	EH, MM, LM	T_PR	60	HPB
419	16	6.4	GF, LSR	PH, OG	T_PR	N/A	CM_LS
420	23	7.5	GF, L100	OG	T_PR	60	HPB
421	22	16.6	GF, LSR	SH, PH, OG	T_PR	60	HPB
422	20	74.8	GF, PR, LSR	SH, PH, MM, OG	T_PR	N/A	CM_LS
425	21	163.0	GF, PR, RT	PH, EM, PN, EA, MM, LM, OG	T_PR	60	HPB
426	24	17.8	GF, PR	SH, EM, MM, OG	T_PR	60	HPB

Unit ID	Stand	Area Estimate (Acres)	LRMP Management Area	Seral Stage	Silvicultural Rx	Minimum Residual Canopy Closure (%)	Fuels Rx
427	26	56.9	GF, PR	SH, EM, EA, LM, OG	T_PR	60	HPB
428	25	80.3	GF, PR	SH, EM, MH, LM, OG	T_PR	60	HPB
429	27	32.1	PR, RT, SHE	EM, MM, LM	T_PR	60	HPB

Table 7. Treatment table for Plantation Units.

Unit ID	Stand	Area Estimate (Acres)	LRMP Management Area	Seral Stage	Silvicultural Rx	Minimum Residual Canopy Closure (%)	Fuels Rx
200	1	24.9	PR, RT	SH	PCT_PR	40	HPB
201	3	41.3	LSR, PR	SH	PCT_PR	25	HPB
202	130	54.4	LSR	SH, PH	PCT	40	LS
203		37.1	LSR	SH, PH, MM	PCT	40	HPB
204	34	17.7	GF, LSR	PH	PCT_PR	40	CM
205	36	50.7	LSR	PH	PCT_PR	40	HPB
206	39	18.5	LSR	PH	PCT	40	LS
207	39	23.7	LSR	SH, PH	PCT_PR	40	CM
208	42	20.2	LSR	SH, PH	PCT_PR	40	CM
209	57	16.6	LSR	SH, PH	PCT	40	LS
210	59	19.1	GF	PH	PCT_PR	40	CM
211	61	42.4	GF, LSR	PH	PCT	40	LS
212	155	35.2	LSR	SH	PCT	40	LS
213	116	8.2	LSR	PH	PCT_PR	40	CM
214	142	11.0	GF	SH	PCT	25	LS
215	147	18.7	GF	PH	PCT	40	LS
216	76	3.9	GF	PH	PCT	40	LS
217	78	2.8	GF	SH	PCT	40	LS
218	78	2.5	GF	PH	PCT	40	LS
219	89	9.5	GF	SH	PCT_PR	25	CM
220	91	14.1	PR, GF	MH	PCT_PR	25	CM
221	96	23.3	PR, GF	SH	PCT_PR	25	CM
222	99	11.1	GF	SH	PCT_PR	25	HPB
223	170	68.8	PR, GF	PH	PCT_PR	40	HPB
224	90	33.5	PR, GF	SH	PCT_PR	25	HPB
225	97	36.3	PR, GF	SH, EA	PCT_PR	25	CM
226	100	6.4	GF	SH	PCT	25	LS
227	103	11.3	PR, GF	SH	PCT	25	LS
228	107	14.4	PR	SH	PCT	25	LS
229	155	8.9	GF, LSR	SH	PCT	40	LS

Table 8. Treatment table for Biomass Units.

Unit ID	Stand	Area Estimate (Acres)	LRMP Management Area	Seral Stage	Silvicultural Rx	Minimum Residual Canopy Closure (%)	Fuels Rx
301	0	25.2	GF, LSR	EA, PH, MM, OG	BT_PR	60	WTY_HPB
303	10	131.8	LSR	SH, PH, MM, LM	BT_PR	60	WTY_HPB
304	4	48.8	GF	EM, EA, MM	BT	60	WTY_HPB
305	3	65.6	GF	EM, EA, MM, LM	BT	60	WTY_HPB
306	12	42.9	GF	SH, EM, EA, LM	BT	60	WTY_HPB
307	2	79.9	GF	SH, EM, EA, PH, OG	BT_PR	60	WTY_HPB
308	1	105.9	GF, LSR	EM, EA, LM, OG	BT	60	WTY_HPB
309	8	26.7	LSR	SH, PH, OG	BT	60	WTY_HPB
311	9	58.4	GF	SH, EM, PH, OH, LM	BT	60	WTY_HPB
312	5	50.0	GF	PH, MM, LM	BT_PR	60	WTY_HPB
313	7	55.1	GF, L100	EM, SH, PH, OG	BT	60	WTY_HPB
314	6	98.2	GF, L100	EM, SH, PH, OG	BT	60	WTY_HPB
317	11	8.0	GF, LSR	SH, PH, OG	BT	60	WTY_HPB
318	13	15.7	GF, LSR	PH, LM, OG	BT	60	WTY_HPB

Table 9. Treatment table for Commercial Thinning Units.

Unit ID	Stand	Area Estimate (Acres)	LRMP Management Area	Seral Stage	Silvicultural Rx	Minimum Residual Canopy Closure (%)	Sawlog Yield Estimate (MBF)	Fuels Rx	Harvest System
100	13	19.1	PR	EM, MM, LM	FT	60	130	WTY_JP	Cable
101	7	36.1	PR	MM	FT	60	657	WTY_JP	Cable
102	9b	27.4	GF, PR	EM, MM, EH	FT	60	219	WTY_JP	Cable
103	9a	16.5	GF	EM, MM	FT	60	130	WTY_JP	Ground
104	14b	4.0	GF	MM, EH	FT	60	11	WTY_JP	Cable
105	14a	1.7	GF	MM	FT	60	14	WTY_JP	Ground
106	15	27.4	GF, PR	EM, MM	FT	60	308	WTY_JP	Cable
107	132	115.2	LSR	PH	FT	40	852	WTY	Ground
108	10	10.7	GF	EA, MM	FT	60	112	WTY_JP	Cable
109	39	29.8	GF	PH	FT	40	175	WTY	Cable
110	31	3.0	GF	PH	FT	40	18	WTY	Ground
111	38b	7.9	PR	LM	FT	60	79	WTY_JP	Ground
112	38	25.8	LSR	LM	FT	60	213	WTY_JP	Cable
113	38a	1.0	PR	LM	FT	60	8	WTY_JP	Ground
114	48	23.1	GF	PH	FT	40	107	WTY	Cable
115	51a	4.2	PR	SH, LM	FT	60	25	WTY_JP	Ground
116	51	68.9	GF, LSR	EM, MM, LM	FT	60	420	WTY_JP	Cable
117	52	15.4	GF, LSR	PH	FT	40	63	WTY	Cable
118	62	11.8	PR, GF	PH	FT	40	60	WTY	Cable
119	62a	4.7	PR	PH	FT	40	23	WTY	Ground
120	142	5.2	PR, GF	EM	FT	60	87	WTY_JP	Cable
121	143	4.8	GF	EM	FT	60	70	WTY_JP	Ground
122	146	22.9	PR, GF	SH, PH	FT	40	64	WTY	Ground
123	147	21.0	GF	PH	FT	40	123	WTY	Cable
124	116	36.1	GF	SH, PH	FT	40	184	WTY	Ground
125	201	69.2	GF	SH, PH	FT	40	358	WTY	Cable

Unit ID	Stand	Area Estimate (Acres)	LRMP Management Area	Seral Stage	Silvicultural Rx	Minimum Residual Canopy Closure (%)	Sawlog Yield Estimate (MBF)	Fuels Rx	Harvest System
126	70	33.6	GF	EM, MM	FT	60	327	WTY_JP	Cable
127	71	70.6	GF	EM, MM	FT	60	548	WTY_JP	Cable
128	74	4.6	GF	PH, MM	FT	60	27	WTY_JP	Ground
129	78	7.3	GF, LSR	PH	FT	40	68	WTY	Ground
130	81a	7.2	GF, PR	EM	FT	60	190	WTY_JP	Ground
131	81	47.5	GF	EM	FT	60	807	WTY_JP	Cable
132	84	10.2	GF	MM	FT	50	259	WTY_JP	Ground
133	86	15.9	GF	EM, MM	FT	50	322	WTY_JP	Cable
134	152	3.5	GF	EM	FT	60	45	WTY_JP	Cable
135	87b	9.6	GF	EM, LM	FT	50	110	WTY_JP	Ground
136	151	20.8	GF, L100	EM, EA, LM	FT	60	201	WTY_JP	Cable
137	87	23.4	GF	EM, LM	FT	50	106	WTY_JP	Cable
138	87a	10.6	GF, PR	EM	FT	50	110	WTY_JP	Ground
139	102	3.6	GF	SH, MM	FT	60	46	WTY_JP	Ground
140	200	2.9	PR, GF	SH, EM, MM	FT	60	21	WTY_JP	Ground
141	105	26.2	LSR, PR, GF	EM, MM	FT	60	486	WTY_JP	Cable
142	104	8.1	GF	MM	FT	60	59	WTY_JP	Ground

Design Features and Applicable Standards and Guides Listing

Silviculture

1. In previously unmanaged natural stands growing on moderate or better quality sites[1] and having greater than 60% existing canopy closure, leave an average of 60% canopy closure[2] after initial thinning and fuels treatments. In areas where intermediate and co-dominant conifers are thinned around mature hardwoods with special emphasis on black oaks (*Quercus kelloggii*), canopy closure may be as low as 50% after treatment. In the previously thinned natural stand of Unit 132,133,135,137, and 138, leave a minimum of 50% canopy closure following thinning and fuels treatments.

2. In previously regenerated even-aged stands younger than 30 years of age and currently having an average canopy closure greater than 25%, leave a minimum average of 25% live vegetative cover following release and/or thinning and fuels treatments.

3. In regenerated even-aged stands 30 years and older that have greater than 40% existing canopy closure, leave a minimum of 40% average canopy closure following thinning and fuels treatments, in areas dominated by both conifers and hardwoods.

4. Yard material smaller than poles and sawlogs generated during commercial thinning operations from appropriate size ranges (7 to 16 inches diameter on large end by 10 feet or greater in length) to landings, disposal sites, or sorting sites for processing into biomass to prevent the buildup of excessive quantities of large woody debris. Yarding of tree tops or whole-tree-yarding would be required in all commercial units and every opportunity to utilize material for biomass will be considered.

5. Within all areas that are to be logged with a yarder , all yarding except lateral yarding shall be accomplished with a skyline system, which supports products clear of the ground across buffer strips, and in other areas yard with one product end suspended. Equipment must have lateral yarding capability and be able to hold the carriage stationary until products are yarded to the skyline corridor. Equipment must be capable of yarding from roadway with additional landing excavation to accommodate the yarder held to a minimum consistent with safe yarding operations.

6. In specific locations, unconventional logging techniques would be used, such as horses, mini-yarders, or yoader, as needed.

7. Require directional felling where needed to provide maximum protection to residual timber, mature hardwoods, sensitive species buffers, and facilities. Trees that cannot normally be felled away from such areas shall be directionally felled away with the aid of specialized equipment such as tree jacks.

8. For ground-based commercial thinning and biomass operations in the shrub, pole, and early mature seral stages, restrict the width of conventional tractors (rubber-tired or track) to a maximum of 10 feet, unless otherwise agreed to.

9. All ground-based commercial thinning operations would be restricted between March 1 and July 15 to minimize the potential for tree damage through bark slippage.

---

[1] Moderate or better sites are those having a Forest Survey Site Class (FSSC) of 4 or above (potential yields at culmination of mean annual increment are at least 85 cubic ft per acre)

[2] As measured in the field using a spherical densitometer.

10. No herbicides would be used during project implementation.

11. When thinning hardwoods over 6 inches in DBH in natural stands, leave one or two of the largest, most vigorous stems from hardwood sprout clumps to minimize re-sprouting.

Fuels

1. Treatment of activity generated and natural fuels would be completed through a variety of methods, including whole tree yarding, thinning, removal, biomass utilization, chipping, mastication, understory burning, lopping and scattering, and piling and burning.

2. Fuels on steeper slopes (greater than 35%) would be treated by hand cutting, jackpot burning, under-burning, hand piling and/or removal by cable or low psi mechanized equipment. Piling of slash material on extreme slopes (greater than 70%) generally would not occur. All opportunities to utilize biomass will be considered.

3. The burn prescription for understory burns would be for low-moderate intensity burns with scattered small pockets of higher intensity burns due to heavier fuel concentrations. These burns would not fully consume the woody debris, needle/leaf litter or humus layer on the forest floor.

4. To protect sensitive features from impacts during burning, cut a hand fire line to keep fire out of buffer or alter firing patterns to modify impacts on vegetation.

5. Debris/slash piles would be built at least 5 feet away from areas to be protected. In addition, to reduce scorching debris/slash piles should be built away from trunks of leave trees and snags, when feasible.

6. No piles shall be placed in ditches, culverts or on paved roads.

7. In cases where biomass cannot be utilized offsite and chipping is implemented along roadways, spread chipped material off roadway to a depth of less than 6 inches, avoiding ditches and culverts.

8. Prescribed burning would be conducted on "burn days" or when a special permit is obtained from North Coast Unified Air Quality Management District.

9. Prescribed burning operations would comply with the procedures specified in open burning regulations for California North Coast Air Basin.

10. To reduce air quality impacts and damage to residuals, encourage off-site use of chips and biomass options.

11. Spring burning is allowed in the northern spotted owl breeding season when surveys completed to protocol indicate no activity centers occur within 0.25 mile of burning activities. In occupied activity centers within 0.25 mile of an activity center, the wildlife biologist would work with the burn boss to make a field assessment of activity centers location in relation to any topographic features that would minimize risk to activity centers such as; activity centers backside of ridge, across river, slope position and site specific conditions that would be used to delineate areas that would restrict understory or pile burning from February 1 through September 15, and other smoke generating activities from February 1 through July 9.

Soil and Water

1. New or reconstructed landings would be shaped to disperse drainage and direct run-off away from watercourses at the time of construction. Rock armoring and/or silt fences with straw

bales may be used as necessary to direct water to areas of suitable drainage and to capture sediment (all materials must be provided from certified weed-free sources). All new landing fill slopes and road fill slopes (greater than 100 sq. ft) would be mulched prior to the first wet period and the mulch would be maintained throughout the life of the contract. When mulched to contract specifications (~4 tons/acre) the mulch protects from rainfall impact and subsequent particle mobilization. As berms constructed from bales breakdown, they would provide a soil binder to hinder soil mobilization.

2. On steep terrain (greater than 35% slope), landing size shall be kept to a minimum consistent with safe yarding and loading operations. In general, the size would be restricted to the area needed for a shovel or heel-boom loader.

3. No full bench skid trails would be constructed. Skid trails, when possible, would be located on ridge tops, flat benches, or existing skid trails to minimize soil displacement and enhance drainage.

4. Each skid road would be water-barred, where needed with consideration of site-specific erosion rating and slope. Waterbars would be constructed prior to the first wet season following use of the skid road.

5. Heavy equipment would be limited to slopes of 35% or less in order to minimize soil disturbance and subsequent erosion (LRMP S&G 1-8; IV-71). Skid trails located on small inclusions of steep areas exceeding 35% would be covered with just enough slash to provide cover on the bare areas. Any use of large material (greater than 9 inches) would be placed at an angle to the trail to both break up flow and divert water off the trail. With effective waterbarring, scattering slash would only be needed on the steeper pitches (greater than 30%).

6. Management activities in riparian reserves associated with actively unstable areas would be restricted to hand thinning small diameter fuels (less than 8 inches in diameter), low intensity underburning, and/or the removal of dead and down fuels by cable (unless otherwise specified). Some vegetation, and therefore root strength, would be maintained.

7. To reduce erosion and the potential for compaction, the Six Rivers National Forest Wet Weather/Winter Operating Standards would be followed.

8. Tractor skid roads and trails would be limited to no more than 15% of the harvest area (LRMP IV-71).

9. For each unit, soil porosity should be maintained to at least 90% of its natural condition over at least 85% of the unit area (LRMP S&G 1-2, IV-71).

10. At the end of project activities, a layer of litter and duff should occur over at least 50% of the activity area (LRMP Appendix L).

11. Burning in the fall and winter would be accomplished when higher moisture conditions lower the inherent risks associated with burning, and minimize the potential for negative impacts to soils and the residual vegetation.

Riparian Reserves (RRs)

1. There would be no new stream crossings associated with temporary road construction, for this project.

2. Landings and disposal sites would be located outside of RRs.

3. Riparian Reserves follow the Six Rivers LRMP standard and guideline for buffers on either side of permanently flowing non-fish bearing stream, including intermittent and ephemeral streams (LRMP IV-44 and 110). Riparian Reserve boundaries are not modified, however selected management activities are allowed within the riparian reserves to better meet ACS objectives and meet LRMP standards and guidelines (LRMP IV-44, 110).

4. Within RRs, commercial-thinning buffers would be delineated in the field based on topographic breaks and slopes or at sufficient distances from stream courses to result in little to no risk of sediment delivery to streams. Commercial thinning buffers are site-specific and would range from 80 to 160 feet from stream courses.

5. Selective commercial thinning of vegetation within the outer edges of RRs would be limited to plantations and early mature seral stages. Selective commercial thinning of vegetation within the outer edges of the commercial-thinning buffer would be possible, as long as recovery of stand health is accelerated. This is particularly important in plantations where significant portions of RRs were previously harvested.

6. Selective hand thinning of excessive fuels would typically be less than 4 inches in diameter but could be up to 8 inches in diameter. Hand thinning of excess fuels could occur within the RRs beyond the break in slope. However, vegetation that provides stream bank stability, or landslide scarp stability, would not be removed. In native and lightly managed native stands, hand fuel treatments in RRs would occur only where there are areas or pockets with high concentrations of fuels.

7. In RRs where silvicultural and fuels treatments are proposed, canopy closure in RRs in plantations in the outer 80 feet of the 160 ft RR buffer would be 40-60% to encourage larger tree diameter growth and accelerate development of diverse riparian vegetation and resilient RRs. Canopy closure in RRs in early mature stands in the outer 80 feet of the 160 ft RR buffer would be 60% or greater.

8. Selective commercial thinning within RRs, adjacent to commercial-thinning buffers, would be accomplished through a combination of cable yarding, tractor yarding, and hand thinning. In areas of tractor thinning, yarding of trees would be accomplished through end-lining of selected trees without heavy equipment entering RRs.

9. In riparian vegetation with wetland characteristics associated with springs and ponds, no-treatment-buffers (up to 100 feet on each side of the feature) would be maintained. Minor fuels reduction treatments, consisting of thinning ladder fuels and pruning larger trees, would be allowed within these buffers. Selective commercial thinning of vegetation within the outer edges of the larger commercial-thinning buffers would be possible, as stated above.

10. Management activities in riparian reserves associated with actively unstable areas would be restricted to hand thinning small diameter fuels (less than 8 inches in diameter), low intensity underburning, and/or the removal of dead and down fuels by cable (unless otherwise specified). Some vegetation, and therefore root strength, would be maintained.

11. Handpiles of thinned fuels would be placed away from the stream channel (greater than 50 feet) and burned during the wet season to reduce the impacts from burning to RRs. In addition, hand piles would be placed in a checkerboard pattern whenever possible (not one pile directly above another). Maximum size of hand piles in RRs would be 6 feet wide by 5 feet high.

12. During burning, ignition would stop at the edge of the RR and the fire would be allowed to slowly back down and go out on its own. Ignition may occur in the RR if needed to ensure a low intensity fire.

13. The intentional ignition of fuels within RRs would be limited to only those instances where ignition is needed to control the burn intensity and hence damage. There is no intention to ignite the entire RR.

14. Leave 10 to 20% of hand piles left unburned in RRs for wildlife habitat.

15. Hazard trees, if located within the RRs, will be left in place after felled. Limbs will be lopped and removed from the RR to reduce fuel loads.

Wildlife

1. Fuels accumulated from thinning that are lopped into smaller pieces and scattered throughout the unit shall be no deeper than 18 inches.

2. Canopy closure in suitable threatened, endangered, and sensitive species habitat (regardless of land allocation) would be maintained at 60% or greater. Canopy closure in all other areas would be maintained at 40% or greater.

3. The project would not remove active threatened, endangered, and sensitive species nest trees (predominants) or affect the canopy around active nest trees and would adhere to LRMP standards and guidelines. Directional falling would be used to protect all predominant trees and the any tree forming a canopy around the predominants.

4. Snags and logs would be retained as per Six Rivers National Forest Land Resource Management Plan, Standard and Guidelines Table IV-8, and Appendix L. Treatments within Late Successional Reserves, RRs, Critical Habitat Units, and suitable northern spotted owl habitat (regardless of land allocation) would maintain snags (20 inches dbh and greater or the largest available in younger seral stages) and downed logs (20 inches and greater and at least 10 feet long or the largest available) at the 80 to 100% level.

5. In suitable northern spotted owl (NSO) nesting habitat:

    a. Maintain 60% or greater canopy closure in all suitable NSO nesting habitat.

    b. Conduct protocol surveys for NSO to determine occupancy and nesting status. If northern spotted owls are found to be nesting, prohibit operations from February 1 through September 15 within the 70-acre nest core and from February 1 through July 9 for all timber harvest and prohibit heavy equipment use, chainsaw use, and smoke producing activities within 0.25 miles of known NSO pair activity center or known nest.

    c. Maintain all large predominant class trees in all suitable NSO nesting habitat and in deficit NSO home ranges (deficit home range has less than 1,340 acres of suitable habitat within 1.3 miles of the activity center).

6. To reduce disturbance from project activities, noise and smoke in bald eagle nest protection zones (NPZ):

    a. Consult with District Biologist to determine occupancy and nesting status and prohibit all activities within the NPZ, from January 1 through August 31, unless surveys show that the nest is not occupied or has failed.

b. Unless they pose a safety hazard, retain all predominant conifers and snags larger than 28 inches dbh, with large limbs and open crown and maintain 60% or greater canopy closure within the NPZ (LRMP FEIS, Appendix B, Table B-15 and LRMP IV-99).

7. In northern goshawk primary nest zones (PNZ):

a. Conduct protocol surveys for goshawks to determine occupancy and nesting status and prohibit habitat-modifying activities from March 1 through August 31 if occupied.

b. 60% of the PNZ shall be maintained as dense mature forest cover (greater than 60% crown closure, greater than 24 inches dbh).

c. Limited operating periods for noise disturbance may be lifted in project areas with high ambient noise (e.g. adjacent to high-use roads, campgrounds, etc.) or if the area is determined to be unoccupied or has failed.

8. Pacific Fisher

a. The Pacific fisher does occupy the project area however there are no known pacific fisher dens. In the event an active den is discovered and confirmed by the wildlife biologist within the project area during implementation of the project, silvicultural prescriptions would be modified to meet the objectives of the Fisher Habitat Capability Model within 500 feet of the den site (LRMP FEIS, Appendix B, Table B-18 and LRMP IV-102).

Snag and Log Retention Guidelines

The average number of snags and logs listed in the table below would be retained 80 to 100% of the time following the thinning operations. These guidelines apply to areas of 40 contiguous acres and not to individual units.

Vegetation Series/Seral Stage	Average Snags per Acre	Average Logs per Acre
Tanoak Series		
Early Mature	3.2	8.2
Mid Mature	3.6	4.7
Late Mature	1.3	1.8
Old growth	4.3	9.2
Douglas-fir Series		
Early Mature	3.7	16.0
Mid Mature	1.2	5.4
Late Mature	0.9	6.3
Old growth	3.9	8.7

Botany-Survey and Manage and Sensitive Botanical Species

1. California globe mallow (*Iliamna latibracteata*) is categorized as a Forest Service (FS) sensitive species. Two sites occur within the proposed treatment areas; both occur within the ridgeline fuelbreak treatment corridor (in the southwest corners of Sections 30 and 32).

- No activities shall occur that directly impact (e.g. crush, uproot, burn, otherwise damage) the individual plants at either site.
- Sites where no activities shall occur will be flagged and further delineated with equipment exclusion signs.

2. Bay horsehair lichen (*Sulcaria badia*) is categorized as a FS sensitive lichen species. Six sites occur within units 102, 106 (2 sites), 142 (2 sites), and one site in unit 141.

   - Buffers around sites in respective units have been delineated with white tree marking paint. Equipment exclusion signs will be installed in alignment with the buffer.
   - All activities are prohibited within the buffered areas, with the exception of the following:
     - Thinning trees of 6" diameter or less and associated removal of trees to the outside of the buffer. Any necessary pile burning related to this activity would occur outside the buffer.

3. Chaenothecopsis lichen (*Chaenothecopsis pusilla*) is a Survey & Manage Category E species. Management direction states that all known sites will be managed. An occurrence lies within the ridgeline fuel treatment corridor near Waterman Ridge.
   - A 25' buffer would be established around the occurrence.
   - All activities would be prohibited within the buffer.

Noxious Weeds

1. Equipment would be cleaned prior to entry into the project area to prevent the incidental introduction of noxious weeds.

2. Progression of work along particular road segments of the project sale area would be specified in the noxious weed risk assessment, the plan of operations, and documented on a map, to reduce the risk of moving weed seed from moderate to heavily infested areas (e.g. FS Route 4 and 7N02C) to relatively weed-free areas within the sale area.

3. To further reduce the risk of exporting weed seed from an infested area to an un-infested area, yellow starthistle sites would be treated using a weed whacker prior to operations (including operations involving mastication machines) to reduce maturation of seed head development when equipment is operating in the area, with the exception of the following:
   - For activities occurring off 7N02C, where yellow starthistle cover is high and thus weed whacking is deemed infeasible, operations would be completed and equipment cleaned at least once before moving elsewhere.

4. After initial treatment of yellow starthistle sites, subsequent treatments would occur at 3-4 week intervals for as long as operations coincident with yellow starthistle sites are occurring.

5. Relative to landings:

   - Where scotch broom, French broom, or Canada thistle occurrences coincide with landings, either manually (pull with weed wrench or dig up with Pulaski) or mechanically remove broom plants (use heavy equipment) and Canada thistle (use weed whacker) prior to activities occurring on the landings.
   - Dispose of removed broom species by piling and burning on site; dispose of Canada thistle by piling plants outside of where equipment will be operating.
   - Where noxious weed occurrences coincide with landings, site prep and re-vegetate landings consistent with re-vegetation guidelines (McRae 2007) or spread with native

mulch material (e.g. finely masticated material) to a depth of 4-6 inches upon completion of landing-related activities.

- Landing sites with documented noxious weeds will be specified in the noxious weed risk assessment, the plan of operations, and documented on a map.
- For any landings that are added or not specified in the noxious weed risk assessment, site review will be conducted to determine if noxious weeds are present. If weeds are detected, the aforementioned guidelines for weed treatment/removal and rehabilitation will be followed.

6. Import of soil, rock or other foreign material used in any part of this project shall originate from a weed-free source.

Heritage

1. Monitoring for archeological sites would occur throughout project implementation activities with priority being given to road and landing construction and reconstruction, harvesting, and burning activities.
2. Any new or known cultural sites would be protected.
3. Post-clearing surveys would be completed in areas too dense to survey before treatment, per Programmatic Agreement with the State Historic Preservation Office) and the Federal Advisory Council on Historic Preservation, "Interim Protocol for Non-Intensive Fuels and Vegetation Reduction Projects."

Scenery

In Units 9, 70, and 105, all cable corridors w*ould be oriented down river*. Cable corridors would be kept to a minimum width.

Special Use Permits

Utilize contract provisions to protect all authorized special-use permit improvements existing within the project area, including, but not limited to, water transmission lines, water holding tanks, electricity lines, phone lines, fences and access roads.

Public Safety

Traffic controls, cautionary signing and public use restrictions would be implemented during operations and log haul as specified under contract provisions.